DEPARTMENT OF MECHANICAL ENGINEERING

SCOPE OF MECHANICAL ENGINEERING

Mechanical engineering is the evergreen branch among all other branches of engineering. They deal with the concepts of mechanics, thermodynamics, robotics, kinematics, structural mechanics, fluid mechanics, power sector, refrigeration, air conditioning sector and aerospace. There is a great scope of mechanical engineering now-a-days. It is expanding beyond its boundaries and more of interdisciplinary in nature. It is one of the oldest branches of engineering. This field of engineering is the broadest of all engineering fields, job prospects on offer for skilled engineer are plenty and unending. They can find employment in both government as well as private sector. Mechanical engineers are required to design, test, manufacture, install, operate and maintain a wide array of machines and mechanical systems that are used in industries. There is a great scope of job avenues for mechanical engineers in India.

EMERGING AREAS

Aerospace industry- In aerospace industry mechanical engineers are used to do research, design, manufacture, operate and maintain the aircrafts.

Automotive industry- In automotive industry mechanical engineers are used to do designing, manufacturing, distributes and perform marketing of motor vehicles.

Chemical industry- In chemical industry, they covers the oil companies, chemical manufactures and the business to build new chemical plants or to develop new process technologies.

Construction industry- In this field of industry the role of mechanical engineer is to design and build the infrastructure and buildings and its services like heating and ventilation.

Defence industry- In defence industry, they provide the equipments and provide support and services to the armed forces.

Electronics industry- In this field of industry,the role of mechanical engineers is to design and manufacture components and complete equipments for sectors from automotive and the military.

Marine industry- In this field of industry, the role of mechanical engineer is to develop the vessels and help to operate them.

Material and metal industry- In this field of industry, mechanical engineer performs the activities which include developing new material and manufacturing components or end products.

Rail industry- In rail industry, the role of mechanical engineer is to design, construct, manage and maintain the rail system component from train and tracks to electrical power system and train control system.

Utilites industry- In this field of industry, they help to supply the power, water, waste material and telecom.

INTERNAL COMBUSTION ENGINES

In two air standard cycles-one operating on the Otto and the other on the Brayton cycle-air is isentropic compressed from 300 to 450 K. Heat is added to raise the temperature to 600 K in the Otto cycle and to 550 K in the Brayton cycle.

1. If are the coefficient of Otto cycle and Brayton cycles then, η_0 and η_B

(a) η_0 =0.25 , η_B =0.18   (b) η_0 =η_B =0.33

(c) η_0 =0.5 , η_B =0.45   (d) it is not possible to calculate efficiencies unless the temperature after the expansion is given

Ans: b   GATE-ME-2005

2. If W_0 and W_B are work outputs per unit mass, then

(a) $W_0 > W_B$ (b) $W_0 < W_B$ (c) $W_0 = W_B$ (d) It is not possible to calculate the work outputs unless the temperature after the expansion is given

Ans: a   GATE-ME-2005

3. Group I shows different heat addition processes in power cycles. Likewise, Group II shows different removal processes. Group III lists power cycles. Match items from Group I, II and III.

Group I	Group II	Group III
P. Pressure constant	S. Pressure constant	1. Rankine cycle
Q. Volume constant	T. Volume constant	2. Otto cycle
R. Temperature constant	U. Temperature constant	3. Carnot cycle
		4. Diesel cycle
		5. Brayton cycle

(a) P-S-5, R-U-3, P-S-1, Q-T-2,   (b) P-S-1, R-U-3, P-S-4, P-T-2

(c) R-T-3, P-S-1, P-T-4, Q-S-5   (d) P-T-4, R-S-3,P-S-1, P-S-5

Ans: a

4. The stroke and bore of a four stroke spark ignition engine are 250 mm and 200 mm respectively. The clearance volume is 0.001 m^3 . If the specific heat ratio γ=1.4 , the air standard cycle efficiency of the engine is

(a) 46.40 %   (b) 56.10 %   (c) 58.20 %   (d) 62.80 %

Ans: c   GATE-ME-2007

5. Which one of the following is not a necessary assumption for the air standard Otto-cycle?

(a) All processes are both internally as well as externally reversible.

(b) Intake and exhaust processes are constant volume heat rejection processes.

(c) The combustion process is a constant volume heat addition process.

(d) The working fluid is an ideal gas with constant specific heats.

Ans: b

6. In air standard Otto-cycle, the compression ratio is 10. The condition at the beginning of the compression process is 100 kPa and 27°C. Heat added at constant volume is 1500 KJ/Kg, while

700 kJ/kg of heat is rejected during the other constant volume process in the cycle. Specific gas constant for air =0.287 kJ/kg K. the mean effective pressure (in kPa) of the cycle is

(a) 103   (b) 310   (c) 515   (d) 1032

Ans: d

7. A turbo-charged four stroke direct injection diesel engine has a displacement volume of 0.0259 m^3 (25.9 litres). The engine has an output of 950 kW at 2200 rpm. The mean effective pressure in (MPa) is close to

(a) 2   (b) 1   (c) 0.2   (d) 0.1

Ans: a

8. The crank radius of a single-cylinder I.C engine is 60 mm and the diameter of the cylinder is 80 mm. The swept volume of the cylinder in cm^3 is

(a) 48   (b) 96   (c) 302   (d) 603

Ans: d

REFRIGERATION AND AIR CONDITIONING

1. Pick up the wrong statement. A refrigerant should have

(a) Tow specific heat of liquid   (b)high boiling point   (c)high latent heat of vaporization (d)higher critical temperature (e) low specific volume of vapour.

Ans: b

2. A standard ice point temperature corresponds to the temperature of

(a) water at 0°C   (b) ice at - 4°C   (c) solid and dry ice   (d) mixture of ice, water and vapour under equilibrium conditions under NTP conditions (e) mixture of ice and water Under equilibrium conditions.

Ans: e

3. Vapour compression refrigeration is somewhat like

(a) Carnot cycle   (b) Rankine cycle   (c) reversed Carnot cycle (d) reversed Rankine cycle (e) none of the above.

Ans: e

4. Which of the following cycles uses air as the refrigerant?

(a) Ericsson   (b) Stirling   (c) Carnot   (d) Bell-coleman   (e) none of the above.

Ans: d

5. Ammonia-absorption refrigeration cycle requires

(a) very little work input   (b) maximum work input   (c) nearly same work input as for vapour compression cycle   (d) zero work input`   (e)none of the above.

Ans: a

6. An important characteristic of absorption system of refrigeration is

(a) noisy operation   (b) quiet operation   (c) cooling below 0°C (d) very little power consumption (e)its input only in the form of heating.

Ans: b

7. The relative coefficient of performance is

(a) actual COP/theoretical COP (b)theoretical COP/actual COP (c)actual COP x theoretical COP (d)1-actual COP x theoretical COP (e)1-actual COP/theoretical COP.

Ans: a

8. Clapeyron equation is a relation between

(a) temperature, pressure and enthalpy (b) specific volume and enthalpy

(c) temperature and enthalpy (d) temperature, pressure, and specific volume

(e) temperature, pressure, specific volume and enthalpy.

Ans: e

9. Clapeyron equation is applicable for refrigeration at

(a) saturation point of vapour (b) saturation point of liquid (c) sublimation temperature (d) triple point (e) critical point.

Ans: a

10. In vapour compression cycle, the condition of refrigerant is saturated liquid

(a) after passing through the condenser (b) before passing through the condenser

(c) after passing through the expansion throttle valve (d) before entering the expansion valve (e) before entering the compressor.

Ans: a

11. In vapour compression cycle, the condition of refrigerant is very wet vapour

(a) after passing through the condenser (b)before passing through the condenser

(c)after passing through the expansion or throttle valve (d)before entering the expansion valve (e) before entering the compressor.

Ans: e

12. In vapour compression cycle, the condition of refrigerant is high pressure saturated liquid

(a) after passing through the condenser (b) before passing through the condenser

(c) after passing through the expansion or throttle valve (d) before entering the expansion valve (e) before entering the compressor.

Ans: d

13. In vapour compression cycle the condition of refrigerant is superheated vapour

(a) after passing through the condenser (b) before passing through the condenser

(c) after passing through the expansion or throttle valve (d) before [entering the expansion valve (e) before entering the compressor.

Ans: b

14. In vapour compression cycle the condition off refrigerant is dry saturated vapour

(a) after passing through the condenser (b) before passing through the condenser

(c) after passing through the expansion or throttle valve (d) before entering the expansion valve (e) before entering the compressor.

Ans: e

15. The boiling point of ammonia is

(a) -100°C (b) -50°C (c) - 33.3°C (d) 0°C (e) 33.3°C.

Ans: c

16. One ton of refrigeration is equal to the refrigeration effect corresponding to melting of 1000 kg of ice

(a) in 1 hour   (b) in 1 minute(c) in 24 hours   (d) in 12 hours   (e) in 10 hours.

Ans: c

17. One ton refrigeration corresponds to

(a) 50 kcal/min   (b) 50 kcal/min   (c) 80 kcal/min   (d) 80 kcal/hr   (e) 1000 kcal/day.

Ans: a

18. In S.J. unit, one ton of refrigeration is equal to

(a) 210 kJ/min   (b) 21 kJ/min   (c) 420 kJ/min   (d) 840 kJ/min   (e) 105 kJ/min.

Ans: a

19. The vapour compression refrigerator employs the following cycle

(a) Rankine   (b) Carnot   (c) Reversed Rankine   (d) Brayton   (e) Reversed Carnot.

Ans: e

20. Allowable pressure on high-pressure side or ammonia absorption system is of the order of

(a) atmospheric pressure   (b) slightly above atmospheric pressure   (c) 2-4 bars

(d) 5-6 bars   (e) 7-10 bars.

Ans: d

21. The moisture in a refrigerant is removed by

(a) evaporator   (b) safety relief valve   (c) dehumidifier   (d) driers

(e) expansion valve

Ans: d

22. The condensing pressure due to the presence of non-condensable gases, as compared to that actually required for condensing temperatures without non-condensable gases,

(a) will be higher   (b) will be lower   (c) will remain unaffected   (d) may be higher or lower depending upon the nature of non-condensable gases (e) unpredictable.

Ans: a

23. Critical pressure of a liquid is the pressure

(a) above which liquid will remain liquid   (b) above which liquid becomes gas   (c) above which liquid becomes vapour (d) above which liquid becomes solid   (e) at which all the three phases exist together.

Ans: a

24. Critical temperature is' the temperature above which

(a) as will never liquefy   (b) as will immediately liquefy   (c) water will evaporate

(d) water will never evaporate   (e) none of the above.

Ans: a

25. The refrigerant for a refrigerator should have

(a) high sensible heat   (b) high total heat   (c) high latent heat   (d) low latent heat   (e) low sensible heat
Ans: c

26. Rating of a domestic refrigerator is of the order of

(a) 0.1 ton   (b) 5 tons   (c) 10 tons   (d) 40 tons   (e) 100 tons.
Ans: a

27. The COP of a domestic refrigerator

(a) is less than 1   (b) is more than 1   (c) is equal to 1   (d) depends upon the make   (e) depends upon the weather conditions.
Ans: b

28. The domestic refrigerator uses following type of compressor

(a) centrifugal   (b) axial   (c) miniature sealed unit   (d) piston type reciprocating   (e) none of the above.
Ans: d

29. Presence of moisture in a refrigerant affects the working of

(a) compressor   (b) condenser   (c) evaparator   (d) expansion valve.   (e) heat transfer.
Ans: d

30. Refrigeration in aeroplanes usually employs the following refrigerant

(a) CO_2 (b) Freon-11   (c) Freon-22   (d) Ai   (e) none of the above.
Ans: d

31. Domestic refrigerator working on vapour compression cycle uses the following type of expansion device

(a) electrically operated throttling valve   (b) manually operated valve   (c) thermostatic valve
(d) capillary tube   (e) expansion valve.
Ans: d

32. Air refrigeration operates on

(a) Carnot cycle   (b) Reversed Carnot cycle   (c) Rankine cycle   (d) Ericson cycle
(e) Brayton cycle.
Ans: e

33. Air refrigeration cycle is used in

(a) domestic refrigerators   (b) commercial refrigerators   (c) air conditioning   (d)gas
liquefaction   (e) such a cycle does not exist.
Ans: d

34. In a vapour compression cycle, the refrigerant immediately after expansion valve is
(a) liquid   (b) sub-cooled liquid   (c) saturated liquid   (d) wet vapour   (e) dry vapour.
Ans: d

35. The vapour pressure of refrigerant should be
(a) lower than atmospheric pressure   (b) higher than atmospheric pressure   (c) equal to
atmospheric pressure   (d) could be anything (e) none of the above.
Ans: b

36. For better COP of refrigerator, the pressure range corresponding to temperature in evaporator
and condenser must be
(a) small   (b) high   (c) equal   (d) anything   (e) under some
conditions small and under some conditions high
Ans: a

37. The bank of tubes at the back of domestic refrigerator are
(a) condenser tubes   (b) evaporator tubes   (c) refrigerant cooling tubes   (d) capillary tubes
(e) throttling device.
Ans: a

38. The higher temperature in vapour compression cycle occurs at
(a) receiver   (b) expansion valve   (c) evaporator   (d) condenser discharge
(e) compressor discharge.
Ans: e

39. Highest temperature encountered in refrigeration cycle should be

(a) near critical temperature of refrigerant   (b) above critical temperature (c) at critical temperature   (d) much below critical temperature   (e) could be anywhere.
Ans: d

40. In refrigerator, liquid receiver is required between condenser and flow controlling device, if quantity of refrigerant for system is
(a) less than 2 kg   (b)more than or equal to 3.65 kg   (c) more than 10 kg   (d) there is no such consideration   (e) none of the above.
Ans: b

41. Absorption system normally uses the following refrigerant
(a) Freon-11   (b) Freon-22   (c) CO_2 (d) SO_2 (e) ammonia.
Ans: e

42. One of the purposes of sub-cooling the liquid refrigerant is to
(a) reduce compressor overheating   (b) reduce compressor discharge temperature (c) increase cooling effect (d) ensure that only liquid and not the vapour enters the expansion (throttling) valve   (e) none of the above.
Ans: d

43. The value of COP in vapour compression cycle is usually\
(a) always less than unity   (b) always more than unity   (c) equal to unity   (d) any one of the above   (e) none of the above.
Ans: b

44. In a refrigeration system, heat absorbed in comparison to heat rejected is
(a) more   (b) less   (c) same   (d) more for small capacity and less for high capacity   (e) less for small capacity and more for high capacity.
Ans: b

45. Condensing temperature in a refrigerator is the temperature
(a) of cooling medium   (b) of freezing zone   (c) of evaporator   (d) at which refrigerant gas becomes liquid   (e) condensing temperature of ice.
Ans: d

46. Formation of frost on evaporator in refrigerator
(a) results in loss of heat due to poor heat transfer   (b) increases heat transfer rate (c) is immaterial (d) can be avoided by proper design   (e) decreases compressor power
Ans: a

47. In refrigerators, the temperature difference between the evaporating refrigerant and the medium being cooled should be

(a) high, of the order of 25°   (b) as low as possible (3 to 11°C)   (c) zero   (d) any value

(e) none of the above.

Ans: b

48. In a flooded evaporator refrigerator, an accumulator at suction of compressor is used to

(a) collect liquid refrigerant and prevent it from going to compressor   (b) detect liquid in vapour

(c) superheat the vapour   (d) collect vapours   (e) increase refrigeration effect.

Ans: a

49. Accumulators should have adequate volume to store refrigerant charge at least

(a) 10%   (b) 25%   (c) 50%   (d) 75%   (e) 100%.

Ans: c

50. At lower temperatures and pressures, the latent heat of vaporization of a refrigerant

(a) decreases   (b) increases   (c) remains same   (d) depends on other factors

(e) none of the above.

Ans: b

51. A refrigeration cycle operates between condenser temperature of + 27°C and evaporator temperature of- 23°C. The

Cannot coefficient of performance of cycle will be

(a) 0.2   (b) 1.2   (c) 5   (d) 6   (e) 10.

Ans: c

52. Which of the following is not a desirable property of a refrigerant?

(a) high triscibility with oil   (b) low boiling point   (c) good electrical conductor   (d) large latent heat   (e) non-inflammable.

Ans: c

53. In vapour compression refrigeration system, refrigerant occurs as liquid between

(a) condenser and expansion valve   (b) compressor and evaporator   (c) expansion valve and evaporator(d) compressor and condenser   (e) none of the above.

Ans: c

54. Pick up the correct statement about giving up of heat from one medium to other in ammonia absorption system

(a) strong solution to weak solution   (b) weak solution to strong solution   (c) strong solution to ammonia vapour   (d) ammonia vapour to weak solution   (e) ammonia vapour to strong solution.

Ans: b

55. Efficiency of a Carnot engine is given as 80%. If the- cycle direction be reversed, what will be the value of COP of reversed Carnot cycle

(a) 1.25   (b) 0.8   (c) 0.5   (d) 0.25   (e) none of the above.

Ans: d

56. Highest pressure encountered in a refrigeration system should be

(a) critical pressure of refrigerant   (b) much below critical pressure   (c) much above critical pressure   (d) near critical pressure   (e) there is no such restriction.

Ans: b

57. If a heat pump cycle operates between the condenser temperature of +27°C and evaporator temperature of - 23°C, then the Carnot COP will be

(a) 0.2   (b) 1.2   (c) 5   (d) 6   (e) 10.

Ans: d

58. A certain refrigerating system has a normal operating suction pressure of 10 kg/cm gauge and condensing pressure of about 67 kg/cm. The refrigerant used is

(a) Ammonia   (b) Carbon dioxide   (c) Freon   (d) Brine   (e)Hydrocarbon refrigerant.

Ans: b

59. Aqua ammonia is used as refrigerant in the following type of refrigeration system

(a) compression   (b) direct   (c) indirect   (d) absorption   (e) none of the above.

Ans: d

60. If the evaporator temperature of a plant is lowered, keeping the condenser temperature constant, the h.p. of compressor required will be

(a) same   (b) more   (c)less   (d) more/less depending on rating   (e)unpredictable.

Ans: b

61. In a refrigeration cycle, the flow of refrigerant is controlled by

(a) compressor   (b) condenser   (c) evaporator (d) expansion valve   (e) all of the above.

Ans: d

62. Where does the lowest temperature occur in a vapour compression cycle?

(a) condenser   (b) evaporator (c) compressor (d) expansion valve   (e) receiver.

Ans: b

63. The leaks in a refrigeration system using Freon are detected by
(a) halide torch which on detection produces greenish flame lighting   (b) sulphur sticks which on detection gives white smoke   (c) using reagents   (d) smelling   (e)sensing reduction in pressure.
Ans: a

64. Pick up the incorrect statement
(a) lithium bromide used in vapour absorption cycle is nonvolatile   (b) lithium bromide plant can't operate below 0°C   (c) a separator is used in lithium bromide plant to remove the unwanted water vapour by condensing   (d) concentration of solution coming out of lithium bromide generator is more in comparison to that entering the generator   (e) weak solution in liquid heat exchanger gives up heat to the strong solution.
Ans: c

65. The lower horizontal line of the refrigeration cycle plotted on pressure-enthalpy-diagram represents
(a) condensation of the refrigerant vapour   (b) evaporation of the refrigerant liquid
(c) compression of the refrigerant vapour   (d) metering of the refrigerant liquid   (e)none of the above.
Ans: b

66. Mass flow ratio of NH_3 in comparison to Freon-12 for same refrigeration load and same temperature limits is of the order of
(a) 1: 1   (b) 1 : 9   (c) 9 : 1   (d) 1 : 3   (e) 3 : 1
Ans: b

67. Freon group of refrigerants are
(a) inflammable   (b) toxic   (c) non-inflammable and toxic   (d) non-toxic and inflammable   (e) non-toxic and non-inflammable.
Ans: e

68 Ammonia is
(a) non-toxic   (b) non-inflammable   (c) toxic and non-inflammable (d) highly toxic and inflammable   (e) none of the above.
Ans: d

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69. In vapour compression cycle using NH_3 as refrigerant, initial charge is filled at
(a) suction of compressor   (b) delivery of compressor   (c) high pressure side
close to receiver   (d) low pressure side near receiver   (e) anywhere in the cycle.
Ans: c

70. Short horizontal lines on pressure-enthalpy chart show
(a) constant pressure lines   (b) constant temperature lines   (c) constant total heat
lines   (d) constant entropy lines   (e) constant volume lines.
Ans: a

71. On the pressure-enthalpy diagram, condensation and desuperheating is represented by a horizontal line because the Process
involves no change in volume(b) takes place at constant temperature   (c)takes place at
constant entropy   (d)takes place at constant enthalpy   (e) takes place at
constant pressure.
Ans: e

72. One ton of the refrigeration is
(a) the standard unit used in refrigeration problems   (b) the cooling effect produced by
melting 1 ton of ice   (c) the refrigeration effect to freeze 1 ton of water at 0°C into ice at 0°C in
24 hours   (d) the refrigeration effect to produce 1 ton of ice at NTP conditions   (e) the
refrigeration effect to produce 1 ton of ice in 1 hour time.
Ans: c

73. Superheating in a refrigeration cycle
(a) increases COP   (b) decreases COP   (c) COP remains unaltered   (d) other
factors decide COP   (e) unpredictable.
Ans: b

74. For proper refrigeration in a cabinet, if the temperature and vapour pressure difference
between cabinet and atmosphere is high, then
(a) bigger cabinet should be used   (b)smaller cabinet should be used   (c) perfectly
tight vapour seal should be used   (d) refrigerant with lower evaporation temperature
should be used   (e) refrigerant with high boiling point must be used.
Ans: c

75. Choose the correct statement
(a) A refrigerant should have low latent heat (b) If operating temperature of system is low, then
refrigerant with low boiling point should be used   (c) Precooling and subcooling of refrigerant

are same   (d) Superheat and sensible heat of a. refrigerant are same   (e)Refrigerant is inside the lubes in case of a direct-expansion chiller.
Ans: b

76. The suction pipe diameter of refrigerating unit compressor in comparison to delivery side is
(a) bigger   (b) smaller   (c) equal   (d)smaller/bigger depending on capacity
(e)unpredictable.
Ans: a

77. Moisture in Freon refrigeration system causes
(a) ineffective refrigeration   (b) high power consumption   (c) freezing automatic regulating valve   (d) corrosion of whole system   (e) breakdown of refrigerant.
Ans: c

78. The advantage of dry compression is that
(a) it permits higher speeds to be used   (b) it permits complete evaporation in the evaporator   (c) it results in high volumetric and mechanical efficiency (d) all of the above
(e) none of the above.
Ans: d

79. Choose the wrong statement
(a) Temperature of medium being cooled must be below that of the evaporator   (b) Refrigerant leaves the condenser as liquid   (c) All solar thermally operated absorption systems are capable only of intermittent operation   (d) frost on evaporator reduces heat transfer   (e) refrigerant is circulated in a refrigeration system to transfer heat.
Ans: a

80. Under-cooling in a refrigeration cycle
(a) increases COP   (b) decreases COP   (c) COP remains unaltered   (d) other factors decide COP   (e) unpredictable.
Ans: a

81. For obtaining high COP, the pressure range of compressor should be
(a) high   (b) low   (c) optimum   (d) any value   (e) there is no such criterion.
Ans: b

82. The coefficient of performance is the ratio of the refrigerant effect to the
(a) heat of compression   (b) work done by compressor   (c)enthalpy increase in compressor   (d) all of the above   (e) none of the above.
Ans: d

83. The C.O.P of a refrigeration cycle with increase in evaporator temperature, keeping condenser temperature constant, will
(a) increase   (b) decrease   (c) remain unaffected   (d) may increase or decrease depending on the type of refrigerant used   (e) unpredictable.
Ans: a

84. Vertical lines on pressure-enthalpy chart show constant
(a) pressure lines   (b) temperature lines   (c)total heat lines   (d) entropy lines
(e) volume lines.
Ans: c

85. Most of the domestic refrigerators work on the following refrigeration system
(a) vapour compression   (b) vapour absorption (c) carnot cycle   (d)electrolux refrigerator   (e) dual cycle.
Ans: a

86. The general rule for rating refrigeration systems (excepting for CO_2 system) is to approximate following h.p. per ton of refrigeration
(a) 0.1 to 0.5 h.p. per ton of refrigeration   (b) 0.5 to 0.8 h.p. per ton of refrigeration
(c) 1 to 2 h.p. per ton of refrigeration   (d) 2 to 5 h.p. per ton of refrigeration
(e) 5 to 10 h.p. per ton refrigeration.
Ans: c

87. Reducing suction pressure in refrigeration cycle
(a) lowers evaporation temperature   (b) increases power required per ton of refrigeration
(c) lowers compressor capacity because vapour is lighter   (d) reduces weight displaced by piston (e) all of the above.
Ans: e

88. Cooling water is required for following equipment in ammonia absorption plant
(a) condenser   (b) evaporator   (c) absorber   (d) condenser and absorber
(e) condenser, absorber and separator (rectifier).
Ans: e

89. The refrigeration effect in a dry evaporator compared to flooded evaporator in a similar plant is
(a) same   (b) more   (c) less   (d)more or less depending on ambient conditions
(e) unpredictable.

Ans: c

90. The C.O.P. of a refrigeration cycle with lowering of condenser temperature, keeping the evaporator temperature constant, will
(a) increase   (b) decrease   (c) may increase or decrease depending on the type of refrigerant used (d) remain unaffected   (e) unpredictable.
Ans: a

91. Which of the following refrigerants has lowest freezing point?
(a) Freon-12   (b) NH_3 (c) CO_2 (d) Freon-22   (e) SO_2
Ans: d

92. The COP of a vapour compression plant in comparison to vapour absorption plant is
(a) more   (b)less   (c)same   (d)   more/less depending on size of plant
(e) unpredictable.
Ans: a

93. The C.O.P. of a domestic refrigerator in comparison to domestic air conditioner will be
(a) same   (b) more   (c)less   (d)dependent on weather conditions
(e) unpredictable.
Ans: c

94. The evolution of heat of solution takes place in ammonia absorption plant when
(a) ammonia vapour goes into solution   (b)ammonia vapour is driven out of solution
(c) lithium bromide mixes with ammonia   (d)weak solution mixes with strong solution
(e)lithium bromide is driven out of solution.
Ans: a

95. The change in evaporator temperature in a refrigeration cycle, as compared to change in condenser temperature, influences the value of C.O.P.
(a) more   (b) less   (c) equally.   (d) unpredictable   (e) none of the above.
Ans: a

GAS TURBINE

1. The major field(s) of application of gas turbine is (are)
(a) Aviation   (b) Oil and gas industry (c) Marine propulsion (d) All of the above
Ans: d

2. The following is (are) the limitation(s) of gas turbines.

(a) They are not self-starting   (b) Higher rotor speeds   (c) Low efficiencies at part loads   (d) All of the above

(Ans: d)

3. The ratio of heat actually released by 1kg of fuel to heat that would be released by complete perfect combustion, is called

(a) Thermal efficiency   (b) Combustion efficiency   (c) Engine efficiency
(d) Compression efficiency

(Ans: b)

4. The percentage of total energy input appearing as network output of the cycle

(a) Thermal efficiency   (b) Combustion efficiency   (c) Engine efficiency
(d) Compression efficiency

(Ans: a)

5. The following method(s) can be used to improve the thermal efficiency of open cycle gas turbine plant

(a) Inter-cooling   (b) Reheating   (c) Regeneration   (d) All of the above

(Ans: d)

6. Which of the following is (are) used as starter for a gas turbine

(a) An Internal combustion engine   (b) A steam turbine   (c) An auxiliary electric motor
(d) All of the above

(Ans: d)

7. Gas turbine is shut down by

(a) Turning off starter   (b) Stopping the compressor   (c) Fuel is cut off from the combustor   (d) Any of the above

(Ans: c)

8. In gas turbine, intercooler is placed

(a) before low pressure compressor (b) in between low pressure compressor and high pressure compressor   (c) in between high pressure compressor and turbine   (d) None of the above

(Ans: b)

9. In gas turbine, the function of Re-heater is to

(a) Heat inlet air   (b) Heat exhaust gases   (c) Heat air coming out of compressor
(d) Heat gases coming out of high pressure turbine

(Ans: d)

10. The 'work ratio' increases with

(a) increase in turbine inlet pressure   (b) decrease in compressor inlet temperature
(c) decrease in pressure ratio of the cycle   (d) all of the above

(Ans: d)

11. In the centrifugal compressor, total pressure varies

(a) directly as the speed ratio   (b) square of speed ratio   (c) cube of the speed ratio

(d) Any of the above

(Ans: b)

12. The efficiency of multistage compressor is _____ than a single stage.

(a) lower   (b) higher   (c) equal to   (d) Any of the above

(Ans: a)

13. In centrifugal compressor, power input varies as

(a) directly as the speed ratio   (b) the square of speed ratio   (c) the cube of the speed ratio   (d) Any of the above

(Ans: c)

14. In the _____ heat transfer takes place between the exhaust gases and cool air.

(a) Intercooler   (b) Re-heater   (c) Regenerator   (d) Compressor

(Ans: c)

15. In centrifugal compressor, the diffuser converts

(a) Kinetic energy into pressure energy   (b) Pressure energy into Kinetic energy

(c) Kinetic energy into Mechanical energy   (d) Mechanical energy into Kinetic energy

(Ans: a)

Steam nozzle and steam turbine

1. A steam nozzle covert

(a) heat energy of steam into kinetic energy   (b) potential energy of steam into kinetic energy

(c) kinetic energy of steam into mechanical energy   (d) heat energy of steam into mechanical energy

(Ans:a)

2. The smallest section in nozzle is known as

(a) throat   (b) venture   (c) convergent   (d) divergent

(Ans:a)

3. Which of the following is not true for steam nozzles?

(a) In convergent nozzle there is divergent after throat   (b) Convergent-divergent nozzle has higher expansion ratio   (c) Convergent-divergent nozzle produces steam at higher velocities as compared to a convergent nozzle   (d) All of the above

(Ans:a)

4. Which of the following is true for steam flow through nozzle?

(a) The flow is assumed to be adiabatic   (b) The steam loses its pressure and heat while passing through nozzle   (c) The work done is equal to the adiabatic heat drop   (d) All of the above

(Ans:d)

5. The maximum velocity of steam at throat is

(a) $\{2(n/n+1) p_1 v_1\}^{1/2}$ (b) $\{2(n/n+1) p_1 v_1\}^{3/2}$ (c) $\{2(n/2n+1) p_1 v_1\}^{1/2}$ (d) $\{2(n/2n+1) p_1 v_1\}^{3/2}$

Where, n=1.135 for saturated steam and 1.3 for superheated steam. p_1= initial pressure of steam, v_1=initial volume of 1 kg of steam at pressure p_1

(Ans:a)

6. The correct order in which energy is converted from one form to another, in steam power plant is

Kinetic energy – potential energy – mechanical energy – electrical energy

Kinetic energy – potential energy– electrical energy – mechanical energy

potential energy – Kinetic energy –mechanical energy – electrical energy

mechanical energy – potential energy – Kinetic energy –electrical energy

(Ans:c)

7. The steam turbine can be governed by the following methods except

(a) Throttle governing   (b) Nozzle governing   (c) By pass governing

(d) Reaction governing

(Ans:d)

8. In reaction turbine the fixed blade

(a) alter the direction of steam   (b) allow steam to expand to a larger velocity

(c) functions as same of nozzle   (d) All of the above

(Ans:d)

9. The following are the method for compounding except

(a) velocity compounding   (b) pressure compounding   (c) volume compounding

(d) reaction turbine

(Ans:c)

10. In velocity compounding, steam is passed through

fixed nozzle-moving blades-fixed blades-moving blades

fixed nozzle-moving blades-fixed nozzles-moving blades

moving blades-fixed nozzles- fixed blades-moving blades

fixed blades-moving blades-fixed nozzles- moving blades

(Ans:a)

11. In pressure compounding, steam is passed through

fixed nozzle-moving blades-fixed blades-moving blades

fixed nozzle-moving blades-fixed nozzles-moving blades

moving blades-fixed nozzles- fixed blades-moving blades

fixed blades-moving blades-fixed nozzles- moving blades

(Ans:b)

12. In pressure velocity compounding

(a) moving blades are used   (b) fixed nozzles are used   (c) fixed blades are used

(d)All of the above are used

(Ans:d)

13. Which of the following is a steam turbine?

(a) De laval   (b) Kaplan   (c) Francis   (d) Bulb

(Ans:a)

14. Maximum efficiency in impulse steam turbine is

(a) $2\cos\alpha$ (b) $\cos2\alpha$ (c) $\cos(\alpha/2)$ (d) $\cos^2\alpha$

Where α is nozzle angle

(Ans:d)

15. Degree of reaction is given by

Heat drop in moving blades / total heat drop in the stage

Heat drop in fixed blades / total heat drop in the stage

Heat drop in moving blades / Heat drop in fixed blades

total heat drop in the stage / Heat drop in fixed blades

(Ans:a)

16. Maximum efficiency in reaction steam turbine is

(a) $2\cos^2\alpha/(1+\cos^2\alpha)$ (b) $\cos2\alpha/(1+\cos^2\alpha)$ (c) $\cos(\alpha/2)/(1+\cos^2\alpha)$

(d) $\cos\alpha/(1+\cos^2\alpha)$

Where α is nozzle angle

(Ans:a)

Nuclear power plant

1. Which of the following fuel material occurred naturally?

(a) U^{235} (b) Pu^{239} (c) Pu^{241} (d) U^{-233}

(Ans:a)

2. The function of a moderator is to

(a) absorb the part of the Kinetic energy of the neutrons   (b) extract the heat   (c) reflect back some of the neutrons   (d) start the reactor

(Ans:a)

3. Which of the following is not used as moderator?

(a) water   (b) heavy water   (c) graphite   (d) boron

(Ans:d)

4. When the control rods are inserted into the reactor, K (Multiplication factor) becomes

(a) 0   (b) >1   (c) 1   (d) <1

(Ans:d)

5. The function of coolant is to

(a) extract heat from reactor   (b) slow down neutrons   (c) control the reaction

(d) reflect the neutrons

(Ans:a)

6. Which of the following has highest moderating ratio?

(a) D_2O (b) H_2O (c) Carbon   (d) Helium

(Ans:a)

7. The reactor performs the following function as that of _____ in a steam power plant.

(a) furnace   (b) turbine   (c) electric generator   (d) boiler

(Ans:a)

8. In pressurized water reactor

(a) light water is used as coolant   (b) light water is used as coolant and moderator

(c) heavy water is used as coolant   (d) heavy water is used as coolant and moderator

9. In which of the following reactors, heat exchanger is not used?

(a) Pressurized water reactor   (b) Boiling water reactor   (c) CANDU reactor

(d) Gas cooled reactor

(Ans:b)

10. In Canadium Deuterium Uranium reactor (CANDU), heavy water is used as

(a) Moderator   (b) Coolant   (c) Neutron reflector   (d) All of the above

(Ans:d)

11. In Canadium Deuterium Uranium reactor (CANDU), the control rods are made of

(a) Cadmium   (b) Boron steel   (c) Graphite   (d) Beryllium

(Ans:a)

12. Gas cooled reactors are _____ moderated.

(a) Light water   (b) Heavy water   (c) Graphite   (d) Beryllium

(Ans:c)

In Sodium-Graphite reactor, sodium is used as

(a) Coolant   (b) Moderator   (c) Reflector   (d) All of the above

(Ans:a)

In which of the following, an intermediate heat exchanger is used

(a) Pressurized water reactor   (b) Boiling water reactor   (c) Gas cooled reactor

(d) Liquid metal cooled reactor

(Ans:d)

Moderator is not required in

(a) Pressurized water reactor   (b) Gas cooled reactor   (c) Boiling water reactor

(d) Breeder reactor

(Ans:d)

Thermal power plant

1. The following is the correct order of energy conversion in thermal power plants

(a) Chemical energy – Mechanical energy – Electrical energy

(b) Mechanical energy – Chemical energy – Electrical energy

(c) Wind energy – Mechanical energy – Electrical energy

(d) Heat energy – Electrical energy – Mechanical energy

(Ans: a)

2. In thermal power plant, turbine is placed

(a) before boiler   (b) in between boiler and generator   (c) after generator

(d) any of the above

(Ans: b)

3. In the steam condensing power plants

(a) The amount of energy extracted per kg of steam is increased

(b) the steam, converted into water, can be re-circulated with the help of pump

(c) Both (A) and (B)

(d) None of the above

(Ans: c)

4. In thermal power plants, the dust of flue gases is trapped by

(a) Precipitator   (b) Economizer   (c) Superheater   (d) Air preheater

(Ans: a)

5. The path of flue gases in Thermal power plant is

(a) Boiler – Economizer – Superheater– Air preheater

(b) Boiler – Superheater – Air preheater – Economizer

(c) Boiler – Air preheater – Superheater – Economizer

(d) Boiler – Superheater – Economizer – Air preheater

(Ans: d)

6.The following is not a component of Thermal power plant

  (a) Condenser   (b) Cooling tower   (c) Turbine   (d) Fuel tank

(Ans: d)

7. With the increase in _____ the efficiency obeys the 'law of diminishing returns'

(a) Pressure   (b) Temperature   (c) Volume   (d) All of the above

(Ans: a)

8. With the increase in _____ the efficiency obeys the 'straight line law'

(a) Pressure   (b) Temperature   (c) Volume   (d) All of the above

(Ans: b)

9. Fluid fuels are handled by

(a) burners   (b) stokers   (c) both (a) and (b)   (d) None of the above

(Ans: C)

10. For steam boilers, the fuel(s) is (are) mainly

(a) Bituminous coal   (b) Fuel oil   (c) Natural gas (d) All of the above

11. The most common method(s) used for burning of coal is (are)

(a) Stroker firing   (b) Pulverized fuel firing   (c) both (a) and (b)   (d) None of the above

(Ans: c)

12-A 'stroker' is a power operated fuel ___ mechanism

(a) Burning   (b) Feeding   (c) Handling   (d) Storage

(Ans: b)

13.The spreader stroker, secondary air is supplied

(a) through holes

(b) through nozzles

(c) from bottom side

(d) any of the above

(Ans: b)

14. The following is not a pulverized fuel burner.
(a) Tangential burner (b) Turbulent burner   (c) Cyclone burner   (d) Radial burner
(Ans: d)

15. In which of the following type of burner, liquid fuel is raised by capillary action?
(a) Wick burners   (b) Re-circulating burner   (c) Rotating cup burner   (d) All of the above
(Ans: a)

16. A Fluidized bed may be defined as the bed of _____ particles.
(a) Liquid   (b) Solid   (c) Both (a) and (b)   (d) None of the above
(Ans: b)

17. The following is (are) ash handling system(s)
(a) Hydraulic system   (b) Pneumatic system   (c) Steam jet system   (d) All of the above
(Ans: d)

18. The following is dry type dust collectors
(a) Spray type   (b) Packed type   (c) Impingement type   (d) cyclone separator
(Ans: d)

19. The major constituent of fly ash is
(a) Silicon dioxide   (b) Aluminium oxide   (c) Calcium oxide   (d) Magnesium oxide
(Ans: a)

20-The draught produced by the chimney if due to the ____ difference between the column of hot gases inside the chimney and the cold air outside.
(a) Temperature   (b) Potential   (c) Density   (d) None of the above
(Ans: c)

Boiler

1. The following are the fire tube boilers except
(a) Cochran   (b) Lancashire   (c) Locomotive   (d) Babcock and Wilcox
(Ans:d)

2. The following are the water tube boilers except
(a) Stirling   (b) Lancashire   (c) Yarrow   (d) Babcock and Wilcox
(Ans:b)

3. Which of the following is a low pressure boiler?
(a) Babcock and Wilcox   (b) Velox   (c)   Lamont   (d) Cochran
(Ans:d)

4. In fire tube boilers, pressure is limited to
(a) 16 bar   (b) 32 bar   (c) 48 bar   (d) 64 bar
(Ans:a)

5. The following is an accessory of a boiler.
(a) Pressure gauge   (b) Safety valve   (c) Fusible plug   (d) Superheater

(Ans:d)

6. The following is a boiler mounting.

(a) Feed pump   (b) Water level gauge   (c) Economizer   (d) Superheater

(Ans:b)

7. The impurities are removed from boiler with the help of

(a) Safety valve   (b) Blow off cock   (c) Stop valve   (d)Fusible plug

(Ans:b)

8. The boiler consists of horizontal fire tubes is

(a) Cochran   (b) Cornish   (c) Babcock and Wilcox   (d) Stirling

(Ans:a)

9. The boiler commonly used in sugar mills is

(a) Cochran   (b) Cornish   (c) Lancashire   (d) Stirling

(Ans:c)

10. Which of the following is a bent tube boiler?

(a) Cochran   (b) Cornish   (c) Lancashire   (d) Stirling

(Ans:d)

11. The boiler works on a forced circulation is

(a) Cochran   (b) Lamont   (c) Lancashire   (d) Stirling

(Ans:b)

12. The following boiler makes use of pressurized combustion

(a) Velox   (b) Benson   (c) Loeffler   (d) Lamont

(Ans:a)

13. Which of the following is used to heat the feed water by using waste heat of flue gases?

(a) Air preheater   (b) Superheater   (c) Economizer   (d) Steam separator

(Ans:c)

14. _____ is generally placed after the economizer

(a) Air preheater   (b) Superheater   (c) Evaporator   (d) None of the above

(Ans:a)

HYDRO POWER

1. A hydraulic turbine converts the potential energy of water into

(a) Kinetic energy   (b) Heat energy   (c) Thermal energy   (d) Gravitational energy

(Ans:a)

2. Impulse turbine requires

(a) High head and low discharge   (b) High head and high discharge   (c) Low head and low discharge   (d) Low head and high discharge

(Ans:a)

3. Reaction turbine requires

(a) High head and low discharge   (b)High head and high discharge   (c) Low head and low discharge   (d) Low head and high discharge

(Ans:d)

4. Which of the following is an impulse turbine?

(a) Pelton turbine   (b) Francis turbine   (c) Kaplan turbine   (d) Propeller turbine

(Ans:a)

5. Pelton turbine is _____

(a) Tangential flow   (b) Radial flow   (c) Axial flow   (d) Mixed flow

(Ans:a)

6. Kaplan turbine is _____

(a) Mixed flow   (b) Tangential flow   (c) Radial flow   (d) Axial flow

(Ans: b)

7. Francis turbine is _____

(a) Tangential flow   (b) Radial flow   (c) Axial flow   (d) Mixed flow

(Ans:d)

8. If the blades of the axial flow turbine are fixed, these are called

(a) Kaplan turbine   (b) Propeller turbine   (c) Francis turbine   (d) Pelton turbine

(Ans:b)

9. In mixed flow turbines, the water enters the blades ____ and comes out _____

(a) radially, axially   (b) radially, radially   (c) axially, radially   (d) axially, axially

(Ans:a)

10. The specific speed of a turbine is

(a) $N\sqrt{P} / H^{1/4}$ (b) $N\sqrt{P} / H^{3/4}$ (c) $N\sqrt{P} / H^{5/4}$ (d) $N\sqrt{P} / H^{7/4}$

Where N = Normal working speed (r.p.m.), P = Power output, H=Net head (in metres)

(Ans:c)

11. In reaction turbines, the runner utilizes

(a) Kinetic energy   (b) Potential energy   (c) Both kinetic energy and potential energy

(d) None of the above

(Ans:c)

12. The function of draft tube is to

(a) increase the pressure of the exiting fluid   (b) increase the Kinetic energy of exiting fluid   (c) allow the turbine to be set below tail water level   (d) keep pressure at runner outlet above the atmospheric pressure

(Ans:a)

13. Cavitation occurs at

(a) high pressure   (b) low pressure   (c) atmospheric pressure   (d) none of the above

(Ans:a)

14. In cavitation, the material fails

by fatigue   (b) due to creep   (c) due to impact load   (d) due to fracture

(Ans:a)

THEORY OF MACHINES

1. Which of the following disciplines provides study of inertia forces arising from the combined effect of the mass and the motion of the parts
(a) theory of machines
(b) applied mechanics
(c) mechanisms
(d)kinetics
(e)kinematics.   Ans: d

2. Which of the following disciplines provides study of relative motion between the parts of a machine
(a) theory of machines
(b) applied mechanics
(c) mechanisms
(d)kinetics
(e)kinematics.   Ans: e

3.Which of the following disciplines provides study of the relative motion between the parts of a machine and the forces acting on the parts
(a) theory of machines
(b) applied mechanics
(c) mechanisms
(d) kinetics
(e) kinematics.   Ans: a

4.The type of pair formed by two elements which are so connected that one is constrained to turn or revolve about a fixed axis of another element is known as
(a)turning pair
(b)rolling pair
(c)sliding pair
(d)spherical pair
(e)lower pair.   Ans: a

5.Which of the following is a lower pair
(a) ball and socket
(b) piston and cylinder
(c) cam and follower
(d) (a) and (b) above
(e) belt drive.   Ans: d

6.If two moving elements have surface contact in motion, such pair is known as
 (a)sliding pair

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(b)rolling pair

(c)surface pair

(d)lower pair

(e)higher pair. Ans: e

7.The example of lower pair is

(a) shaft revolving in a bearing

(b) straight line motion mechanisms

(c) automobile steering gear

(d) all of the above

(e) none of the above. Ans: d

8.Pulley in a belt drive acts as

(a)cylindrical pair

(b)turning pair

(c)rolling pair

(d)sliding pair

(e)surface pair. Ans: c

9.The example of rolling pair is

(a) bolt and nut

(b) lead screw of a lathe

(c) ball and socket joint

(d) ball bearing and roller bearing

(e) all of the above. Ans: d

10.Any point on a link connecting double slider crank chain will trace a

(a)straight line

(b)circle

(c)ellipse

(d)parabola

(e)hyperbola. Ans: c

11.The purpose of a link is to

(a) transmit motion

(b) guide other links

(c) act as a support

(d) all of the above

(e) none of the above. Ans: d

12.A universal joint is an example of

(a)higher pair

(b)lower pair

(c)rolling pair

(d)sliding pair

(e)turning pair. Ans: b

13. Rectilinear motion of piston is converted into rotary by

(a)cross head

(b)slider crank

(c)connecting rod

(d)gudgeon pin

(e)four bar chain mechanism.   Ans: b

14.Pitch point on a cam is

(a) any point on pitch curve

(b) the point on cam pitch curve having the maximum pressure angle

(c) any point on pitch circle

(d) the point on cam pitch curve having the minimum pressure angle

(e) none of the above.   Ans: b

15.The values of velocity and acceleration of piston at near dead center for a slider-crank mechanism will be

(a) 0, and more than $\omega^2 r$

(b) 0, and less than ωV

(c) 0, 0

(d)ωr, 0

(e)none of the above.   Ans: a

16.The example of spherical pair is

(a) bolt and nut

 (b)lead screw of a lathe

(c)ball and socket joint

(d)ball bearing and roller bearing

(e)none of the above.   Ans: c

17. Cross head and guides form a

(a)lower pair

(b)higher pair

(c)turning pair

(d)rolling pair

(e)sliding pair.   Ans: e

19.A circular bar moving in a round hole is an example of

(a) incompletely constrained motion

(b) partially constrained motion

(c) completely constrained motion

(d)successfully constrained motion

(e)none of the above   Ans: a

20.If some links are connected such that motion between them can take place in more than one direction, it is called

(a) incompletely constrained motion

(b) partially constrained motion

(c) completely constrained motion

(d) successfully constrained motion

(e) none of the above.   Ans: a

21.If there are L number of links in a mechanism then number of possible inversions is equal to

(a)L + 1

(b)L - 1

(c)L

(d)L + 2

(e)L - 2.   Ans: c

22. Kinematic pairs are those which have two elements that

(a)have line contact

(b)have surface contact

(c)permit relative motion

(d)are held together

(e)have dynamic forces.   Ans: c

24. The lower pair is a

(a)open pair

(b)closed pair

(c)sliding pair

(d)point contact pair

(e)does not exist.   Ans: b

25. Automobile steering gear is an example of

(a)higher pair

(b)sliding pair

(c)turning pair

(d)rotary pair

(e)lower pair.   Ans: e

26. In higher pair, the relative motion is

(a)purely turning

(b)purely sliding

(c)purely rotary

(d)purely surface contact

(e)combination of sliding and turning.   Ans: e

27. Which of the following has sliding motion

(a)crank

(b)connecting rod

(c)crank pin

(d)cross-head

(e)cross head guide.   Ans: d

28.The example of higher pair is

(a) belt, rope and chain drives

(b) gears, cams

 (c)ball and roller bearings

(d)all of the above

(e)none of the above.   Ans: d

29.Which of the following mechanism is obtained from lower pair

(a) gyroscope

(b) pantograph

(c) valve and valve gears

(d) generated straight line motions

(e) all of the above.   Ans: e

30.Which of the following would constitute a link

(a)piston, piston rings and gudgeon pin

(b)piston, and piston rod

(c)piston rod and cross head

(d)piston, crank pin and crank shaft

(e)piston, piston-rod and cross head.   Ans: e

31.The Scott-Russell mechanism consists of

(a) sliding and turning pairs

(b) sliding and rotary pairs

(c) turning and rotary pairs

(d) sliding pairs only

(e) turning pairs only.   Ans: a

32.Davis steering gear consists of

(a)sliding pairs

(b)turning pairs

(c)rolling pairs

(d)higher pairs

(e)lower pairs.   Ans: a

33. Ackermann steering gear consists of

(a)sliding pairs

(b)turning pairs

(c)rolling pairs

(d)higher pairs

(e)lower pairs.   Ans: b

34.A completely constrained motion can be transmitted with .

(a) 1 link with pin joints

(b) 2 links with pin joints

(c) 3 links with pin joints

(d) 4 links with pin joints

(e) all of the above.   Ans: d

36. Oldham's coupling is the

(a)second inversion of double slider crank chain

(b)third inversion of double slider crank chain

(c)second inversion of single slider crank chain

(d)third inversion of slider crank chain

(e)fourth inversion of double slider crank chain.   Ans: b

37.Sense of tangential acceleration of a link

(a) is same as that of velocity

(b) is opposite to that of velocity

(c) could be either same or opposite to velocity

(d) is perpendicular to that of velocity

(e) none of the above.   Ans: c

38.A mechanism is an assemblage of

(a)two links

(b)three links

(c)four links or more than four links

(d)all of the above

(e)none of the above.   Ans: c

39. The number of links in pantograph mechanism is equal to

(a)2

(b)3

(c)4

 (d)5

(e)6.   Ans: c

40.Elements of pairs held together mechanically is known as

(a) closed pair

(b) open pair

(c) mechanical pair

(d) rolling pair

(e) none of the above.   Ans: a

41.Shaft revolving in a bearing is the following type of pair

(a) lower pair

(b) higher pair

(c) spherical pair,

(d) cylindrical pair

(e) bearing pair.   Ans: a

42.Rectangular bar in a rectangular hole is the following type of pair

(a) completely constrained motion

(b) partially constrained motion

(c) incompletely constrained motion

(d) freely constrained motion

(e) none of the above.   Ans: a

43.A foot step bearing and rotor of a vertical turbine form examples of

(a) incompletely constrained motion

(b) partially constrained motion

(c) completely constrained motion

(d) successfully constrained motion

(e) none of the above.   Ans: b

44.A slider crank chain consists of following numbers of turning and sliding pairs

(a) I, 3

(b) 2, 2

(c) 3, 1

(d) 4, 0

(e) 0, 4.   Ans: c

46.Relationship between the number of links (L) and number of pairs (P) is

(a) P = 2L-4

(b) P = 2L + 4

(c) P = 2L+2

(d) P = 2L-2

(e) P = L-4.   Ans: c

2.49.In problem 47, the chain is unconstrained when

(a) L.H.S. = R.H.S.

(b) L.H.S. > R.H.S.

(c) L.H.S. < R.H.S.

(d) there is no such criterion for checking above requirement

(e)none of the above.   Ans: c

50.In problem 47, the chain is constrained when

(a) L.H.S. = R.H.S.

(b) L.H.S. < R.H.S.

(c) L.H.S. > R.H.S.

(d) there is no such criterion for checking above requirement

(e) none of the above.   Ans: a

51.The tendency of a body to resist change from rest or motion is known as

(a) mass

(b) friction

(c) inertia

(d) resisting force

(e) resisting torque.   Ans: c

53.The type of coupling used to join two shafts whose axes are neither in same straight line nor parallel, but intersect is

(a) flexible coupling

(b) universal coupling

(c) chain coupling

(d) Oldham's coupling

(e)American coupling.   Ans: b

54.The advantage of the piston valve over D-slide valve is that in the former case

(a) wear is less

(b) power absorbed is less

(c) both wear and power absorbed are low

(d) the pressure developed being high provides tight sealing

(e) there is overall economy of initial cost, maintenance and operation.   Ans: c

55.Flexible coupling is used because

(a)it is easy to disassemble

(b)it is easy to engage and disengage

(c)it transmits shocks gradually

(d)it prevents shock transmission and eliminates stress reversals

(e)it increases shaft life.   Ans: d

56.With single Hooke's joint it is possible to connect two shafts, the axes of which have an angular misalignment up to

(a) 10°

(b) 20°

(c) 30°

(d) 40°

(e) 60°.   Ans: d

57.The Hooke's joint consists of :

(a)two forks

(b)one fork

(c)three forks

(d)four forks

(e)five forks.   Ans: a

58. The Klein's method of construction for reciprocating engine mechanism

(a)is based on acceleration diagram

(b)is a simplified form of instantaneous center method

(c)utilises a quadrilateral similar to the diagram of mechanism for reciprocating engine

(d)enables determination of Corioli's component

(e)none of the above.   Ans: c

59.It is required to connect two parallel shafts, the distance between whose axes is small and variable. The shafts are coupled by

(a) universal joint

(b) knuckle joint

(c)Oldham's coupling

(d)flexible coupling

(e)electromagnetic coupling.   Ans: c

60.The e.g. of a link in any mechanism would experience

(a) no acceleration

(b) linear acceleration

(c) angular acceleration

(d) both angular and linear accelerations

(e) none of the above.   Ans: d

61.In elliptical trammels

(a)all four pairs are turning

(b)three pairs turning and one pair sliding

(c)two pairs turning and two pairs sliding

(d)one pair turning and three pairs sliding

(e)all four pairs sliding.   Ans: c

62.In automobiles the power is transmitted from gear box to differential through

(a) bevel gear

(b) universal joint

(c) Hooke's joint

(d) Knuckle joint

(e) Oldham's coupling.   Ans: c

63.The indicator using Watt mechanism is known as

(a)Thompson indicator

(b)Richard indicator

(c)Simplex indicator

 (d)Thomson indicator

(e)none of the above.   Ans: b

64.The Ackermann steering mechanism is preferred to the Davis type in automobiles because

(a) the former is mathematically accurate

(b) the former is having turning pair

(c) the former is most economical

(d) the former is most rigid

(e) none of thfr above.   Ans: b

65. Transmission of power from the engine to the rear axle of an automobile is by means of

(a)compound gears

(b)worm and wheel method

(c)Hooke's joint

(d)crown gear

(e)bevel gears.   Ans: c

66.When a ship travels in a sea, which of the effect is more dangerous

(a) steering

(b) pitching

(c) rolling

(d) all of the above

(e) none of the above.   Ans: b

67.In an ideal machine, the output as compared to input is

(a)less

(b)more

(c)equal

(d)may be less or more depending on efficiency

(e)always less.   Ans: c

68.Governor is used in automobile to

(a) decrease the variation of speed

(b) to control

(c) to control SN

(d) all of the above

(e) none of the above.   Ans: c

69.In gramophones for adjusting the speed of the turntable, the following type of governor is commonly employed

(a) Hartung governor

(b) Wilson Hartnell governor

(c) Pickering governor

(d) Inertia governor

(e) none of the above.   Ans: c

70.For fluctuating loads, welsuited bearing is

(a)ball bearing

(b)roller bearing

(c)needle roller bearing

(d)thrust bearing

(e)sleeve bearing.   Ans: c

71.Crowning on pulleys helps

(a) in increasing velocity ratio

(b) in decreasing the slip of the belt

(c) for automatic adjustment of belt posi-tion so that belt runs centrally

(d) increase belt and pulley life

(e) none of the above.   Ans: c

72.Idler pulley is used

(a)for changing the direction of motion of the belt

(b)for applying tension

(c)for increasing -velocity ratio

(d)all of the above

(e)none of the above.   Ans: b

73.In multi-V-belt transmission, if one of the belt is broken, we have to change the

(a) broken belt

(b) broken belt and its adjacent belts

(c) all the belts

(d) there is no need of changing any one as remaining belts can take care of transmission of load

 (e)all the weak belts.   Ans: c

74.The moment on the pulley which produces rotation is called

(a) inertia

(b)momentum

(c)moment of momentum

(d)work

(e)torque.   Ans: e

75. Creep in belt drive is due to

(a)material of the pulley

(b)material of the belt

(c)larger size of the driver pulley

(d)uneven extensions and contractions due to varying tension

(e)expansion of belt.   Ans: d

76.TJie horse power transmitted by a belt is dependent upon

(a) tension on tight side of belt

(b) tension on slack side of belt

(c) radius of pulley

(d) speed of pulley

(e) all of the above.   Ans: e

77.The locus of a point on a thread unwound from a cylinder will be

(a) a straight line

(b) a circle

(c) involute

(d) cycloidal

(e) helix.   `   Ans: c

78.To transmit power from one rotating shaft to another whose axes are neither parallel nor intersecting, use

(a) spur gear

(b) spiral gear

(c) bevel gear

(d) worm gear

(e) crown gear. ` Ans: d

79.For S.H.M. cam, the acceleration of the follower at the ends of the stroke and aimidstroke respectively, is

(a) maximum and zero

(b) zero and maximum

(c) minimum and maximum

(d) zero and minimum

(e) maximum and minimum. Ans: a

80.Throw of a cam is the maximum distance of the follower from

(a)base circle

(b)pitch circle

(c)root circle

(d)prime circle

(e)inner circle. Ans: a

81.To obviate axial thrust, following gear drive is used

(a) double helical gears having opposite teeth

(b) double helical gears having identical teeth

(c) single helical gear in which one of the teeth of helix angle a is more

(d) mutter gears

(e) none of the above. Ans: a

82.Which of the following is false statement in respect of differences between machine and structure

(a) Machines transmit mechanical work, whereas structures transmit forces

(b) In machines, relative motion exists be-tween its members, whereas same does hot exist in case of structures

(c) Machines modify movement and work, whereas structures modify forces

(d) Efficiency of machines as well as structures is below 100%

(e) Machines are run by electric motors, but structures are not. Ans: d

83.If D1 and D2 be the diameters of driver and driven pulleys, then belt speed is proportional to

(a)D1/D2

(b)D2/D1

(C) D1-D2.

(d)D1

(e)D1+D2. Ans: d

84.Typewriter constitutes

(a) machine

(b) structure

(c) mechanism

(d) inversion

(e) none of the above.   Ans: c

85.Lower pairs are those which have

(a)point or line contact between the two elements when in motion

(b)surface contact between the two elements when in motion

(c)elements of pairs not -held together mechanically

(d)two elements that permit relative motion

(e)none of the above.   Ans: b

86.A point on a link connecting double slider crank chain traces a

(a) straight line

(b) circle

(c) parabola

(d) hyperbola

(e) ellipse.   Ans: e

87.A pantograph is a mechanism with

(a)lower pairs

(b)higher pairs

(c)rolling pairs

(d)turning pairs   Ans: a

88. Kinematic pairs are those which have

(a)point or line contact between the two elements when in motion

(b)surface contact between the two ele-ments when in motion

(c)elements of pairs not held together mechanically

(d)two elements that permit relative mo-tion

(e)none of the above.   Ans: d

89.If the opposite links of a four bar linkage are equal, the links will always form a

(a) triangle

(b) rectangle

(c) parallelogram

(d) pentagon

(e) trapezoid.   Ans: c

90.Higher pairs are those which have

(a)point or line contact between the two elements when in motion

(b)surface contact between the two ele-ments when in motion

(c)elements of pairs not held together mechanically

(d)two elements that permit relative motion

(e)none of the above.   Ans: a

91.A cam mechanism imparts following motion

(a) rotating

(b) oscillating

(c) reciprocating

(d) all of the above

(e) none of the above.   Ans: d

92.A cam with a roller follower would con stitute following type of pair

(a)lower pair

(b)higher pair

(c)open pair

(d)close pair

(e)cam pair.   Ans: b

93.The approximate straight line mechanism is a

(a) four bar linkage

(b) 6 bar linkage

(c)8 bar linkage

(d)3 bar linkage

(e)5 bar linkage.   Ans: a

94. "Open pairs are those which have

(a)point or line contact between the two elements when in motion

(b)surface contact between the two ele-ments when in motion

(c)elements of pairs not held together mechanically

(d)two elements that permit relative motion

(e)none of the above.   Ans: c

95.Peaucellier mechanism has

(a) eight links

(b) six links

(c) four links

(d) twelve links

(e) five links.   Ans: a

96.Hart mechanism has

(a)eight links

(b)six links

(c)four links

(d)twelve links

(e)five links.   Ans: b

97. A chain comprises of 5 links having 5 joints. Is it kinematic chain ?

(a)yes

(b)no

(c)it is a marginal case

(d)data are insufficient to determine it

(e)unpredictable. Ans: b

99. The main disadvantage of the sliding pair is that it is

(a)bulky

(b)wears rapidly

(c)difficult to manufacture

(d)(a) and (b) above

(e)(a) and (c) above. Ans: d

100.For a kinematic chain to be considered as mechanism

(a) two links should be fixed

(b) one link should be fixed

(c) none of the links should be fixed

(d) there is no such criterion

(e) none of the above. Ans: b

101.An eccentric sheave pivoted at one point rotates and transmits oscillatory motion to a link whose one end is pivoted and other end is connected to it. This mechanism has

(a) 2 links

(b) 3 links

(c) 4 links

(d) 5 links

(e) none of the above. Ans: c

102.Whitworth quick return mechanism is obtained by inversion of

(a)slider crank mechanism

(b)kinematic chain

(c)five link mechanism

(d)roller cam mechanism

(e)none of the above. Ans: a

103.In its simplest form, a cam mechanism consists of following number of links

(a) 1

(b) 2

(c) 3

(d) 4

(e) none. Ans: c

104.Which of the following mechanisms produces mathematically an exact straight line motion

(a) Grasshopper mechanism

(b) Watt mechanism

(c) Peaucellier's mechanism

(d) Tchabichiff mechanism

(e) Ackermann mechanism. Ans: c

105. In a mechanism, usually one link is fixed.

If the fixed link is changed in a kinematic chain, then relative motion of other links

40

(a)will remain same

(b)will change

(c)could change or remain unaltered depending oh which link is fixed

(d)will not occur

(e)none of the above.   Ans: a

106.A kinematic chain requires at least

(a) 2 links and 3 turning pairs

(b) 3 links and 4 turning pairs

(c) 4 links and 4 turning pairs

(d) 5 links and 4 turning pairs

(e) none of the above.   Ans: c

107.In a darg link quick return mechanism, the shortest link is always fixed. The sum of the shortest and longest link is

(a) equal to sum of other two

(b) greater than sum of other two

(c) less than sum of other two

(d) there is no such relationship

(e) none of the above.   Ans: c

108.The following is the inversion of slider crank chain mechanism

(a)Whitworth quick return mechanism

(b)hand pump

(c)oscillating cylinder engine

(d)all of the above

(e)none of the above.   Ans: d

109.Kinematic pairs are those which have

(a) two elements held together mechani-cally

(b) two elements having relative motion

(c) two elements having Coroili's com-ponent

(d) minimum of two instantaneous centres

(e) all of the above.   Ans: b

110 A typewriter mechanism has 7 number of binary joints, six links and none of higher pairs. The mechanism is

(a)kinematically sound

(b)not sound

(c)soundness would depend upon which link is kept fixed

(d)data is not sufficient to determine same

(e)none of the above.   Ans: a

111.In a four-bar chain it is required to give an oscillatory motion to the follower for a continuous rotation of the crank. For the lengths of 50 mm of crank and 70 mm of the follower,

determine theoretical maximum length of coupler. The distance between fixed pivots of crank and followers is

(a) 95 mm

(b) slightly less than 95 mm

(c) slightly more than 95 mm

(d) 45 mm

(e) none of the above.   Ans: b

112. In above example, the minimum length of the coupler will be

(a) 45 mm

(b) slightly less than 45 mm

(c) slightly more than 45 mm

(d) 95 mm

(e) none of the above.   Ans: c

113. In S.H.M., acceleration is proportional to

(a) velocity

(b) displacement

(c) rate of change of velocity

(d) all of the above

(e) none of the above.   Ans: b

114. For simple harmonic motion of the of follower, a cosine curve represents

(a) displacement diagram

(b) velocity diagram

(c) acceleration diagram

d) all of the above

(e) none of the above.   Ans: c

115. In S.H.M., the velocity vector w.r.t. displacement vector

(a) leads by 90°

(b) lags by 90°

(c) leads by 180°

(d) are in phase

(e) could be anywhere.   Ans: a

116. A body having moment of inertia o:m2 is rotating at 210 RPM and r with another body at rest having I 40kg m^2. The resultant speed after ing will be

(a) 90 RPM

(b) 100 RPM

(c) 80 RPM

(d) data are insufficient

(e) none of the above.   Ans: a

117. Inertia force acts

(a)perpendicular to the accel< force

(b)along the direction of accel* force

(c)opposite to the direction of ace ing force

(d)in any direction w.r.t. accel* force depending on the magnit two

(e)none of the above.   Ans: c

118.The frequency of oscillation at compared to earth will be

(a) 6 times more

(b) 6 times less

(c) 2.44 times more

(d) 2.44 times,less

(e) 36 times less.   Ans: d

119.Polar moment of inertia (IP) of ac disc is to ht determined by suspen by a wire and noting the frequei oscillations (/)

(a)Ipocf

(b)Ipocf

(C)Ip oc j

(d)Ipoc-

(e)none of the above.   Ans: c

120.If the radius of gyration of a compound pendulum about an axis through e.g. is more, then its frequency of oscillation will be

(a)less

(b)more

(c)same

(d)data are insufficient to determine same

(e)none of the above.   Ans: a

121.The Bifilar suspension method is used to determine

(a) natural frequency of vibration

(b) position of balancing weights

(c) moment of inertia

(d) centripetal acceleration'

(e) angular acceleration of a body.   Ans: c

122.Which is the false statement about the properties of instantaneous centre

(a)at the instantaneous center of rotation, one rigid link rotates instantaneously relative to another for the configuration of mechanism considered

(b)the two rigid links have no linear velocities relative to each other at the instantaneous centre

(c)the two rigid links which have no linear velocity relative to each other at this center have the same linear velocity to the third rigid link

(d)the double centre can be denoted either by 02\ or Ol2, but proper selection should be made

(e)none of the above.   Ans: d

123.Instantaneous center of rotation of a link in a four bar mechanism lies on

(a) right side pivot of this link

(b) lift side pivot of this link

(c) a point obtained by intersection on extending adjoining links

(d) can't occur

(e)none of the above.   Ans: c

124.The number of links and instantaneous centers in a reciprocating engine mechanism are

(a) 4, 4

(b) 4, 5

(c) 5, 4

(d) 6, 4

(e) 4, 6.   Ans: e

125.According to Kennedy's theorem, if three bodies have plane motions, their instantaneous

centers lie on

(a) a triangle

(b) a point

(c) two lines

(d) a straight line

(e) a curve.   Ans: d

126.In a rigid link OA, velocity of A w.r.t. will be

(a)parallel to OA

(b)perpendicular to OA

(c)at 45° to OA

(d)along AO

(e)along OA.   Ans: b

127.Two systems shall be dynamically equivalent when

(a) the mass of two are same

(b) e.g. of two coincides

(c) M.I. of two about an axis through e.g. is equal

(d) all of the above

(e) none of the above.   Ans: d

128.The velocity of any point in mechanism relative to any other point on the mechanism on

velocity polygon is represented by the line

(a) joining the corresponding points

(b) perpendicular to line as per (a)

(c) not possible to determine with these data

(d) at 45° to line as per (a)

(e) none of the above.   Ans: a

129. The absolute acceleration of any point P in a link about center of rotation 0 is

(a) along PO

(b) perpendicular to PO

(c) at 45° to PO

(d) along OP

(e) none of the above. Ans: e

130. Angular acceleration of a link can be determined by dividing the

(a) centripetal component of acceleration with length of link

(b) tangential component of acceleration with length of link

(c) resultant acceleration with length of link

(d) all of the above

(e) none of the above. Ans: b

131. Corioli's component of acceleration exists whenever a point moves along a path that has

(a) linear displacement

(b) rotational motion

(c) tangential acceleration

(d) centripetal acceleration

(e) none of the above. Ans: b

132. The direction of Corioli's component of acceleration is the direction

(a) of relative velocity vector for the two coincident points rotated by 90° in the direction of the angular velocity of the rotation of the link

(b) along the centripetal acceleration

(c) along tangential acceleration

(d) along perpendicular to angular velocity

(e) none of the above. Ans: a

133. In a shaper mechanism, the Corioli's component of acceleration will

(a) not exist

(b) exist

(c) depend on position of crank

(d) unpredictable

(e) none of the above. Ans: b

134. The magnitude of tangential acceleration is equal to

(a) velocity2 x crank radius

(b) velocityvcrankradius

(c) (velocity/crankradius)

(d) velocity x crank radius2

(e) none of the above. Ans: b

135. Tangential acceleration direction is

(a) along the angular velocity

(b) opposite to angular velocity

(c)may be any one of these

(d)perpendicular to angular velocity

(e)none of the above.   Ans: c

136.Corioli's component is encountered in

(a) quick return mechanism of shaper

(b) four bar chain mechanism

(c) slider crank mechanism

(d) (a) and (c) above

(e) all of the above.   Ans: a

137.Klein's construction gives a graphica construction for

(a) slider-crank mechanism

(b) velocity polygon

(c) acceleration polygon

(d) four bar chain mechanism

(e) angular acceleration.   Ans: c

138.Klein's construction can be used to determine acceleration of various parts when the crank is at

(a) inner dead centre

(b) outer dead centre

(c) right angles to the link of the stroke

(d) at 45° to the line of the stroke

(e) all of the above.   Ans: e

139.The number of centers in a crank driven slider crank mechanism are

(a)0

(b)2

(c)4

(d)6

(e)may be any number depending upon position of mechanism.   Ans: b

140. Corioli's component acts

(a)perpendicular to sliding surfaces

(b)along sliding surfaces

(c)somewhere in between above two

(d)unpredictable

(e)none of the above.   Ans: a

141.The sense of Corioli's component is such that it

(a) leads the sliding velocity vector by 90°

(b) lags the sliding velocity vector by 90°

(c) is along the sliding velocity vector

(d) leads the sliding velocity vector by 180°

(e) none of the above.   Ans: a

142. Klein's construction can be used when
(a) crank has a uniform angular velocity
(b) crank has non-uniform velocity
(c) crank has uniform angular acceleration
(d) crank has uniform angular velocity and angular acceleration
(e) there is no such criterion.   Ans: a

143. Klein's construction is useful to determine
(a) velocity of various parts
(b) acceleration of various parts
(c) displacement of various parts
(d) angular acceleration of various parts
(e) all of the above.   Ans: b

144. A circle passing through the pitch point with its center at the center of cam axis is known as
(a) pitch circle
(b) base circle
(c) prime circle
(d) outer circle
(e) cam circle.   Ans: c

145. The pressure angle of a cam depends upon
(a) offset between centre lines of cam and follower
(b) lift of follower
(c) angle of ascent
(d) sum of radii of base circle and roller follower
(e) all of the above.   Ans: e

146. Cam size depends upon
(a) base circle
(b) pitch circle
(c) prime circle
(d) outer circle
(e) none of the above.   Ans: a

147. Cylindrical cams can be classified as
(a) circular
(b) tangent
(c) reciprocating
(d) all of the above
(e) none of the above.   Ans: e

148. The maximum value of the pressure angle in case of cam is kept as
(a) 10°
(b) 14°
(c) 20°

(d) 30°

(e) 25°.   Ans: d

149.For the same lift and same angle of ascent, a smaller base circle will give

(a) a small value of pressure angle

(b) a large value of pressure angle

(c) there is no such relation with pressure angle

(d) something else

(e) none of the above is true.   Ans: b

150.Cam angle is defined as the angle

(a)during which the follower returns to its initial position

(b)of rotation of the cam for a definite displacement of the follower

(c)through which, the cam rotates during the period in which the follower remains in the highest position

(d)moved by the cam from the instant the follower begins to rise, till it reaches its highest position

(e)moved by the can from beginning of i ascent to the termination of descent.   Ans: b

PRODUCTION PLANNING AND CONTROL

1.Work study is concerned with

(a) Improving present method and finding standard time

(b)motivation of workers

(c)improving production capability

(d)improving production planning and control

(e)all of the above.

Ans: a

2.Basic tool in work study is

(a)graph paper

(b)process chart

(c)planning chart

(d)stop watch

(e)analytical mind.

Ans: d

3.What does symbol 'O' imply in work study

(a)   operation

(b)   inspection

(c)transport
(d)delay/temporary storage
(e)none of the above.
Ans: a

4.What does symbol 'D' imply in work study
(a)   inspection
(b)   transport
(c)delay/temporary storage
(d)permanent storage
(e)none of the above.
Ans: c

5.What does symbol 'V' employ in work study
(a)operation
(b)inspection
(c)delay/ temporary Storage
(d)permanent storage
(e)none of the above.
Ans: d

6.Material handling in automobile industry is done by
(a)overhead crane
(b)trolley
(c)   belt conveyor
(d)all of the above
(e)none of the above.
Ans: a

7.String diagram is used when
(a)team of workers is working at a place
(b)material handling is to be done
(c)idle time is to be reduced
(d)all of the above
(e)none of the above.
Ans: a

8.Work study is most useful
(a)where production activities are involved
(b)in judging the rating of machines

(c)in improving industrial relations

(d)in judging the output of a man and improving it

(e)where men are biggest contributor to success of a project.

Ans: a

9.Micromotion study is

(a)enlarged view of motion study

(b)analysis of one stage of motion study

(c)minute and detailed motion study

(d)subdivision of an operation into therbligs and their analysis

(e)motion study of small components upto mirco-seconds.

Ans: d

10.In micromotion study, therblig is described by

(a) a symbol

(b) anevent

(c) anactivity

(d) micro motions

(e) standard symbol and colour.

Ans: e

11.The allowed time for a job equals standard time plus

(a)policy allowance

(b)interference allowance

(c)process allowance

(d)learning allowance

(e)unforeseen allowance.

Ans: a

12.Micromotion study involves following number of fundamental hand motions

(a) 8

(b) 12

(c) 16

(d) 20

(e) 24

Ans: c

13.The standard time for a job is

(a)total work content

(b)base time + relaxation time

(c)total work content + basic time

(d)total work content + delay contingency allowance

(e)total work content + relaxation time.

Ans: d

14.Work study is done with the help of

(a) process chart

(b) material handling

(c) stop watch

(d) all of the above

(e) none of the above.

Ans: c

15.Scheduling gives information about

(a)when work should start and how much work should be completed during a certain period

(b)when work should complete

(c)that how idle time can be minimized

(d)proper utilisation of machines

(e)none of the above.

Ans: a

16.Expediting function consists in keeping a watch on

(a)operator's activity

(b)flow of material and in case of trouble locate source of trouble

(c)minimising the delays

(d)making efficient despatching

(e)none of the above.

Ans: b

17.Choose the wrong statement Time study is used to

(a)determine overhead expenses

(b)provide a basis for setting piece prices or incentive wages

(c)determine standard costs

(d)determine the capability of an operator to handle the number of machines

(e)compare alternative methods.

Ans: a

18.Job evaluation is the method-of determining the

(a)relative worth of jobs

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(b)skills required by a worker

(c)contribution of a worker

(d)contribution of a job

(e)effectiveness of various alternatives.

Ans: a

19.Micromotion study is

(a)analysis of a man-work method by using a motion picture camera with a timing device in the field of view

(b)motion study* observed on enhanced time intervals

(c)motion study of a sequence of operations conducted systematically

(d)study of man and machine conducted simultaneously

(e) scientific, analytically procedure for determining optimum work method.

Ans: a

20.Per cent idle time for men or machines is found by

(a)work sampling

(b)time study

(c)method study

(d)work study

(e)ABC analysis.

Ans: a

21.TMU in method time measurement stands for

(a) time motion unit

(b) time measurement unit

(c)time movement unit

(d)technique measurement unit

(e)time method unit.

Ans: b

22.Time study is

(a)the appraisal, in terms of time, of the value of work involving human effort

(b)machine setting time

(c)time taken by workers to do a job

(d)method of fixing time for workers

(e)method of determining the personnel Requirement.

Ans: a

23.Work sampling observations are taken on the basis of

(a)detailed calculations
(b)convenience
(c)table of random numbers
(d)past experience
(e)fixed percentage of daily production.
Ans: c

24.One time measurement unit (TMU) in method time measurement system equals
(a) 0.0001 minute
(b) 0.0006 minute
(c) 0.006 minute
(d) 0.001 minute
(e) 0.06 minute.
Ans: b

25.Basic motion time study gives times for basic motions in ten thousandths of
(a) second
(b) minute
(c) hour
(d) day
(e) none of the above.
Ans: b

26.Choose the wrong statement. Motion study is used for
(a)improving a work method
(b)improvising a work method
(c)designing a work method
(d) providing a schematic framework
(e) reducing inventory costs.
Ans: e

27.Gnatt chart provides information about the
(a)material handling
(b)proper utilisation of manpower
(c)production schedule
(d)efficient working of machine
(e)all of the above.
Ans: c

28.ABC analysis deals with
(a)analysis of process chart

(b)flow of material
(c)ordering schedule of job
(d)controlling inventory costs money
(e)all of the above.
Ans: d

29.Process layout is employed for
(a) batch production
(b)continuous type of product
(c)effective utilisation of machines
(d)all of the above
(e)none of the above.
Ans: a

30.For a product layout the material handling equipment must
(a)have full flexibility
(b)employ conveyor belts, trucks, tractors etc.
(c)be a general purpose type
(d)be designed as special purpose for a particular application
(e)arranging shops according to specialization of duties.
Ans: d

31.Travel charts provide
(a)an idea of the flow of materials at various stages
(b)a compact estimate of the handling which must be done between various work sections
(c)the information for changes required in rearranging material handling equipment
(d)an approximate estimate of the handling which must be done at a particular station
(g) solution to handling techniques to achieve most optimum^ results.
Ans: b

32.Product layout is employed for
(a)batch production
(b)continuous production
(c)effective utilization of machine
(d)all of the above
(e)none of the above.
Ans: b

33.The most important objective behind plant layout is
(a) overall simplification, safety of integration

(b)economy in space

(c)maximum travel time in plant

(d)to provide conveniently located shops

(e)to avoid any bottlenecks.

Ans: a

34.The process layout is best suited where

(a)specialisation exists

(b)machines are arranged according to sequence of operation

(c)few number of non-standardised units are to be produced

(d)mass production is envisaged

(e)bought out items are more.

Ans: c

35.A low unit cost can be obtained by following

(a) product layout

(b) functional layout

(c)automatic material handling equipment

(d)specialisation of operation

(e)minimum travel time plan and com¬pact layout.

Ans: a

36.Military organisation is known as

(a)line organisation

(b)line and staff organisation

(c)functional organisation

(d)all of the above

(e)none of the above.

Ans: a

37.The main disadvantage of line organisation is

(a)top level executives have to do excessive work

(b)structure is rigid

(c)communication delays occur

(d)all of the above

(e)none of the above.

Ans: d

38.The main advantage of line organisation is its

(a)effective command and control

(b)defined responsibilities at all levels
(c)rigid discipline in the organisation
(d)ability of quick decision at all levels
(e)all of the above.
Ans: e

39.Frederick W. Taylor introduced a system of working known as
(a)line organisation
(b)line and staff organisation
(c)functional organisation
(d)effective organisation
(e)none of the above.
Ans: c

40.The salient feature of functional organisation is
(a)strict adherence to specification
(b)separation of planning and design part
(c)each individual maintains functional efficiency
(d)work is properly planned and distributed
(e)all of the above.
Ans: e

41.The most popular type of organisation used for Civil Engineering Constructions is
(a) line organisation
(b)line and staff organisation
(c)functional organisation
(d)effective organisation
(e)none of the above.
Ans: a

42.Templates are used for
(a)a planning layout
(b)flow of material
(c)advancing a programme in automatic machines
(d)copying complicated profiles
(e)none of the above.
Ans: a

43.In steel plant the most important system for materials handling is
(a) conveyors

(b) cranes and hoists

(c) trucks

(d) locos

(e) none of the above.

Ans: d

44.Routing prescribes the

(a)flow of material in the plant

(b)proper utilization of man power

(c)proper utilization of machines

(d)inspection of final product

(e)none of the above.

Ans: a

45.Queuing theory deals with problems of

(a)material handling

(b)reducing the waiting time or idle Jajme

(c)better utilization of man services

(d)effective use of machines

(e)none of the above.

Ans: b

46.Standard time is defined as

(a)normal time + allowances

(b)normal time + idle time + allowances

(c)normal time + idle time

(d)only normal time for an operation

(e)none of the above.

Ans: a

47.Father of industrial engineering is

(a) Jeck Gilberth

(b) Gnatt

(c) Taylor

(d) Newton

(e) none of the above.

Ans: b

48.The grouping of activities into organisational units is called

(a)corporate plans

(b)higher level management
(c)functional authority
(d)departmentatidn
(e)company policy.
Ans: d

49.Which of the following organisation is preferred in automobile industry
(a) functional organisation
(b)line organisation
(c)staff organisation
(d)line and staff organisations
(e)scalar organisation.
Ans: d

50.Which of the following organisations is best suited for steel plants
(a)functional organisation
(b)line organisation
(c)staff organisation
(d)line, staff and functional organisations
(e)scalar organisation.
Ans: d

51.The wastage of material in the store is taken into account by the following method in the evaluation of the material issued from the store
(a)inflated system
(b)primary cost method
(c)current value method
(d)fixed price method
(e)variable price method.
Ans: a

52.Which of the following is independent of sales forecast
(a)productivity
(b)inventory control
(c)production planning
(d)production control
(e)capital budgeting.
Ans: a

53.Gnatt charts are used for
(a)forecasting sales

(b)production schedule

(c)scheduling and routing

(d)linear programming

(e)none of the above.

Ans: b

54.Inventory management consists of

(a)effective running of stores

(b)state of merchandise methods of stroing and maintenance etc.

(c)stock control system

(d) all of the above

(e) none of the above.

Ans: d

55.Gnatt charts provide information about

(a)break even point analysis

(b)production schedule

(c)material handling layout

(d)determining selling price

(e)value analysis.

Ans: b

56.Inventory control in production, planning and control aims at

(a) achieving optimisation

(b)ensuring against market fluctuations

(c)acceptable customer service at low capital investment in inventory

(d) discounts allowed in bulk purchase

(e) regulate supply and demand.

Ans: c

57.In inventory control, the economic order quantity is the

(a)optimum lot size

(b)highest level of inventory

(c)lot corresponding to break-even point

(d)capability of a plant to produce

(e)none of the above.

Ans: a

58.Statistical quality control techniques are based on the theory of

(a)quality

(b) statistics

(c) probability

(d) all of the above

(e) none of the above.

Ans: c

59.The appellate authority for an industrial dispute is

(a) management

(b)labour court

(c)high court/supreme court

(d)board of directors

(e)president.

Ans: c

60.Under the Apprenticeship Act

(a)all industries have to necessarily train the apprentices

(b)industries have to train apprentices ac-cording to their requirement

(c)all industries employing more than 100 workers have to recruit apprentices

(d)only industries employing more than 500 workers have to recruit apprentices

(e)all industries other than small scale industries have to train apprentices.

Ans: d

61.Standing orders which are statutory are applicable to

(a)all industries

(b)all process industries and thermal power plants

(c)only major industries

(d)only key industries

(e)all industries employing more than 100 workers.

Ans: e

62.Acceptance sampling is widely used in

(a)batch production

(b)job production

(c)mass production

(d)all of the above

(e)none of the above.

Ans: c

63.The technique of value analysis can be applied to

(a)complicated items only
(b)simple items only
(c)crash programmer items only
(d)cost consciousness items only
(e)any item.
Ans: e

64.The term 'value' in value engineering refers to
(a)total cost of the product
(b)selling price of the product
(c)utility of the product
(d)manufactured cost of the product
(e)depreciation value.
Ans: c

65.Value engineering aims at finding out the
(a)depreciation value of a product
(b)resale value of a product
(c)major function of the item and accomplishing the same at least cost without change in quality
(d)break even point when machine re-quires change
(e)selling price of an item.
Ans: c

66.In the perpetual inventory control, the material is checked when it reaches its
(a)minimum value
(b)maximum value
(c)average value
(d)alarming value
(e)original value.
Ans: a

67.According to MAPI formula, the old machine should be replaced by new one when
(a)CAM < DAM
(b)CAM > DAM
(c)CAM = DAM
(d)there is no such criterion
(e)none of the above.
(CAM = Challenger's Adverse minimum DAM = Defender's Adverse minimum)
Ans: a

68.Merit Rating is the method of determining worth of

(a)a job

(b)an individual employee

(c)a particular division in workshop

(d) machine

(e) overall quality.

Ans: b

69.Material handling and plant location is analysed by

(a) Gnatt chart

(b) bin chart

(c) Emerson chart

(d)travel chart

(e) activity chart.

Ans: d

70.Works cost implies

(a) primary cost

(b) factory cost

(c) factory expenses

(d) primary cost + factory expenses

(e)none of the above.

Ans: d

71.Motion study involves analysis of

(a)actions of operator

(b)layout of work place

(c)tooling and equipment

(d) all of the above

(e) none of the above.

Ans: a

72.Standard time as compared to normal time is

(a) greater

(b) smaller

(c)equal

(d)there is no such correlation

(e)none of the above.

Ans: a

73. Pick up the incorrect statement about advantages of work sampling
(a) permits a fine breakdown of activities and delays
(b) simultaneous study of many operators may be made by a single observer
(c) calculations are easier, method is economical and less time consuming
(d) no time measuring devices are generally needed
(e) asoperators are not watched for long periods, chances of obtaining misleading results are less.
Ans: a

74. In which of the following layouts, the lines need to the balanced
(a) process layout
(b) product layout
(c) fixed position layout
(d) plant layout
(e) functional layout.
Ans: b

75. Which of the following layouts is suited for mass production
(a) process layout
(b) product layout
(c) fixed position layout
(d) plant layout
(e) functional layout.
Ans: b

76. Which of the following layouts is suited to job production
(a) process layout
(b) product layout
(c) fixed position layout
(d) plant layout
(e) functional layout.
Ans: a

77. The employees provident fund act is applicable to
(a) all industries
(b) all industries other than small and medium industries
(c) volunteers
(d) the industries notified by Government
(e) all major industries.

Ans: d

78.The amount deducted from the salary of workers towards employees provident fund is
(a)credited into reserves of company
(b)deposited in nationalised bank
(c)deposited in post office
(d)deposited in the account of worker with employer or Reserve Bank of India
(e)deposited in the account of worker with Provident Fund Commissioner.
Ans: e

79.The deductions for, employees provident fund start
(a)immediately on joining the service
(b)after 60 days of joining the service
(c)after 100 days of joining the service
(d)after 240 days of joining the service
(e)after one year of joining the service.
Ans: d

80.Father of time study was
(a) F.W. Taylor
(b) H.L. Gantt
(c) F.B. Gilberfh
(d) R.M. Barnes
(e) H.B. Maynord.
Ans: a

81.Tick the odd man out
(a) Taylor
(b) Drucker
(c) McGregor
(d) Galileo
(e) Parkinson.
Ans: d

82.Current assets include
(a)manufacturing plant
(b)manufacturing plant and equipment
(c)inventories
(d)common stock held by the firm

(e)all of the above.
Ans: a

83.The objective of time study is to determine the time required to complete a job by
(a) fast worker
(b) average worker
(c) slow worker
(d) new entrant
(e) any one of the above.
Ans: b

84.Job enrichment technique is applied to
(a)reduce labour monotony
(b)overcome boring and demotivating work
(c)make people happy
(d)all of the above
(e)none of the above.
Ans: d

85.For ship vessel industry the following layout is best suited
(a)process layout
(b)product layout
(c)fixed position layout
(d)plant layout
(e)functional layout.
Ans: c

86.In Halsey 50-50 plan, output standards are established
(a)by time study
(b)from previous production records
(c)from one's judgement
(d)all of the above
(e)none of the above.
Ans: b

87.Routing is essentiaI in the following type of industry
(a)assembly industry
(b)process industry
(c)job order industry

(d)mass production industry

(e)steel industry.

Ans: a

88.An optimum project schedule implies

(a)optimum utilization of men, machines and materials

(b)lowest possible cost and shortest possible time for project

(c)timely execution of project

(d)to produce best results under given constraints

(e)realistic execution time, minimum cost and maximum profits.

Ans: b

89.Graphical method, simplex method, and transportation method are concerned with

(a) break-even analysis

(b) value analysis

(c) linear programming

(d)queing theory

(e)tnaterial handling.

Ans: c

90.Which one of the following represents a group incentive plan ?

(a)Scanlon Plan

(b)Rowan Plan

(c)Bedaux Plan

(d)Taylor Differential Piece Rate System

(e)Halsey Premium Plan.

Ans: a

91.In the Halsey 50-50 plan, the following are rewarded more

(a)past good workers

(b)past poor workers

(c)past average workers

(d)all of the above

(e)none of the above.

Ans: b

92.In the Halsey system of wage incentive plan, a worker is

(a)paid as per efficiency

(b)ensured of minimum wages

(c)not paid any bonus till his efficiency

(d)never a loser

(e)induced to do more work.

Ans: b

93.'Value' for value engineering and analysis purposes is defined as

(a)purchase value

(b)saleable value

(c)depreciated value

(d) present worth

(e) function/cost.

Ans: e

94.Break-even analysis can be used for

(a)short run analysis

(b)long run analysis

(c)average of above two run analysis

(d)there is no such criterion

(e)none of the above.

Ans: a

95.CPM has following time estimate

(a)one time estimate

(b)two time estimate

(c)three time estimate

(d)four time estimate

(e)nil time estimate.

Ans: a

96.PERT has following time estimate

(a)one time estimate

(b)two time estimate

(c)three time estimate

(d)four time estimate

(e)nil time estimate.

Ans: c

97.In Lincoln plan (one type of group incentive plan), the amount of the profit which an

.employee receives in addition to the guaranteed basic pay/wages, is based on :

(a)a standard rating system
(b)a merit rating system
(c)a job evaluation system
(d)his individual performance
(e)all of the above.
Ans: b

98.Which of the following incentive plansrensures a part of the swing to the worker and rest to the employer
(a)Emerson efficiency plan
(b)Taylor plan
(c)Halsey premium plan
(e) Gilberth plan.
Ans: c

99.Which of the following is not wage incentive plan
(a)differential piece rate system
(b)Rowan plan
(c) Emerson plan
(d) Taylor plan
(e) Halsey plan.
Ans: d

100.Which of the following plans motivates supervisors by paying a premium on time saved by workers
(a) Halsey plan
(b) Rowan plan
(c) Haynes plan
(d) Emerson's plan
(e) Taylor's plan.
Ans: c

101.The time required to complete a task is established and a bonus is paid to the worker for every hour he saves from the established time required. This type of incentive plan is known as
(a)Rowan Plan
(b)Bedaux Plan
(c)Taylor Differential Piece rate system
(d)Halsey Premium plan
(e) Day work plan.
Ans: d

102.One of the basic essentials of an incentive plan is that

(a)a differential piece rate system should exist

(b)minimum wages should be guaranteed

(c)provide incentive to group efficiency performance

(d)all standards should be based on optimum standards of production

(e)all standards should be based on time studies.

Ans: e

103.In the Emerson efficiency plan, a worker receives only his daily wage and no bonus is paid till his efficiency reaches

(a) 50%

(b) 661%

(c) 75%

(d) 80%

(e) 90%.

Ans: b

104.According to Rowan plan, if H = hourly rate, A = actual time and S = standard time, then wages will be

(a)HA

(b)HA + (S~A) HA

(c)HA + ^^-H

(d)HA + ^^-H

(e)HA + ^^-HA.

Ans: b

105.If a worker gets a daily wage of Rs HA, then according to Rowan plan, his maximum daily earnings can be

(a) 2 HA

(b) 1.33 HA

(c) 1.5 HA

(d) 1.15 HA

(e) 2.5 HA.

Ans: a

106.In A-B-C control policy, maximum attention is given to

(a)those items which consume money

(b)those items which are not readily available

(c)those x items which are in more demand

(d)those items which consume more money

(e)proper quality assurance program-mes.

Ans: d

107.Which one of the following represents a group incentive plan ?

(a)Halsey Premium Plan

(b)Bedaux Plan

(c)Lincoln Plan

(d)Rowan Plan

(e)Taylor Plan.

Ans: c

108.The mathematical technique for finding the best use of limited resources in an optimum manner is known as

(a)operation research

(b)linear programming

(c)network analysis

(d)queuing theory

(e)break-even analysis.

Ans: b

109.In order that linear programming techniques provide valid results

(a)relations between factors must be linear (positive)

(b)relations between factors must be linear (negative)

(c)(a) or (b)

(d)only one factor should change at a time, others remaining constant

(e)none of the above.

Ans: c

110.The linear programming techniques can be applied successfully to industries like

(a)iron and steel

(b)food processing

(c)oil and chemical

(d)banking

(e)all of the above.

Ans: e

111. The simplex method is the basic method for

(a) value analysis

(b) operation research

(c)linear programming
(d)model analysis
(e)none of the above.
Ans: c

112.The two-bin system is concerned with
(a)ordering procedure
(b)forecasting sales
(c)production planning
(d) despatching and expediting
(e) none of the above.
Ans: a

113.The time required to complete a job is established and a bonus is paid to the worker based on the exact % of time saved. This type of incentive plan is known as
(a)Dry work Plan
(b)Halsey Premium Plan
(c)Taylor Plan
(d)Bedaux Plan
(e)Rowan Plan.
Ans: e

114. Replacement studies are made on the fol-lowing basis:
(a)annual cost method
(b)rate of return method
(c)total life average method
(d)present worth method
(e) any one of the above.
Ans: e

115.String diagram is used
(a)for checking the relative values of various layouts
(b)when a group of workers are working at a place
(c)where processes require the operator to be moved from one place to another
(d)all of the above
(e)none of the above.
Ans: d

116.Which of the following depreciation system ensures that the interest be charged on the cost of machine asset every year

on the book value, but the rate of depreciation every year remains constant
(a)sinking fund method
(b)straight line method
(c)A-B-C charging method
(d)annuity charging method
(e)diminishing balance method.
Ans: d

117.Bin card is used in
(a)administrative wing
 (b)workshop
(c) foundry shop
(d) stores
(e) assembly shop.
Ans: d

118.Slack represents the difference between the
(a)latest allowable time and the normal expected time
(b)latest allowable time and the earliest expected time
(c)proposed allowable time and the earliest expected time
(d)normal allowable time and the latest expected time
(e)project initiation tune and actual starting time.
Ans: b

119.PERT and CPM are
(a)techniques to determine project status
(b)decision making techniques
(c)charts which increase aesthetic appearance of rooms
(d)aids to determine cost implications of project
(e)aids to the decision maker.
Ans: e

120.A big advantage of PERT over Gantt charts is that in the former case
(a)activities and events are clearly shown
(b)early start and late finish of an activity are clearly marked
(c)activity times are clear
(d)critical path can be easily determined
(e)inter-relationship among activities is clearly shown.
Ans: e

121.CPM is the
(a)time oriented technique
(b)event oriented technique
(c)activity oriented technique
(d)target oriented technique
(e)work oriented technique.
Ans: c

122.PMTP (predetermined motion time systems) include
(a)MTM (method time measurement)
(b)WFS (work factor systems)
(c)BNTS (basic motion time study)
(d)all of the above
(e)none of the above
Ans: d

123.Work study comprises following main techniques
(a)method study and work measurement
(b)method study and time study
(c)time study and work measurement
(d)method study and job evaluation
(e)value analysis and work measurement.
Ans: a

124. Which of the following equations is not in conformity with others
(a)organisation performance x motivation = profits
(b)knowledge x skill = ability
(c)ability x motivation = performance
(d)attitude x situation = motivation
(e) performance x resources
Ans: a

125. PERT is the
(a)time oriented technique
(b)event oriented technique
(c) activity oriented technique
(d)target oriented technique
(e)work oriented technique.
Ans: b

126.The basic difference between PERT and CPM is that
(a)PERT deals with events and CPM with activities
(b)critical path is determined in PERT only
(c)costs are considered on CPM only and not in PERT
(d)guessed times are used in PERT and evaluated times in CPM
(e)PERT is used in workshops and CPM in plants.
Ans: d

127.PERT stands for k (fit) project evaluation and review technique
(b)project examination and review technique
(c)project evaluation and reporting technique
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(d)process execution and reporting technology
(e)project execution and results technique.
Ans: a

128.Queuing theory is used for
(a)inventory problems
(b)traffic congestion studies
(c)job-shop scheduling
(d)all of the above
(e)none of the above.
Ans: d

129.In queuing theory, the nature of the waiting situation can be studied and analysed
mathematically if
(a)complete details'of items in, waiting line are known
(b)arrival and waiting times are known and can be grouped to form a waiting line model
(c)all variables and constants are known and form a linear equation
(d)the laws governing arrivals, service times, and the order in which the arriving units are taken
into source are known
(e)all of the above.
Ans: d

130.Queuing theory is associated with
(a) sales
(b) inspection time
(c) waiting time
(d) production time
(e) inventory.

Ans: c

131.The reasons which are basically responsible for the formation of a queue should be that
(a)the average service rate Hess than the average arrival rate
(b)output rate is linearly proportional to input
(c)output rate is constant and the input varies in a random manner
(d)all of the above
(e)none of the above.
Ans: d

132.Monte Carlo solutions in queuing theory are extremely useful in queuing problems
(a)that can't be analysed mathematically
(b)involving multistage queuing
(c)to verify mathematical results
(d)all of the above
(e)none of the above.
Ans: a

133.In perpetual inventory control, the material is checked as it reaches its
(a)minimum value
(b)maximum value
(c)average value
(d)middle value
(e)alarming value.
Ans: a

134.A milestone chart
(a) shows the inter dependences of various jobs
(b) depicts the delay of jobs, if any
(c) points outgoing ahead of schedule of jobs, if any
(d) all of the above
(e) none of the above.
Ans: e

135.Bar charts are suitable for
(a) minor works
(b) major works
(c) large projects
(d) all of the above
(e) none of the above.

Ans: a

136. The first method invented for planning projects was
(a) bar chart method
(b) milestone chart
(c) critical path method (CPM)
(d) programme evaluation and review technique (PERT)
(e) none of the above.
Ans: a

137. Pick up the correct statement from the following
(a) programmer evaluation and review technique is event oriented
(b) programmer evaluation and review technique is not event oriented
(c) critical path method is event oriented
(d) critical.path method is not activity oriented
(e) none of the above.
Ans: e

138. Pick up the correct statement from the following
(a) critical path method is an improvement upon bar chart method
(b) critical path method provides a realistic approach to the daily problems
(c) critical path method avoids delays which are very common in bar chart
(d) critical path method was invented by Morgan R. Walker of Dupot and James E. Kelley of Remington U.S.A in 1957
(e) all of the above.
Ans: e

139. Pick up the correct step used for scheduling a project by C.P.M.
(a) a project is divided into various activities
(b) required time for each activity is established
(c) sequence of various activities is made according to their importance
(d) network is drawn by connecting the activities and the events
(e) all of the above.
Ans: e

140. The time of completing a project in network analysis is given by following time of the critical activity meeting at the finalitiode
(a) ear
ly finish
(b) early start

(c) late start
(d) late finish
(e) none of the above.
Ans: a

141. The disadvantage of product layout is
(a)high initial investment for the specialized facilities
(b)skilled labour to operate machines
(c)production time is longer, requiring more goods in inventory
(d)high cost of inspection
(e)costly and complex production control.
Ans: a

142. Emergency rush order can be pushed more effectively in
(a)job production
(b)automatic production
(c)continuous production
(d)intermittent production
(e)none of the above.
Ans: d

143.Routing assists engineers in deciding in advance
(a)the flow of material in the plant
(b)the methods of proper utilization of manpower
(c)the methods of proper utilization of machines
(d)the layout of factory facilities
(e)normal route of workers through the plant.
Ans: c

144.The performance of a specific task in CPM is known as
(a) dummy
(b) event
(c) activity
(d) contract
(e) none of the above.
Ans: c

145.Pick up the incorrect statement from the following
(a)an activity of the project is denoted by an arrow on the net work
(b)the tail of the arrow indicates the start of the activity

(c)the head of the arrow indicates the end of,the activity!

(d)the arrows are drawn (to scale from) left to right

(e)each activity consumes a given time

Ans: d

146.The artificial activity; which indicates that an activity following it cannot be started unless, the preceding activity is complete, is known as

(a) event

(b) free float

(c) artificial

(d) constraint

(e) dummy.

Ans: e

147.A dummy activity

(a)is artificially introduced

(b)is represented by a dotted line

(c)does not require any time

(d)all of the above

(e)none of the above.

Ans: d

148.If E is the duration, ES and EF are die earliest start and finish times, LS an d LF are latest start and finish times, then the following relation holds good

(a) EF=ES+D

(b) LS=LF-D

(c) LF = LS + D

(d) D = EF-ES

(e) all of the above.

Ans: e

149.The difference between the time available to do the job and the time required to do the job, is known as

(a) event

(b) float

(c) duration

(d) constraint

(e) none of the above.

Ans: b

150.The probability distribution of activity times in PERT follows following distribution

(a) normal

(b) binomial

(c) beta

(d) exponential

(e) Gaussian.

Ans: c

151.The probability distribution of project completion in PERT follows following distribution

(a) normal

(b) binomial

(c) beta

(d) exponential

(e) Gaussian.

Ans: e

152.If TL is the largest allowable event occurrence time, total activity slack (s) is equal to

(a)latest start time - earliest start time

(b)latest finish time - earliest finish time (EFT)

(c)TL-EFT

(d) all of the above

(e) none of the above.

Ans: d

153.The critical activity has

(a) maximum float

(p) minimum float

(c) zero float,

(d) average float

(e) none of these.

Ans: c

154.The time by which the activity completion time can be delayed without affecting the start of succeeding activities, is Known as

(a) duration

(b) total float

(c) free float

(d) interfering float

(e) none of the above.

Ans: c

155.The critical path of a network represents
(a)the minimum time required for completion of project
(b)the maximum time required for completion of project
(c)maximum cost required for completion of project
(d)minimum cost required for completion of project
(e)none of the above.
Ans: a

156.Pick up the correct statement from the following
(a)the float may be positive, zero or negative
(b)if the float is positive and the activity is delayed by a period equal to its total float, the completion of project in not delayed
(c)if the float of an activity is negative, delay in its performance is bound to delay the completion of project
(d)if the float of an activity is zero, the activity is critical and any delay in its performance will delay the whole project
(e)all of the above.
Ans: e

157.Critical path moves along the activities having total float of
(a) positive value
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(b) negative value
(c) zero value
(d) same value
(e) none of the above.
Ans: c

158.Critical Path Net Work helps an engineer
(a)to concentrate his attention on critical activities
(b)to divert the resources from non-critical advanced activities to critical activities
(c)to be cautious for avoiding any delay in the critical activities to avoid delay of the whole project
(d) all of the above
(e) none of the above.
Ans: d

159.Pick up the correct statement about relationship between various floats
(a)free float = total float

(b)independent float = total float

(c)independent float > free float

(d)free float > total float

(e)independent float < free float.

Ans: e

160.The time which results in the least possible direct cost of an activity is known as

(a) normal time

(b) slow time

(c) crash time

(d) standard time

(e) none of the above.

Ans: b

161.The technique for establishing and maintaining priorities among the various jobs of any project is known as

(a)event flow scheduling technique

(b)critical ratio scheduling

(c)slotting technique for scheduling

(d)short interval scheduling

(e)none of the above.

Ans: b

162.Pick up the incorrect statement from the following. A critical ratio scheduling

(a)establishes the relative priorities among various activities on a common basis

(b)determines the status of each activity

(c)adjusts automatically changes in activity progress

(d)is a dynamic system

(e)none of the above.

Ans: e

163.PERT is

(a) ananalytic tool in concept

(b) limit up of event oriented diagrams

(c)used for research and development projects

(d)based on three time estimates for activities linking up two events

(e)all of the above.

Ans: e

164.CPMis

(a)synthesising in concepts
(b)is built of activities oriented program-mes
(c)is, based on one time eytimate
(d)is used for repetitive works
(e)all of the above.
Ans: e

165.A CPM family includes
(a)CPA (Critical Path Analysis)
(b)CPP (Critical Path Plotted)
(c)MCE (Minimum Cost Expenditure)
(d)CPS (Critical Path Scheduling)
(e)all of the above.
Ans: e

166.PERT/CPM, techniques can be used for following applications
(a)once through project
(b)maintenance jobs
(c)research and development
(d)all non-technical jobs
(e)all of the above.
Ans: e

167.PERT analysis is based on
(a)optimistic time
(b)pessimistic time
(c)most likely time
(d)all of the above
(e)none of the above.
Ans: d

168.Descripancies of bar chart techniques are
(a)consequential effects of lack in one activity on omer
(b)consequential effects of lack in one activity on the finish date
(c) free time available for an activity can't be predicted
(d)effective monitoring/controlling can't be done
(e)all of the above.
Ans: e

169.O on a PERT/CPM chart represents

(a)an ordinary event

(b)a significant event representing some mile-stone

(c)an event to be transferred to other network chart

(d)dangling event

(e)dummy event.

Ans: a

170.Pick up the correct statement. Dummy activity on a PERT/CPM chart means, it

(a) consumes time, but no resources

(b)consumes resources but no time

(c)consumes neither time nor resources

(d)is a dangling event

(e)consumes both resources and time.

Ans: c

171.Criticalpath on PERT/CPM chart is obtained by joining the events having

(a)maximum slack

(b)minimum slack

(c)average slack

(d)no slack

(e)judgement and experience.

Ans: b

172.Slack of various events on the critical path in PERT/CPM chart

(a)increases continuously

(b)decreases continuously

(c)remains constant

(d)may increase or decrease depending on various factors

(e)unpredictable.

Ans: c

173.The assumption in PERT is

(a)a project will always be behind schedule, if left uncorrected

(b)cost of project will always be more than the estimated cost, if no timely corrections are taken

(c)a project can be subdivided into a set of predictable, independent activities

(d)activities are fixed and can't be changed

(e)commissioning time can be changed, if activities are behind schedule.

Ans: c

174.Activity s,lack or float of any event on a PERT/CPM chart is represented by

(a)latest start time of succeeding event -earliest finish time of preceding event activity time

(b)latest start time of the event - earliest start time of the event

(c)latest finish time of event - earliest finish time of the event

(d)anyone of the above

(e)none of the above.

Ans: d

175.The important file in making a PERT is

(a)an event can't be accomplished until activities leading to it are completed

(b)no activity from any event can be started from preceding event till it is completed

(c)length of arrow has nothing to do with time

(d)every activity must be completed before end point is reached

(e)all of the above.

Ans: e

176.An event is indicated on the network by

(a)a straight line

(b)a number enclosed in a circle or a square

(c)a straight line with circles at the ends

(d) a dotted line

(e) an arrow.

Ans: b

177.In a PERT chart

(a)all activities should be numbered

(b)only important activities should be numbered

(c)only critical activities are numbered

(d)only selected activities are numbered

(e)no activity is numbered.

Ans: a

178.Positive slack on a PERT indicates that project is

(a)ahead of schedule

(b)beyond schedule

(c)as per schedule

(d)on critical path

(e)none of the above.

Ans: a

179.Pessimistic time is

(a)the maximum time which an activity might require

(b)the average time required for a job

(c)the most probable time considering all conditions

(d)the minimum time in which an activity can possibly be accomplished

(e)the earliest finish.

Ans: a

180.

In PERT analysis, critical path is obtained by joining events having

(a) +ve slack

(b) -ve slack

(c) zero sldck

(d) dummy activities

(e) critical activities.

Ans: c

PRODUCTION PLANNING AND CONTROL

☐ Question 1. What Is The Meaning Of Production Planning?

Answer :

Production planning is the planning of production and manufacturing modules in a company or industry. It utilizes the resource allocation of activities of employees, materials and production capacity, in order to serve different customers.

☐ Question 2. What Is The Cycle Of Production?

Answer :

Production cycle is used in two meanings: broad: a production process that begins with raw materials and ends with finished product, narrow: time period of the production process from raw materials to finished product.

☐ Question 3. What Does A Production Planner Do?

Answer :

Production planners, also known as production schedulers, managers, controllers and coordinators, are involved in the logistics of supply chain management. Most of their time is spent on business and organizational aspects of producing and distributing products.

☐ Question 4. What Is Production Control?

Answer :

Production control is the activity of monitoring and controlling any particular production or operation. Production control is often run from a specific control room or operations room.

☐ Question 5. What Is The Production Planning And Control?

Answer :

Production planning is the planning of production and manufacturing modules in a company or industry. It utilizes the resource allocation of activities of employees, materials and production capacity, in order to serve different customers.

☐ Question 6. What Are The Types Of Production Control?

Answer :

Types of production control : In the manufacturing world, production planning and control features four stages: Routing, Scheduling, Dispatching, and Follow Up. The first two relate to production planning while the second two relate to control.

☐ Question 7. What Is Ppc In Production?

Answer :

The PPC Cycle refers to Production Planning Control. It has three phases—preplanning, planning, controlling. The pre-planning phase consists of product development, sales forecasting, factory or plant layout, equipment selection policy, and preplanning of production just prior to large scale production.

☐ Question 8. What Are The Objectives Of Production Planning?

Answer :

objectives of production planning are as follows:

To ensure right quantity and quality of raw material, equipment, etc. are available during times of production.

To ensure capacity utilization is in tune with forecast demand at all the time.

☐ Question 9. What Are The Benefits Of Production Planning?

Answer :

Organization can deliver a product in a timely and regular manner.

Supplier are informed will in advance for the requirement of raw materials.

It reduces investment in inventory.

It reduces overall production cost by driving in efficiency.

☐ Question 10. What Are The Strategies Taken Care By Production Planning?

Answer :

Production planning takes care of two basic strategies

product planning

process planning.

Production planning is done at three different time dependent levels i.e. long-range planning dealing with facility planning, capital investment, location planning, etc.; medium-range planning deals with demand forecast and capacity planning and lastly short term planning dealing with day to day operations.

☐ Question 11. What Are The Factors Of Production Control?

Answer :

Production control cannot be same across all the organization. Production control is dependent upon the following factors:

Nature of production(job oriented, service oriented, etc.).

Nature of operation.

Size of operation.

☐ Question 12. What Are The Advantages Of Robust Production Control?

Answer :

The advantages of robust production control are as follows:

Ensure a smooth flow of all production processes.

Ensure production cost savings thereby improving the bottom line.

Control wastage of resources.

It maintains standard of quality through the production life cycle.

☐ Question 13. What Are The Objectives Of Production Control?

Answer :

objectives of production control are as follows:

Regulate inventory management

Organize the production schedules

Optimum utilization of resources and production process

☐ Question 14. What Are The Stages Of Production Planning & Control?

Answer :

Production Planning & Control is done in three stages namely,

Pre-planning

Planning

Control.

Stage 1: Pre-Planning : Under this phase of production planning, basic ground work on the product design, layout design and work flow are prepared. The operations relating to the availability scope and capacity of men, money materials, machines, time are estimated.

Stage 2: Planning : This is a phase where a complete analysis on routing, estimating and scheduling is done. It also tries to find out the areas of concern for short time and long time so that prominent planning can be prepared.

Stage 3: Control : Under this phase, the functions included are dispatching, follow up, inspection and evaluation. It tries to analyze the expedition of work in progress. This is one of the important phases of the Production Planning and Control.

☐ Question 15. What Are The Main Elements Of Production Planning & Control?

Answer :

Main elements of Production Planning & Control :

The following are main elements of Production Planning and Control.

Routing

Loading

Scheduling

Dispatching

Follow up

Inspection

Corrective

Routing: It is about selection of path or route through which raw materials pass in order to make it into a finished product. The points to be noted while routing process are – full capacity of machines, economical and short route and availability of alternate routing. Setting up time for the process for each stage of route is to be fixed. Once overall sequence are fixed, then the standard time of operations are noted using work measurement technique.

Loading and scheduling: Loading and Scheduling are concerned with preparation of workloads and fixing of starting and completing date of each operation. On the basis of the performance of each machine, loading and scheduling tasks are completed.According to Kimball and Kimball, scheduling is defined as the determination of the time that should be required to perform the entire series as routed, making allowance for all factors concerned.

Dispatching: Dispatching is the routine of setting productive activities in motion through the release of orders and instructions, in accordance with previously planned time and sequence, embodied in route sheet and schedule charts. It is here the orders are released.

Expediting / Follow-up: It is a control tool which brings an idea on breaking up, delay, rectifying error etc., during the progress of work.

Inspection: Inspection is to find out the quality of executed work process.

Corrective: At evaluation process, a thorough analysis is done and corrective measures are taken in the weaker spots.

 Question 16. What Are The Types Of Production Systems?

Answer :

Types of Production Systems : A production system can be defined as a transformation system in which a saleable product or service is created by working upon a set of inputs. Inputs are usually in the form of men, machine, money, materials etc. Production systems are usually classified on the basis of the following:

Type of product,

Type of production line,

Rate of production,

Equipments used etc

They are broadly classified into three categories:

Job shop production.

Batch production.

Mass production.

 Question 17. Explain Job Production?

Answer :

Job Production :

In this system products are made to satisfy a specific order. However that order may be produced-

only once

or at irregular time intervals as and when new order arrives

or at regular time intervals to satisfy a continuous demand

The following are the important characteristics of job shop type production system:

Machines and methods employed should be general purpose as product changes are quite frequent.

Planning and control system should be flexible enough to deal with the frequent changes in product requirements.

Man power should be skilled enough to deal with changing work conditions.

Schedules are actually non existent in this system as no definite data is available on the product.

In process inventory will usually be high as accurate plans and schedules do not exist.

Product cost is normally high because of high material and labor costs.

Grouping of machines is done on functional basis (i.e. as lathe section, milling section etc.)

This system is very flexible as management has to manufacture varying product types.

Material handling systems are also flexible to meet changing product requirements.

☐ Question 18. Explain Batch Production?

Answer :

Batch production is the manufacture of a number of identical articles either to meet a specific order or to meet a continuous demand. Batch can be manufactured either-

only once

or repeatedly at irregular time intervals as and when demand arise

or repeatedly at regular time intervals to satisfy a continuous demand

The following are the important characteristics of batch type production system:

As final product is somewhat standard and manufactured in batches, economy of scale can be availed to some extent.

Machines are grouped on functional basis similar to the job shop manufacturing.

Semi automatic, special purpose automatic machines are generally used to take advantage of the similarity among the products.

Labor should be skilled enough to work upon different product batches.

In process inventory is usually high owing to the type of layout and material handling policies adopted.

Semi automatic material handling systems are most appropriate in conjunction with the semi automatic machines.

Normally production planning and control is difficult due to the odd size and non repetitive nature of order.

☐ Question 19. Explain Mass Production?

Answer :

In mass production, same type of product is manufactured to meet the continuous demand of the product. Usually demand of the product is very high and market is going to sustain same demand for sufficiently long time.

The following are the important characteristics of mass production system:

As same product is manufactured for sufficiently long time, machines can be laid down in order of processing sequence. Product type layout is most appropriate for mass production system.

Standard methods and machines are used during part manufacture.

Most of the equipments are semi automatic or automatic in nature.

Material handling is also automatic (such as conveyors).

Semi skilled workers are normally employed as most of the facilities are automatic.

As product flows along a pre defined line, planning and control of the system is much easier.

Cost of production is low owing to the high rate of production.

In process inventories are low as production scheduling is simple and can be implemented with ease.

☐ Question 20. Explain Product Design?

Answer :

Product design is a strategic decision as the image and profit earning capacity of a small firm depends largely on product design. Once the product to be produced is decided by the entrepreneur the next step is to prepare its design. Product design consists of form and function. The form designing includes decisions regarding its shape, size, color and appearance of the product. The functional design involves the working conditions of the product. Once a product is designed, it prevails for a long time therefore various factors are to be considered before designing it. These factors are listed below: -

Standardization

Reliability

Maintainability

Servicing

Reproducibility

Sustainability

Product simplification

Quality Commensuration with cost

Product value

Consumer quality

Needs and tastes of consumers.

MANUFACTURING TECHNOLOGY

1. Which of the following statements are true for ultrasonic welding?
    1. Productivity of ultrasonic welding is high
    2. Thin pieces can be welded to thicker pieces by ultrasonic welding
    3. Ultrasonic welds contain foreign inclusions
    4. Post cleaning of welds is necessary in ultrasonic welding
    5. Preparation required for ultrasonic welding process is very little

a. (1), (2) and (4)

b. (2), (3) and (4)

c. (1), (3) and (5)

d. (1), (2) and (5)

ANSWER: (1), (2) and (5)

2. The welding process by Metal Inert-Gas (MIG) welding is
   a) slower than the welding process by Tungsten Inert-Gas (TIG) welding
   b) faster than the welding process by Tungsten Inert-Gas (TIG) welding
   c) at same speed as the welding process by Tungsten Inert-Gas (TIG) welding
   d) at unpredictable speed

ANSWER: faster than the welding process by Tungsten Inert-Gas (TIG) welding

3. Which current is used in Tungsten Inert-Gas (TIG) welding?
   a) Only A.C. can be used as welding current
   b) Only D.C. can be used as welding current
   c) Both A.C. and D.C. can be used as welding current
   d) None of the above

ANSWER: Both A.C. and D.C. can be used as welding current

4. What is swing over carriage?
   a) The maximum diameter of workpiece that can be rotated over the bed ways
   b) The minimum diameter of workpiece that can be rotated over the bed ways
   c) The maximum diameter of workpiece that can be rotated over lathe saddle
   d) The minimum diameter of workpiece that can be rotated over lathe saddle

ANSWER: The maximum diameter of workpiece that can be rotated over lathe saddle

5. Which of the following is not a part of carriage of the centre lathe?
   a) Tool post
   b) Apron
   c) Compound rest
   d) Gear box controls

ANSWER: Gear box controls

6. Consider the following diagram of tailstock.

The part shown in blue color in the below diagram is called as
   a) tailstock clamping lever
   b) tailstock dead centre
   c) tailstock spindle
   d) none of the above

ANSWER: tailstock spindle

7. The centre lathes receive their power through
   a) headstock
   b) tailstock
   c) both a. and b.
   d) none of the above
ANSWER: headstock

8. Chances of crack propagation are more in
   a) cold working process
   b) hot working process
   c) both a. and b.
   d) none of the above
ANSWER: cold working process

9. In circular drawing process, when the depth of drawing is more than the diameter of the die, then the process is called as
   a) forced drawing
   b) hollow drawing
   c) deep drawing
   d) all of the above
ANSWER: deep drawing

10. What is the process, in which the metal is caused to flow through a restricted orifice to create an extremely elongated strip of uniform and comparatively smaller cross-sectional area, called?
   a) Rolling
   b) Extrusion
   c) Drawing
   d) Spinning
ANSWER: Extrusion

11. The foundation of the centre lathe is called as
   a) carriage
   b) tray
   c) base
   d) bed
ANSWER: bed

12. When the tool of centre lathe moves perpendicular to the axis of rotation,
   a) it produces a cylindrical surface
   b) it produces a flat surface
   c) it produces a tapered surface
   d) none of the above
ANSWER: it produces a flat surface

13. Why are the plasticisers added with polymers?
    a) To hold other constituents of plastic together
    b) To reduce the cost and enhance the strength and hardness of plastics
    c) To improve flexibility and to reduce the temperature and pressure required for moulding of plastics
    d) None of the above

ANSWER: To improve flexibility and to reduce the temperature and pressure required for moulding of
plastics

14. The materials such as lead and barium, which are added with polymers to minimize the effect of heat, sunlight and ozone are called as
    a) binders
    b) blenders
    c) stabilisers
    d) fillers

ANSWER: stabilisers

15. Match the following Tools used in smithy in Group 1 with their Applications in Group 2 and select the correct option.
    a) Sledge hammers, straight, flat and cross peen ------------- A. To nick the bar and to shape the cold work
    b) Smith ball peen hammer ------------------------------------- B. To make recesses of any shape in hot
    c) metal
    d) Punches -- C. To cut plates to curves
    e) Hardie -- D. To forge art, bend and shape the work
    f) Anvil --- E. To forge light and medium work
    g) Gouge -- F. To forge big jobs

a. 1-(E), 2-(F), 3-(A), 4-(B), 5-(C), 6-(D)
b. 1-(E), 2-(F), 3-(B), 4-(A), 5-(D), 6-(C)
c. 1-(F), 2-(E), 3-(A), 4-(B), 5-(C), 6-(D)
d. 1-(F), 2-(E), 3-(B), 4-(A), 5-(D), 6-(C)

ANSWER: 1-(F), 2-(E), 3-(B), 4-(A), 5-(D), 6-(C)

16. Castings are usually
    a) costlier than forgings

b) cheaper than forgings

c) at the same rate as forging for similar metal

d) none of the above

ANSWER: cheaper than forgings

17. Which of the following options best describes the centre lathes?
   a) Machining machines
   b) Shaping machines
   c) Turning machines
   d) None of the above

ANSWER: Turning machines

18. Which type of arc welding is suitable for joining non-ferrous metals?
   a) D.C. Arc welding
   b) A.C. Arc welding
   c) Both D.C. As well as A.C. Arc welding
   d) None of the above

ANSWER: D.C. Arc welding

19. Which type of process the machining can be?
   a) Cold working
   b) Hot working
   c) Both a. and b.
   d) None of the above

ANSWER: Cold working

20. Power consumption in D.C. arc welding is
   a) less than the power consumption in A.C. arc welding
   b) more than the power consumption in A.C. arc welding
   c) similar to the power consumption in A.C. arc welding
   d) very difficult to calculate

ANSWER: more than the power consumption in A.C. arc welding

21. The process of combining two or more distinct polymer molecules to form a new product with different characteristics is called as
   a) binding
   b) stabilizing
   c) filling
   d) blending

ANSWER: blending

22. Specific gravity of the plastics is usually
    a. less than the specific gravity of metals
    b. more than the specific gravity of metals
    c. similar to the specific gravity of metals
    d. Unpredictable
ANSWER: less than the specific gravity of metals

23. How does the ability of material to withstand unpredictable loads change after forging?
    a. The ability of material to withstand unpredictable loads increases after forging
    b. The ability of material to withstand unpredictable loads decreases after forging
    c. The ability of material to withstand unpredictable loads does not change after forging
    d. Unpredictable
ANSWER: The ability of material to withstand unpredictable loads increases after forging

24. Which characteristic of material is used in forging process?
    a. characteristics of elasticity of material
    b. characteristics of ductility of material
    c. characteristics of plasticity of material
    d. none of the above
ANSWER: characteristics of plasticity of material

25. Joint strength in brazing operation is
    a. as high as in gas or arc welding
    b. not as high as in gas or arc welding
    c. higher than that of in gas or arc welding
    d. unpredictable
ANSWER: not as high as in gas or arc welding

26. What is used as joining medium in brazing operation?
    a. Copper-zinc alloy
    b. Nickel-silver alloy
    c. Lead-tin alloy
    d. All of the above
ANSWER: Copper-zinc alloy

27. Which of the following is a soft solder?
    a. Copper-zinc alloy
    b. Nickel-silver alloy

c. Lead-tin alloy
        d. All of the above
ANSWER: Lead-tin alloy

28. Calculate time taken to face a workpiece of 100 mm diameter. The cross feed is 0.2 mm/rev and spindle speed is 200 r.p.m.
        a. 10 min
        b. 5 min
        c. 2.5 min
        d. 1.25 min
ANSWER: 1.25 min

29. Assume a machining process of taper turning. In this process, a large diameter of taper is 'D' and it is uniformly decreased to the small diameter of the taper 'd' at the horizontal length of tapered part of workpiece is 'L'. What is the correct formula for half of tapper angle $(2\alpha / 2)$?
        a. $\alpha = \sin^{-1} ((D - d) / 2L)$
        b. $\alpha = \cos^{-1} ((D - d) / 2L)$
        c. $\alpha = \tan^{-1} ((D - d) / 2L)$
        d. $\alpha = \cot^{-1} ((D - d) / 2L)$
ANSWER: $\alpha = \tan^{-1} ((D - d) / 2L)$

30. Consider the following diagram of machining tool. What is the type of the tool shown below?
        a. Turning tool
        b. Facing tool
        c. Chamfering tool
        d. Parting or necking tool
ANSWER: Chamfering tool

31. Which of the following characteristics does not affect the properties of plastics?
        a. Their molecular structure
        b. Their degree of polymerization
        c. Both a. and b
        d. None of the above
ANSWER: None of the above

32. Which of the following is an example of thermoplastic material?
        a. Camera bodies
        b. Automobile parts
        c. Electric plugs
        d. Electric insulation

ANSWER: Electric insulation

33. Which of the following is an example of fusion welding?
     a. Atomic hydrogen welding
     b. Flash welding
     c. Seam welding
     d. Spot welding
ANSWER: Atomic hydrogen welding

34. The metal joined is never brought to a molten stage in
     a. pressure welding
     b. fusion welding
     c. thermit welding
     d. none of the above
ANSWER: pressure welding

35. The volume of metal that enters the rolling stand
     a. should increase after rolling process
     b. should decrease after rolling process
     c. should remain same after rolling process
     d. unpredictable
ANSWER: should remain same after rolling process

36. Worm working or semi-hot working process, which is the plastic deformation of metal or alloy under conditions of temperature and strain rate, is performed to eliminate drawbacks of
     a. cold working process
     b. hot working process
     c. both cold and hot working processes
     d. none of the above
ANSWER: both cold and hot working processes

37. Which plastic materials contain strong cross linkings in their molecular structure?
     a. Thermoplastic materials
     b. Thermosetting materials
     c. Both a. and b.
     d. None of the above
ANSWER: Thermosetting materials

38. Thermosetting materials are
     a. the plastics which can be softened even after they have set and hardened
     b. the plastics which require heat and pressure to mould them into shape
     c. both a. and b.
     d. none of the above
ANSWER: the plastics which require heat and pressure to mould them into shape

39. Which of the following statements is/are true for welding process?
     a. General welding equipments are very costly
     b. Welding results in residual stresses and distortion of workpiece
     c. Two dissimilar metals cannot be joined by welding
     d. All of the above
ANSWER: Welding results in residual stresses and distortion of workpiece

40. The process of joining two pieces of metal with a different fusible metal applied in a molten state is called as
     a. welding
     b. soldering
     c. both a. and b.
     d. none of the above
ANSWER: soldering

41. Which casting process has no size and shape limits?
     a. Sand casting
     b. Shell-mould casting
     c. Plaster-mould casting
     d. none of the above
ANSWER: Sand casting

42. Hot working process is the plastic deformation of metal which is carried out
     a. at temperature below the recrystallisation temperature
     b. at temperature above the recrystallisation temperature
     c. at temperature equals to boiling point of water
     d. none of the above
ANSWER: at temperature above the recrystallisation temperature

43. Blow holes in casting are caused by
     a. excessive moisture
     b. low permeability
     c. excessive fine grains

d. all of the above

ANSWER: all of the above

44. In resistance electric welding, the current passed through two joining metal pieces is
    a. 230 to 440 volts, at a high amperage
    b. 230 to 440 volts, at a low amperage
    c. 2 to 8 volts, at a high amperage
    d. 2 to 8 volts, at a low amperage

ANSWER: 2 to 8 volts, at a high amperage

45. Which of the following are the cold working processes?
    (1) Forging
    (2) Bending
    (3) Squeezing
    (4) Pipe Welding
    (5) Drawing
        a. (1), (2) and (3)
        b. (2), (3) and (5)
        c. (2), (4) and (5)
        d. (1), (2), (3) and (5)

ANSWER: (2), (3) and (5)

46. Good surface finish and better dimensional accuracy can be achieved in
    a. cold working process
    b. hot working process
    c. both a. and b.
    d. none of the above

ANSWER: cold working process

47. As compared to the arc welding, the gas welding takes
    a. considerably less time for the metal to heat up
    b. considerably more time for the metal to heat up
    c. approximately same time for the metal to heat up as arc welding
    d. unpredictable

ANSWER: considerably more time for the metal to heat up

48. The productivity of casting process is comparatively

a. lower than the productivity of other automatic processes like rolling

b. higher than the productivity of other automatic processes like rolling

c. similar to the productivity of other automatic processes like rolling

d. unpredictable

ANSWER: lower than the productivity of other automatic processes like rolling

49. Which of the following sentences is/are correct for casting process?

a. Casting process is comparatively costly

b. Objects of larges sizes cannot be produced easily by casting process

c. The time required for the process of making casting is quite long

d. All of the above sentences are correct

ANSWER: The time required for the process of making casting is quite long

50. Match the following contents of green sand in Group 1 with their approximate per cent in Group 2.

1. Silica -------------------------- A. 5 to 10 per cent
2. Clay -------------------------- B. 2 to 5 per cent
3. Bentonite --------------------- C. 8 to 15 per cent
4. Coal dust --------------------- D. 7 to 8 per cent
5. Water -------------------------- E. up to 75 per cent

    a. 1-(E), 2-(C), 3-(B), 4-(A), 5-(D)

    b. 1-(E), 2-(A), 3-(B), 4-(C), 5-(D)

    c. 1-(C), 2-(D), 3-(B), 4-(A), 5-(E)

    d. 1-(C), 2-(A), 3-(B), 4-(D), 5-(E)

ANSWER: 1-(E), 2-(C), 3-(B), 4-(A), 5-(D

51) The productivity of casting process is comparatively

a. lower than the productivity of other automatic processes like rolling

b. higher than the productivity of other automatic processes like rolling

c. similar to the productivity of other automatic processes like rolling

d. unpredictable

ANSWER: lower than the productivity of other automatic processes like rolling

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5. Water ------------------------- E. up to 75 per cent
               a. 1-(E), 2-(C), 3-(B), 4-(A), 5-(D)
               b. 1-(E), 2-(A), 3-(B), 4-(C), 5-(D)
               c. 1-(C), 2-(D), 3-(B), 4-(A), 5-(E)
               d. 1-(C), 2-(A), 3-(B), 4-(D), 5-(E)
ANSWER: 1-(E), 2-(C), 3-(B), 4-(A), 5-(D)

54) What is the highest possible percentage of clay contents in loam sand?
        a. 10
        b. 20
        c. 30
        d. 50
ANSWER: 50

55) The sand in its natural or moist state is called as
        a. green sand
        b. loam sand
        c. dry sand
        d. none of the above
ANSWER: green sand

56) The ability of the moulding sand to withstand the heat of melt without showing any sign of softening is called as
        a. strength or cohesiveness
        b. refractiveness
        c. collapsibility
        d. adhesiveness
ANSWER: refractiveness

57) Permeability can be defined as the property of moulding sand
        a. to hold sand grains together
        b. to allow gases to escape easily from the mould
        c. to withstand the heat of melt without showing any sign of softening
        d. none of the above
ANSWER: to allow gases to escape easily from the mould

58) The patterns which are made in two or more pieces are called as
- a. solid patters
- b. split patterns
- c. loose piece patterns
- d. none of the above

ANSWER: split patterns

59) Which of the following is not a requirement of a good pattern?
- a. It should be light in weight to handle easily
- b. It should be smooth to make casting surface smooth
- c. It should have low strength to break it and to remove casting easily
- d. none of the above

ANSWER: It should have low strength to break it and to remove casting easily

60) A model of casting, constructed to use for forming a mould in damp sand, is called as
- a. sand construction
- b. pattern
- c. cover
- d. none of the above

ANSWER: pattern

METROLOGY AND INSPECTION

1) The study of scientific metrology deals with
a. accuracy and methods of measurement
b. standard specifications
c. theories related to nature
d. all of the above

2) Which of the following processes is used to monitor space signals of a space craft?
a. Stroboscope
b. Telemetry
c. Pyrometer
d. None of the above

3) Match the following Group 1 items (Grades) with Group 2 items (application) and select the correct option

1. Grade I --------------------------------- A. high precision task

2. Grade II -------------------------------- B. comparators

3. Grade 00 -------------------------------- C. inspection department

4. Calibration grade ---------------------- D. production

1-A, 2-C, 3-D, 4-B

b. 1-C, 2-D, 3-A, 4-B

c. 1-B, 2-A, 3-C, 4-D

d. 1-D, 2-B, 3-A, 4-C

4) Which of the following is not a type of direct measuring instrument?

a. micrometer

b. vernier caliper

c. divider

d. All of the above

5) Johansson mickrocator is a type of

a.mechanicaloptical comparator

b. mechanical comparator

c. optical comparator

d. electrical comparator

6) Which of the following statements are true?

1. Mechanical comparators are compact and easy to handle

2. Parallax error is never observed in mechanical comparator

3. Sigma comparator is a type of mechanical comparator

4. Mechanical comparators have low inertia which makes them sensitive to vibrations

a. 1 and 2

b. 3 and 4

c. 1 and 3

d. All of the above

7) Which method is used to test the straightness of an object?

a. Indicator method

b. Interference method

c. Wedge method

d. All of the above

8) What is a least square line?

a. A line which has sum of errors minimum

b. A line which has sum of difference of errors minimum

c. A line which has sum of squares of errors minimum

d. None of the above

9) What does allowance represent in clearance fits?

a. It represents minimum clearance and is positive

b. It represents maximum clearance and is positive

c. It represents minimum clearance and is negative

d. It represents maximum clearance and is negative

10) Which of the following statements is/are false?

a. Interference is observed in tight fit

b. Allowance represents minimum interference for interference fits

c. Clearance is observed in push fit

d. All of the above

11) Match the following Group 1 items with Group 2 items

1. Flaw --- A. Secondary texture

2. Actual surface -------------------------------- B. Surface which does not exist

3. Nominal surface ----------------------------- C. Primary texture

4. Waviness ------------------------------------- D. Designer prescribes the surface

5. Roughness ----------------------------------- E. Irregularities occurring at one place

a. 1 - A, 2 - B, 3 - D, 4 - C, 5 - E

b. 1 - D, 2 - E, 3 - D, 4 - C, 5 - C

c. 1 - E, 2 - D, 3 - B, 4 - A, 5 - C

d. 1 - C, 2 - A, 3 - D, 4 - B, 5 – E

12) What does effective profile mean, while defining a surface texture?

a. Workpiece having repetitive irregularities

b. Roughness can be measured in this imaginary profile

c. Real contour of a surface

d. All of the above

13) Which thread has a combined strength of square thread and V thread?

a. Acme thread

b. Knuckle thread

c. Buttress thread

d. British standard Whitworth thread

14) Why are pitch errors observed in threads?

a. Lack of inspection

b. Incorrect ratio of tool work velocity

c. Interference between mating parts

d. All of the above

15) Spiral gears are used to transmit power when the shafts are

a. parallel   c. parallel and intersecting

b. Interesting   d. neither parallel nor intersecting

16) Which of the following statements is/are true?

a. Parkinson's gear tester is used to measure variation in centre distance

b. Tool maker's microscope is used to measure tooth thickness

c. Teeth having wider flanks have less strength

d. All the above statements are true

17) Universal measuring machine is a combination of

a. Tool maker's microscope and Parkinson's gear tester

b. Tool maker's microscope and optical measuring machine

c. Parkinson's gear tester and optical measuring machine

d. None of the above

18) Which among the following machines can inspect geometric features of different components?

a. Co-ordinate measuring machines

b. Universal measuring machines

c. Both a. and b.

d. None of the above

19) Match the following group 1 items (Authors) with group 2 items (Definitions)

1. Juran -- A. Quality is conformance to requirements

2. Crossby --- B. Quality in essence is a way of managing the organization

3. Hoshin -- C. Quality is fitness for use

4. Feigenbaum -------------------------------------- D. Quality is correcting and preventing loss,not living with loss

a. 1 – A, 2 – D, 3 – B, 4 – C

b. 1 – C, 2 – A, 3 – D, 4 - B

c. 1 – B, 2 – A, 3 – C, 4 - D
d. 1 – D, 2 – A, 3 – B, 4 - C

20) According to ISO 8402, quality is defined as
a. the totality of features and characteristics of a product or service that bears on its ability to satisfy given needs
b. the totality of features and characteristics of a product or service that bears on its ability to satisfy stated or implied needs
c. the minimum loss imparted by the product to satisfy from the time the product is dispatched
d. none of the above

21) Who among the following suggested seven quality tools for controlling quality?
a. Juran   c. Dr. W. Edward Deming
b. Kaoru Ishikawa   d. Feigenbaum

22) Fish bone diagram is also known as?
a. Cause and effect chart   c. Both a. and b.
b. Ishikawa diagram   d. None of the above

23) Which among the following is a type of control chart for variables?
a. C chart   c. X chart
b. P chart   d. U chart

24) The distribution of measured data can be studied by using
a. X chart   c. both X and R chart
b. R chart   d. None of the above

25) What is the aim of fool proofing technique used for total quality management?
a. to achieve zero defects   c. to specify targets
b. to specify time schedules   d. none of the above

26) Match the following group 1 items with group 2 items

1. Sort ------------- A. Seitan
2. Set in order ---- B. Seiketsu
3. Shine ----------- C. Seiri
4. Standardize ---- D. Seiso
a. 1 – D, 2 – A, 3 – B, 4 – C
b. 1 – C, 2 – A, 3 – D, 4 – B

c. 1 – B, 2 – C, 3 – A, 4 – D

d. 1 –A, 2 – C, 3 – D, 4 – B

27) Which of the following statements is/are true?

a. Pyrometer is a non-contact type of instrument

b. Stroboscope is a contact type of instrument

c. Micrometer is a non-contact type of instrument

d. All of the above

28) Which of the following causes is/are responsible for systematic errors?

a. non linearity   c. zero offset

b. change in sensitivity   d. All of the above

29) Which among the following is an optical instrument?

a. angle dekkor   c. both a. and b.

b. Autocollimator   d. none of the above

30) What is the type of instrument shown below?
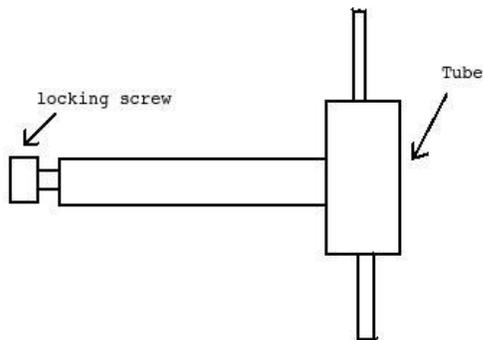
a. Bore gauge   c. Slip gauge

b. Telescopic gauge   d. None of the above

31) Which type of comparator changes its magnification, when distance between cross strip hinge and knife edge is varied?

a. Johansson mickrocator   c. Projector comparator

b. Solex pneumatic comparator   d. Sigma comparator

32) Indicator method is used to test

a. straightness   c. flatness

b. Squareness   d. all of the above

33) The out of roundness δ for least square circle is given as

a. $\delta = \delta p - \delta v$ c. $\delta = \delta r$

b. $\delta = \delta p + \delta v$ d. None of the above

34) What is a loose running fit?

a. Loose running fit has minimum clearance

b. They can be used in textile machinery

c. Used in high precision task

d. All the above

35) Which among the following is a type of clearance fit?

a. Force fit   c. Slide fit

b. Push fit   d. Tight fit

36) Which type of fringe is formed, if a path difference of $\lambda/2$ is observed in an interference pattern?

a. Dark fringe   c. Both bright and dark fringe overlap

b. Bright fringe   d. Unpredictable

37) Which type of surface, has a fringe pattern shown below?
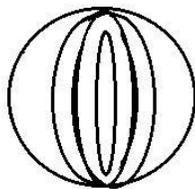
a. Sphere   c. Conical

b. Cylinder   d. Spheroid

38) Which among the following causes first order surface irregularity?

a. Lack of straightness   c. Feed and speed

b. Lack of rigidity   d. Vibrations

39) Which among the following is a type of direct measuring instrument of roughness?

a. Micro interferometer   c. Profilometer

b. Wallace surface dynamometer   d. None of the above

40) Which type of errors show linear relation between cumulative pitch error and length of thread?

a. Periodic errors   c. Both a. and b.

b. Progressive errors   d. None of the above

41) What is used to measure the major diameter of an external thread?

a. Bench micrometer   c. One wire method

b. Thread micrometer   d. All of the above

42) Smooth motion in involute tooth profile is possible due to

a. variation in pressure angle   c. Both a. and b.

b. constant pressure angle   d. None of the above

43) Which type of tooth profile has double curvature?

a. cycloidal tooth profile   c. both a. and b.

b. involute tooth profile   d. none of the above

44) Which of the following statements is/are false for Co-ordinate measuring machine?

a. Conventional comparators have greater accuracy than co-ordinate measuring machines

b. Gantry type of co-ordinate measuring machine use inductive transducers for measurement

c. Loading and unloading operations are easily done by cantilever type of co-ordinate measuring machine

d. All the statements are false

45) According to laser Doppler principle, light experiences a change in its frequency when it comes in contact with a moving object depending upon

a. the velocity of the object   c. both a. and b.

b. the direction of the object   d. none of the above

46) According Juran's Triology, which of the following actions is performed under planning procedure?

a. choosing control subjects   c. project establishment

b. organizing project teams   d. deal with resistance to change

47) Which award is presented to different organizations for quality and excellent performance by president of USA?

a. Malcolm Balbridge National Award

b. Dr. W. Edward Deming National Award

c. US Excellence Award

d. None of the above

48) Relaxed ambiance for group participation is observed in which type of brain storming sessions?

a. structured sessions   c. both a. and b.

b. unstructured sessions   d. none of the above

49) Match the following group 1 (charts) with group 2 (use) and select the correct option.

1. R chart ---------- A. study the number of defects per unit

2. C chart ---------- B. size of variable is studied

3. P chart ---------- C. dispersion of measured data

4. X chart ---------- D. defective units produced per subgroup

a. 1 – A, 2 – B, 3 – D, 4 - C

b. 1 – C, 2 – D, 3 – B, 4 - A

c. 1 – A, 2 – D, 3 – B, 4 - C

d. 1 – C, 2 – A, 3 – D, 4 - B

50) Which of the following gives actual measurement of any specific dimension?

a. Inspection by variables   c. Both a. and b.

b. Inspection by attributes   d. None of the above

51) Lot Tolerance Percent Defective is also known as?

a. rejectable quality level   c. indifferent quality level

b. acceptance quality level   d. all of the above

52) What is the effect of sample size on probability of acceptance?

a. sample size has no effect on probability of acceptance

b. as number of items in a sample decrease, higher is the possibility of number of defectives thereby probability of acceptance decreases

c. as number of items in a sample increase, higher is the possibility of number of defectives

thereby probability of acceptance decreases

d. none of the above

53) What is meant by Kaizen?

a. card signal

c. change for better quality

b. to avoid inadvertent errors

d. none of the above

54) Which among the following is a pull type signaling system?

a. Just in time

c. both a. and b.

b. Kanban

d. none of the above

55) Imperial standard yard is made of

a. platinum alloy

c. bronze

b. platinum iridium alloy

d. all of the above

56) In which of the following length standards, parallax error is observed?

a. line standard

c. both a. and b

b. end standard

d. none of the above

57) Grade 1 is used in

a. high precision tasks

c. calibration of instruments

b. department of inspection

d. all of the above

58) Testing flatness or straightness of a surface is possible using

a. vernier calliper

c. autocollimator

b. Micrometer

d. all of the above

59) Which principle is used to measure distance in electronic comparator?

a. Frequency modulation

c. Both a. and b.

b. Radio oscillations

d. None of the above

60) The sensitivity of back pressure air gauge is given by the relation shown below, what does $\delta R / \delta p2$ signify?

$(\delta R / \delta t) = (\delta Am / \delta t) \times (\delta R / \delta p2) \times (\delta p2 / \delta Am)$

a. Pneumatic sensitivity

c. Overall magnification

b. Sensitivity of pressure gauge

d. Measuring head sensitivity

61) Which error is observed due to lack of squareness when depth is measured using depth micrometer?

a. parallax error   c. sine error

b. cosine error   d. all of the above

62) Which type of circularity reference circle is shown below ?
Condition given out of roundness δ = δr
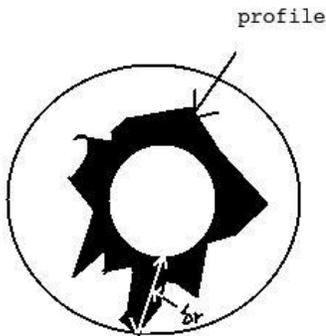
a. Minimum inscribed circle   c. Least square circle

b. Minimum circumscribed circle   d. Minimum zone circle

63) Which of the following is true for interference fit?

a. Shaft is always smaller than the hole

b. Shaft is always bigger than the hole

c. Interference fits have shaft and hole of same dimension

d. None of the above

64) How is interference between shaft and hole calculated?

a. Interference = maximum shaft – minimum hole

b. Interference = minimum shaft – maximum hole

c. Interference = minimum shaft + maximum hole

d. None of the above

65) Which among the following is used to create fringes in N.P.L. interferometer?

a. Condensing lens   c. Optical flat

b. Collimating lens   d. All of the above

66) Which type of light source is used in N.P.L. type of flatness interferometer?

a. Mercury vapour lamp   c. Both a. and b.

b. Cadmium lamp   d. None of the above

67) Which principle does Taylor-Hobson-Talysurf tester work on?
a. Capacitive demodulating principle
b. Intensity modulating principle
c. Inductive modulating principle
d. Carrier modulating principle

68) Which of the following methods is unreliable to evaluate the surface finish?
a. Electrical stylus profilometer
b. Wallace surface dynamometer
c. Profilograph
d. Tomlinson surface tester

69) Which of the following is a contact type of automated inspection method?
a. Inspection probe   c. Electric field
b. Laser scanning   d. All of the above

70) Which are the different techniques used by interpretation segments for interpretation?
a. frame grabber and frame store   c. thresholding and edge detection
b. template matching and weighting d. all of the above

71) Which formula is used to calculate quality of performance?
a. Quality of performance = quality of design + quality of conformance
b. Quality of performance = quality of design - quality of conformance
c. Quality of performance = quality of design + availability
d. None of the above

72) Which of the following strategies of Deming's fourteen points is included into category of Management commitment?
a. Institute leadership   c. Eliminating exhortations
b. Encouraging education   d. Adopting new philosophy

73) Which among the following depicts positive and negative relation between driving factor and performance factor?
a. Scatter diagram   c. check sheet
b. Histogram   d. none of the above

74) Which type of chart uses the rule of 20:80?
a. cause and effect chart   c. fish bone diagram
b. Pareto chart   d. control chart

75) Which of the following statements is true?

1. P and nP charts cannot use limit gauges
2. P charts are difficult to understand
3. P charts cannot recognize different degrees of defectiveness in units

a. Only 1   c. Only 3
b. Only 2   d. All the statements are true

76) Sample size of 1 m2 is observed in which type of chart?

a. C chart   c. nP chart
b. P chart   d. R chart

77) Which of the following statements is/are true?

1. Probability of acceptance decreases if acceptance number increases, when sampling size is kept constant
2. Indifferent quality range is the range between lot tolerance percent defective and acceptable quality level
3. Operating characteristics curve is the curve plotted between probability of acceptance and indifferent quality range

a. Only 1   c. Only 3
b. Only 2   d. All the above statements are true

78) On operating characteristics curve, consumers risk is denoted by

a. α   c. γ
b. B   d. None of the above

79) ISO 14000 quality standard is related with

a. Environmental management systems
b. Automotive quality standards
c. Eliminating poor quality
d. Customer satisfaction

80) Which ISO standard is used in international automobile companies to set automotive quality system standards ?

a. ISO 14000   c. ISO 9000
b. TS 16949   d. none of the above

81) Which of the following is a characteristic of End standard?

a. accuracy of ± 0.2 mm   c. accuracy of ± 0.001 mm

b. accuracy of ± 0.050 mm   d. accuracy of ± 1.00 mm

82) Match the following Group 1 items (Type of error) with Group 2 items (characteristics) and select the correct option

1. Gross error ------------- A. Magnitude and direction vary
2. Systematic error ------- B. Caused by electrostatic fields
3. Random error ---------- C. Human fault
4. Environmental error -- D. Magnitude and direction are definite

a. 1-B, 2-A, 3-D, 4-C
b. 1-A, 2-C, 3-D, 4-B
c. 1-C, 2-D, 3-A, 4-B
d. 1-D, 2-A, 3-B, 4-C

83) Which among the following is measured using four ball method?

a. Diameter   c. Angle

b. Length   d. All of the above

84) Which of the following is true?

a. Ring gauge has a taper angle of 3 Φ
b. Clinometer cannot measure angle between two adjacent surfaces
c. Clinometer uses micrometer to measure small angles
d. All of the above

85) Internal diameter of any workpiece can be measured using

a. Solex pneumatic comparator
b. Sigma comparator
c. Johansson mickrocator
d. All of the above

86) In the diagram shown below, what is the distance between A and B called as ?
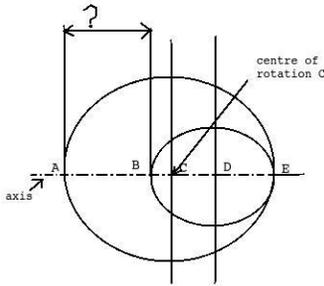
a. Radial throw
b. Runout

c. Radial runout
d. None of the above

87) What is/are the factor(s) causing runout?
a. Error of position
b. Error of bearings

c. Both a and b
d. None of the above

88) The snap gauge having go dimension corresponds to
a. maximum metal condition
b. minimum metal condition

c. minimum material condition
d. none of the above

89) Which type of deviation is observed while calculating hole dimensions?
a. Positive
b. Negative

c. Zero
d. All of the above

90) At which angle does a glass plate reflector set in N.P.L. interferometer?
a. 30°
b. 45°

c. 60°
d. 90°

91) Which type of surface in a fringe pattern exhibits the movement of fringes towards the centre?
a. concave surface
b. convex surface

92) Which of the following statements is true?
a. Photocell is used to measure light intensity
b. Planimeter is used to measure surface roughness
c. According to Indian Standard 696 roughness valve is to be measured in millimeter
d. All statements are true

93) What is ten point height method?
a. It is the average sum of ten highest points measured within sampling length
b. It is the average difference of five highest points and five deepest valleys measured within

sampling length

c. It is the sum of ten highest points divided by sum of ten deepest valleys measured within sampling length

d. It is the average sum of five highest points and five deepest valleys measured within sampling length

94) What effect does pitch error have on nut and bolt?

a. Major diameter of nut decreases and effective diameter of bolt increases

b. Effective diameter of nut decreases and effective diameter of bolt increases

c. Effective diameter of nut increases and effective diameter of bolt decreases

d. None of the above

95) According to Taylor's principle which type of gauge checks both size and geometric features?

a. Go gauge   c. Both a. and b.

b. No go gauge   d. None of the above

96) Which formula is used to calculate diametral pitch?

a. (number of teeth) x (pitch circle diameter)

b. (pitch circle diameter) / (number of teeth)

c. (number of teeth) / (pitch circle diameter)

d. none of the above

97) Analytical checking of gears includes checking of

a. tooth profile   c. noise level

b. Vibrations   d. all of the above

98) What is the function of frame grabber?

a. It stores the obtained data

b. It converts digital words to analog voltage levels

c. It converts analog voltage levels to digital words

d. All of the above

99) In image shearing techniques, what is meant by single shear?

a. In single shear technique, two images have edge to edge contact and later on one image is shifted some distance over the other

b. In single shear technique, one image is shifted some distance till an edge to edge contact is established

100) Inadvertent errors are caused due to
a. improper timely feedback
b. less knowledge about the product
c. less information
d. all of the above

101) Which of the following is the limitation of Quality circle?
a. higher cost
b. training time and cost
c. development of leadership
d. all of the above

102) Waterfall method is observed in
a. product design and development   c. brain storming
b. quality circle   d. flow chart

103) Which control chart pattern is/are used for assignable causes?
a. Trend pattern   c. Extreme variation pattern
b. Shift pattern   d. All of the above

104) Which of the following statements is/are true?

1. Trend type of control chart pattern shows continuous movement of points upwards and downwards
2. Trend pattern occurs due to change in inspection method
3. Downward trend indicates wear of parts
a. Only 1   c. Only 3
b. Only 2   d. All of the above

105) Maximum data handling analysis load is observed in
a. single sampling plan   c. sequential sampling plan
b. double sampling plan   d. all of the above

106) Which sampling method is used when simple random sampling method becomes inconvenient to use in large lots?
a. systematic sampling   c. cluster sampling
b. stratified sampling   d. sampling in stages

107) What is quality assurance?

a. Quality assurance deals with activities which prove that products and services meet the required quality standard

b. Quality assurance deals with activities which aim at customers satisfaction

c. Quality assurance deals with controlling the quality of products by inspection

d. All of the above

108) Which of the following statements is/are false?

1. Fault tree analysis method is used to determine reliability of product
2. The goal of Six Sigma is to reduce number of defects to 2.4 parts per billion
3. Six sigma is represented by normal distribution curve
4. Poka yoke is a policy which prevents occurrence of human errors

a. Only statement 3   c. Statement 1, 3 and 4

b. Statement 2 and statement 3   d. Only statement 2

109) Which of the following errors are also known as cumulative errors?

a. Random errors   c. Gross errors

b. Systematic errors   d. System interaction errors

110) Which of the following statements is/are true?

1. Gross errors are known as compensating errors
2. Systematic errors are caused due to system interaction errors
3. Probability laws are followed by systematic errors

a. Only 1   c. Only 3

b. Only 2   d. All of the above

111) Which type of tolerance does a slip gauge have?

a. Unilateral tolerance   c. Both a. and b.

b. Bilateral tolerance   d. None of the above

112) Which of the following materials is/are used to make an angle gauge block?

a. Hardening tool steel   c. Tungsten carbide

b. Nickel   d. All of the above

113) Which of the following statements is true for LVDT?

a. It is a mutual capacitive transducer

b. Presence of hysteresis gives high repeatability

c. It can measure displacement and pressure

d. All of the above

114)   What is the phase difference, when the system is operated at excitation frequency ?

a. Phase difference is greater than 90o

b. Phase difference is less than 90o

c. Phase difference is zero

d. Unpredictable

115)   What is error of circularity?

a. Distance between maximum inscribing circle and minimum circumscribing circle measured radially

b. Distance between maximum inscribing circle and minimum zone circle measured radially

c. Distance between least square circle and minimum zone circle measured radially

d. None of the above

116)   Which of the following is tested for parallelism between trajectory and a plane?

a. plane is on a component which moves

b. plane is on a component which does not moves

c. both a. and b.

d. none of the above

117)   In hole basis system, basic size is equal to

a. maximum hole size   c. upper deviation which is zero

b. minimum hole size   d. none of the above

118)   Newall system is a type of

a. bilateral hole based system   c. both a. and b.

b. limit system   d. none of the above

119)   What does the following interference band pattern indicate?
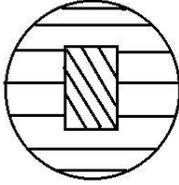
a. Gauge has taper along its large edge

b. Gauge has taper along its short corner

c. Flat gauge

d. Bands have same direction but the pitch is different

120) The Pitter - N.P.L. Gauge interferometer is used to measure

a. flatness
c. straightness

b. Length
d. all of the above

121) Which method is calculated considering geometric average of ordinates?

a. Centre line average method
c. Root mean square method

b. Peak to valley height method
d. All of the above

122) Which of the following instruments is used to measure base pitch of a gear in base tangent method?

a. Gear tooth vernier caliper

b. David Brown tangent caliper

c. David Brown tangent comparator

d. David Brown tangent micrometer

123) Which of the following components are inspected by a Tool maker's microscope?

a. gauges
c. dies and fixtures

b. screw threads
d. all of the above

124) Which dimensions can be measured using image shearing microscope?

a. linear dimensions

b. angular dimensions

c. both linear and angular dimensions

d. none of the above

125) Which among the following is used to measure velocity of an object?

a. Laser Doppler effect
c. Laser telemetric system

b. Laser interferometers
d. None of the above

126) Which of the following statements is/are true according to Deming's Deadly Diseases?
a. short term profits are very useful for long term goals
b. mobility of management leads to stability
c. merit rating leads to devastating
d. all of the above

127) Which quality management program is related to the maintenance of plants and equipments?
a. Environmental management systems
b. Fault tree analysis
c. Failure mode effect analysis
d. Total productive maintenance

128) The aim of Just-In-Time manufacturing principle is to eliminate
a. time wastage
b. labour wastage
c. cost of excessive inventory
d. all of the above

129) What does N, P and L mean in N.P.L. Gauge interferometer?
a. Nikon pulsed laser
b. Nuclear plasma laboratory
c. National Physics Laboratory
d. Nuclear physics laboratory

130) What is meant by hitch hiking?
a. procedure of secret voting to select the most appropriate idea
b. enlisting ideas in specific format considering similarities
c. ideas suggested based on other ideas
d. none of the above

Answers:
c. theories related to nature
b. Telemetry
b. 1-C, 2-D, 3-A, 4-B
c. Divider
b. mechanical comparator
c. 1 and 3
c. Wedge method
c. A line which has sum of squares of errors minimum
a. It represents minimum clearance and is positive
b. Allowance represents minimum interference for interference fits

c. 1 - E, 2 - D, 3 - B, 4 - A, 5 – C

c. Real contour of a surface

c. Buttress thread

b. Incorrect ratio of tool work velocity

d. neither parallel nor intersecting

a. Parkinson's gear tester is used to measure variation in centre distance

b. Tool maker's microscope and optical measuring machine

b. Universal measuring machines

b. 1 – C, 2 – A, 3 – D, 4 – B

b. the totality of features and characteristics of a product or service that bears
on its ability to satisfy stated or implied needs

b. Kaoru Ishikawa

c. Both a. and b.

c. X chart

c. both X and R chart

a. to achieve zero defects

b. 1 – C, 2 – A, 3 – D, 4 – B

a. Pyrometer is a non-contact type of instrument

d. All of the above

c. both a. and b.

b. Telescopic gauge

d. Sigma comparator

b. Squareness

b. $\delta = \delta p + \delta v$

b. They can be used in textile machinery

c. Slide fit

a. Dark fringe

d. Spheroid

a. Lack of straightness

c. Profilometer

b. Progressive errors

a. Bench micrometer

b. constant pressure angle

a. cycloidal tooth profile

a. Conventional comparators have greater accuracy than co-ordinate
measuring machines

c. both a. and b.

c. project establishment

a. Malcolm Balbridge National Award

b. unstructured sessions

d. 1 – C, 2 – A, 3 – D, 4 – B

a. Inspection by variables

a. rejectable quality level

c. as number of items in a sample increase, higher is the possibility of number of defectives thereby probability of acceptance decreases

c. change for better quality

c. both a. and b.

c. Bronze

a. line standard

b. department of inspection

c. Autocollimator

c. Both a. and b.

b. Sensitivity of pressure gauge

b. cosine error

d. Minimum zone circle

b. Shaft is always bigger than the hole

a. Interference = maximum shaft − minimum hole

c. Optical flat

a. Mercury vapour lamp

d. Carrier modulating principle

b. Wallace surface dynamometer

a. Inspection probe

b. template matching and weighting

a. Quality of performance = quality of design + quality of conformance

d. Adopting new philosophy

a. Scatter diagram

b. Pareto chart

c. Only 3

a. C chart

b. Only 2

b. B

a. Environmental management systems

b. TS 16949

c. accuracy of ± 0.001 mm

c. 1-C, 2-D, 3-A, 4-B

a. Diameter

c. Clinometer uses micrometer to measure small angles

a. Solex pneumatic comparator

b. Runout

c. Both a and b

a. maximum metal condition

d. All of the above

b. 45°

a. concave surface

a. Photocell is used to measure light intensity

b. It is the average difference of five highest points and five deepest valleys measured within sampling length

b. Effective diameter of nut decreases and effective diameter of bolt increases

a. Go gauge

c. (number of teeth) / (pitch circle diameter)

a. tooth profile

c. It converts analog voltage levels to digital words

a. In single shear technique, two images have edge to edge contact and later on one image is shifted some distance over the other

d. all of the above

b. training time and cost

a. product design and development

d. All of the above

a. Only 1

c. sequential sampling plan

b. stratified sampling

a. Quality assurance deals with activities which prove that products and services meet the required quality standard

d. Only statement 2

b. Systematic errors

b. Only 2

b. Bilateral tolerance

d. All of the above

c. It can measure displacement and pressure

c. Phase difference is zero

a. Distance between maximum inscribing circle and minimum circumscribing circle measured radially

c. both a. and b.

b. minimum hole size

c. both a. and b.

b. Gauge has taper along its short corner

b. Length

c. Root mean square method

c. David Brown tangent comparator

d. all of the above

a. linear dimensions

a. Laser Doppler effect

c. merit rating leads to devastating

d. Total productive maintenance

d. all of the above

c. National Physics Laboratory

c. ideas suggested based on other ideas

MECHANICS OF MATERIALS:

1. Strain is defined as the ratio of
(a) Change in volume to original volume (b) Change in length to original length
(c) Change in cross-sectional area to original cross-sectional area (d) Any one of the above
(e) None of the above.

2.Hooke's law holds good up to
(a) yield point (b) limit of proportionality
(c) breaking point (d) elastic limit (e) plastic limit.

3. Young's modulus is defined as the ratio of
(a) volumetric stress and volumetric strain (b) lateral stress and lateral strain
(c) longitudinal stress and longitudinal strain (d) shear stress to shear strain
(e) longitudinal stress and lateral strain.

4.The unit of Young's modulus is
(a) mm/mm (b) kg/cm
(c) kg (d) kg/cm2 (e) kg cm2.

5.Deformation per unit length in the direction of force is known as
(a) strain (b) lateral strain
(c) linear strain (d) linear stress (e) unit strain.

6. It equal and opposite forces applied to a body tend to elongate it, the stress so produced is called
(a) internal resistance (b) tensile stress
(c) transverse stress (d) compressive stress (e) working stress.

7.The materials having same elastic properties in all directions are called
(a) ideal materials (b) uniform materials

(c) isotropic materials (d) paractical materials (e) elastic materials.

8. A thin mild steel wire is loaded by adding loads in equal increments till it breaks. The extensions noted with increasing loads will behave as under
(a) Uniform throughout (b) increase uniformly
(c) First increase and then decrease (d) increase uniformly first and then increase rapidly 2
(e) Increase rapidly first and then uniformly.

9. Modulus of rigidity is defined as the ratio of
(a) Longitudinal stress and longitudinal strain (b) volumetric stress and volumetric strain
(c) Lateral stress and lateral strain (d) shear stress and shear strain
(e) Linear stress and lateral strain.

10. If the radius of wire stretched by a load is doubled, then its Young's modulus will be
(a) Doubled (b) halved
(c) Become four times (d) become one-fourth (e) remain unaffected.

11. The ultimate tensile stress of mild steel compared to ultimate compressive stress is
(a) Same (b) more
(c) less (d) more or less depending on other factors
(e) unpredictable.

12. Tensile strength of a material is obtained by dividing the maximum load during the test by the
(a) Area at the time of fracture (b) original cross-sectional area
(c) Average of (a) and (b) (d) minimum area after fracture
(e) None of the above.

13. The impact strength of a material is an index of its
(a) Toughness (b) tensile strength
(c) capability of being cold worked (d) hardness
(e) fatigue strength.

14. The Young's modulus of a wire is defined as the stress which will increase the length of wire compared to its original length
(a) half (b) same amount
(c) double (d) one-fourth (e) four times.

15. Percentage reduction of area in performing tensile test on cast iron may be of the order of
(a) 50% (b) 25%

(c) 0% (d) 15% (e) 60%.

16. The intensity of stress which causes unit strain is called
(a) unit stress (b) bulk modulus
(c) modulus of rigidity (d) Modulus Of Elasticity (e) principal stress. 3

17. True stress-strain curve for materials is plotted between
(a) load/original cross-sectional area and change in length/original length
(b) load/instantaneous cross-sectional area original area and log.
(c) load/instantaneous cross-sectional area and change in length/original length
(d) load/instantaneous area and instantaneous area/original area
(e) none of the above.

18. The maximum deflection of a simply supported beam of length L with a central load W, is
(A) WL²/48EI (B) W²L/24EI
(C) WL3/48EI (D) WL²/8EI

19. For steel, the ultimate strength in shear as compared to in tension is nearly
(a) same (b) half
(c) one-third (d) two-third (e) one-fourth.

20. Which of the following has no unit
(a) Kinematic viscosity (b) surface tension
(c) bulk modulus (d) strain (e)elasticity.

21. Which is the false statement about true stress-strain method?
(a) It does not exist
(b) It is more sensitive to changes in both metallurgical and mechanical conditions
(c) It gives, a more accurate picture of the ductility
(d) It can be correlated with stress-strain values in other tests like torsion, impact, combined stress tests etc.
(e) It can be used for compression tests as well.

22. In a tensile test on mild steel specimen, the breaking stress as compared to ultimate tensile stress is
(a) more (b) less
(c) same (d) more/less depending on composition
(e) may have any value.

23. Which of the following materials is most elastic

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(a) rubber (b) plastic

(c) brass (d) steel (e) glass. 4

24.The value of modulus of elasticity for mild steel is of the order of

(a) 2.1xl05 kg/cm2 (b) 2.1 X 106 kg/cm2

(c) 2.1 x 107 kg/cm2 (d) 0.1 xlO6 kg/cm2 (<?) 3.8 x 106 kg/cm2.

25. The value of Poisson's ratio for steel is between

(a) 0.01 to 0.1 (b) 0.23 to 0.27

(c) 0.25 to 0.33 (d) 0.4 to 0.6 (e) 3 to 4.

27.The total elongation produced in a bar of uniform section hanging vertically downwards due
to its own weight is equal to that produced by a weight

(a) of same magnitude as that of bar and applied at the lower end

(b) half the weight of bar applied at lower end

(c) half of the square of weight of bar applied at lower end

(d) one-fourth of weight of bar applied at lower end

(e) none of the above.

28. The property of a material by virtue of which a body returns to its original, shape after
removal of the load is called

(a) plasticity (b) Elasticity

(c) ductility (d) malleability (e) resilience.

29. The materials which exhibit the same elastic properties in all directions are called

(a) homogeneous (b) inelastic

(c) isotropic (d) isentropic (e) visco-elastic.

30. The value of Poisson's ratio for cast iron is

(a) 0.1 to 0.2 (b) 0.23 to 0.27

(c) 0.25 to 0.33 (d) 0.4 to 0.6 (e) 3 to 4.

31. The property of a material which allows it to be drawn into a smaller section is called

(a) plasticity (b) ductility

(c) elasticity (d) malleability (e) drawabihty.

32. Poisson's ratio is defined as the ratio of

(a) longitudinal stress and longitudinal strain (b) longitudinal stress and lateral stress

(c) lateral stress and longitudinal stress (d) lateral stress and lateral strain

(e) none of the above.

33. For which material the Poisson's ratio is more than unity

(a) steel (b) copper 5

(c) aluminium (d) cast iron (e) none of the above.

34. The property of a material by virtue of which it can be beaten or rolled into plates is called
(a) malleability (b) ductility
(c) plasticity (d) elasticity (e) reliability.

35. The change in the unit volume of a material under tension with increase in its Poisson's ratio will ,

(a) increase (b) decrease

(c) remain same (d) increase initially and then decrease (e) Unpredictable.

36. The percentage reduction in area of a cast iron specimen during tensile test would be of the order of

(a) more than 50% (b) 25—50%

(c) 10—25% (d) 5—10% (e) negligible.

37..If a circular beam of diameter d experiences a longitudinal strain P/E and a lateral strain 2P/mE, the volumetric strain is

(A) $(P/E) + (2P/mE)$

(B) $(P/E) - (2P/mE)$

(C) $(P/E) + (mE/2P)$

(D) $(P/E) - (mE/2P)$

38. If a material expands freely due to heating it will develop
(a) thermal stresses (b) tensile stress
(c) bending (d) compressive stress (e) no stress.

39. In a tensile test, near the elastic limit zone, the
(a) tensile strain increases more quickly
(b) tensile strain decreases more quickly
(c) tensile strain increases in proportion to the stress
(d) tensile strain decreases in proportion to the stress
(e) tensile strain remains constant.

40. Maximum deflection of a cantilever due to pure bending moment M at its free end, is
(A) $ML^2/3EI$ (B) $ML^2/4EI$
(C) $ML^2/6EI$ (D) $ML^2/2EI$ 6

41. In the tensile test, the phenomenon of slow extension of the material, i. e. stress increasing with the time at a constant load is called
(a) creeping (b) yielding
(c) breaking (d) plasticity (e) none of the above.

42. The stress developed in a material at breaking point in extension is called
(a) breaking stress (b) fracture stress
(c) yield point stress (d) ultimate tensile stress (e) proof stress.

43. Rupture stress is
(a) breaking stress (b) maximum load/original cross-sectional area
(c) load at breaking point/A (d) load at breaking point/neck area
(e) maximum stress.

44. The elasticity of various materials is controlled by its
(a) ultimate tensile stress (b) proof stress
(c) stress at yield point (d) stress at elastic limit (e) tensile stress.

45. The ratio of lateral strain to the linear strain within elastic limit is known as
(a) Young's modulus (b) bulk modulus
(c) modulus of rigidity (d) modulus of elasticity (e) Poisson's ratio.

46. The ratio of direct stress to volumetric strain in case of a body subjected to three mutually perpendicular stresses of equal intensity, is equal to
(a) Young's modulus (b) bulk modulus
(c) modulus of rigidity (d) modulus of elasticity (e)Poisson's ratio.

47. The stress at which extension of the material takes place more quickly as compared to the increase in load is called
(a) elastic point of the material (b) plastic point of the material
(c) breaking point of the material (d) yielding point of the material
(e) ultimate point of the material.

48. For structural analysis, Maxwell's reciprocal theorem can be applied to:
(A) Plastic structures (B) Elastic structures
(C) Symmetrical structures (D) All the above 7

49. If all the dimensions of a bar are increased in the proportion n : 1, the proportion with which the maximum stress produced in the prismatic bar by its own weight, will increase in the ratio
(A) 1 : n (B) n : 1

(C) 1 : (1/n) (D) 1 : n

50. Which of the following is a vector quantity?
(A) Energy (B) Mass
(C) Momentum (D) Angle

51. The energy absorbed in a body, when it is strained within the elastic limits, is known as
(a) strain energy (b) resilience
(c) proof resilience (d) modulus of resilience (e) toughness.

52. Resilience of a material is considered when it is subjected to
(a) frequent heat treatment (b) fatigue
(c) creep (d) shock loading (e) resonant condition.

53. The maximum strain energy that can be stored in a body is known as
(a) impact energy (b) resilience
(c) proof resilience (d) modulus of resilience (e) toughness.

54. The total strain energy stored in a body is termed as
(a) resilience (b) proof resilience
(c) modulus of resilience (d) toughness (e) impact energy.

55. Proof resilience per material is known as
(a) resilience (b) proof resilience
(c) modulus of resilience (d) toughness (e) impact energy.

56. The stress induced in a body due to suddenly applied load compared to when it is applied gradually is
(a) same (b) half
(c) two times (d) four times (e) none of the above. 8

57. The strain energy stored in a body due to suddenly applied load compared to when it is applied gradually is
(a) same (b) twice
(c) four times (d) eight times (e) half.

58. A material capable of absorbing large amount of energy before fracture is known as
(a) ductility (b) toughness
(c) resilience (d) shock proof (e) plasticity.

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59. For a given material, if E, C, K and m are Young's modulus, shearing modulus, bulk modulus and Poisson ratio, the following relation does not hold good
(A) E = 9KC/3K + C (B) E = 2K (1 + 2/m)
(C) E = 2C (1 + 1/m) (D) E = 3C (1 - 1/m)

60. A beam is loaded as cantilever. If the load at the end is increased, the failure will occur
(a) in the middle (b) at the tip below the load
(c) at the support (d) anywhere (e) none of the above.

61. A non-yielding support implies that the
(a) support is frictionless (b) support can take any amount of reaction
(c) support holds member firmly (d) slope of the beam at the support is zero
(e) none of the above.

62. The ratio of elongation in a prismatic bar due to its own weight (W) as compared to another similar bar carrying an additional weight (W) will be
(a) 1:2 (b) 1 : 3
(c) 1 : 4 (d) 1 : 2.5 (e) 1 : 2.25.

63. In a prismatic member made of two materials so joined that they deform equally under axial stress, the unit stresses in two materials are
(a) equal
(b) proportional to their respective moduli of elasticity
(c) inversely proportional to their moduli of elasticity
(d) average of the sum of moduli of elas-ticity
(e) none of the above.

64. Maximum deflection of a
(A) Cantilever beam carrying a concentrated load W at its free end is WL3/3EI 9
(B) Simply supported beam carrying a concentrated load W at mid-span is WL3/48EI
(C) Cantilever beam, carrying a uniformly distributed load over span is WL3/8EI
(D) All the above

65. If two tensile forces mutually perpendicular act on a rectangular parallelepiped bar are equal, the resulting elongation of the pipe, is
(A) (P/E) (1 - m) (B) (E/P) (m -1)
(C) (E/P) (1 - m) (D) (P/E) (1 + m)

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66. The section modulus of a rectangular section is proportional to
(A) Area of the section
(B) Square of the area of the section
(C) Product of the area and depth
(D) Product of the area and width

67. Stress in a beam due to simple bending, is
(A) Directly proportional (B) Inversely proportional
(C) Curvilinearly related (D) None of these

68. The unit of work or energy in S.I. units is
(A) Newton
(B) Pascal
(C) Kilogram meter
(D) Joule

69. The shear force on a simply supported beam is proportional to
(A) Displacement of the neutral axis (B) Sum of the forces
(C) Sum of the transverse forces
(D) Algebraic sum of the transverse forces of the section

70. Which of the following is not the unit of distance?
(A) Angstrom (B) Light year
(C) Micron (D) Milestone

71. In a bar of large length when held vertically and subjected to a load at its lower end, its own-weight produces additional stress. The maximum stress will be
(A) At the lower cross-section (B) At the built-in upper cross-section 10
(C) At the central cross-section (D) At every point of the bar

72. The value of Poisson's ratio always remains
(A) Greater than one (B) Less than one
(C) Equal to one (D) None of these

73.The B.M. diagram of the beam shown in below figure, is
(A) A rectangle (B) A triangle
(C) A trapezium (D) A parabola

74. The deformation of a bar under its own weight compared to the deformation of same body subjected to a direct load equal to weight of the body is
(a) same (b) double
(c) half (d) four times (e) one-fourth.

75. The force acting along the circumference will cause stress in the walls in a direction normal to the longitudinal axis of cylinder; this stress is called
(a) longitudinal stress (b) hoop stress
(c) yeiled stress (d) ultimate stress (e) none of the above.

76. A boiler shell 200 cm diameter and plate thickness 1.5 cm is subjected to internal pressure of 1.5 MN/m , then the hoop stress will be
(a) 30 MN/m2 (b) 50 MN/m2
(c) 100 MN/m2 (d) 200 MN/m2 (e) 300 MN/m2

77. A cylindrical section having no joint is known as
(a) jointless section (b) homogeneous section
(c) perfect section (d) manufactured section (e) seamless section.

78. Longitudinal stress in a thin cylinder is
(a) equal to the hoop stress (b) twice the hoop stress
(c) half of the hoop stress (d) one-fourth of hoop stress
(e) four times the hoop stress.

79. The safe twisting moment for a compound shaft is equal to the
(a) maximum calculated value (b) minimum calculated value 11
(c) mean value (d) extreme value
(e) none of the above.

80. The torsional rigidity of a shaft is expressed by the
(a) maximum torque it can transmit
(b) number of cycles it undergoes before failure
(c) elastic limit up to which it resists torsion, shear and bending stresses
(d) torque required to produce a twist of one radian per unit length of shaft
(e) maximum power it can transmit at highest possible-speed.

81. The value of shear stress which is induced in the shaft due to the applied couple varies
(a) from maximum at the center to zero at the circumference
(b) from zero at the center to maximum at the circumference
(c) from maximum at the center to mini-mum at the cricumference

(d) from minimum at the centro to maxi-mum at the circumference

(e) none of the above.

82. A rectangular bar of width b and height h is being used as a cantilever. The loading is in a plane parallel to the side b. The section modulus is

(A) bh3/12 (B) bh²/6

(C) b²h/6 (D) None of these

83. A beam is said to be of uniform strength, if

(A) B.M. is same throughout the beam

(B) Shear stress is same throughout the beam

(C) Deflection is same throughout the beam

(D) Bending stress is same at every section along its longitudinal axis

84. Shear stress induced in a shaft subjected to tension will be

(a) maximum at periphery and zero at center (b) maximum at center

(c) uniform throughout (d) average value in center

(e) none of the above.

85.A long vertical member, subjected to an axial compressive load, is called

(A) A column (B) A strut

(C) A tie (D) A stanchion 12

86. The intensity of direct longitudinal stress in the cross-section at any point distant r from the neutral axis, is proportional to

(A) r (B) 1/r

(C) r2 (D) 1/r²

87. The ratio of the moments of resistance of a solid circular shaft of diameter D and a hollow shaft (external diameter D and internal diameter d), is

(A) D4/(D4 – d4) (B) D3/(D3 – d3)

(C) (D4 – d4)/D4 (D) (D3 – d3)/D3

88. The maximum stress intensity due to a suddenly applied load is x-times the stress intensity produced by the load of the same magnitude applied gradually. The value of x is

(A) 1 (B) 2

(C) 3 (D) 1/2

89. The unit of power in S.I. units is

(A) Newton meter (B) Watt

(C) Joule (D) Kilogram meter/sec

90. The maximum bending moment due to a moving load on a simply supported beam, occurs
(A) At the mid span (B) At the supports
(C) Under the load (D) Anywhere on the beam

91. During a tensile test on a ductile material
(A) Nominal stress at fracture is higher than the ultimate stress
(B) True stress at fracture is higher than the ultimate stress
(C) True stress at fracture is the same as the ultimate stress
(D) None of these

92. Pick up the correct statement from the following:
(A) The rate of change of bending moment is equal to rate of shear force
(B) The rate of change of shear force is equal to rate of loading
(C) Neither (a) nor (b)
(D) Both (a) and (b)

93. In a loaded beam, the point of contraflexure occurs at a section where
(A) Bending moment is minimum 13
(B) Bending moment is zero or changes sign
(C) Bending moment is maximum
(D) Shearing force is maximum

94. Shear deflection of a cantilever of length L, cross sectional area A and shear modulus G, under a concentrated load W at its free end, is
(A) (2/3) (WL/AG) (B) (1/3) (WL²/EIA)
(C) (3/2) (WL/AG) (D) (3/2) (WL²/AG)

95. Which of the following is not the unit of work, energy and heat?
(A) kcal (B) kg m
(C) kWhr (D) hp

96. In a shaft shear stress intensity at a point is not
(A) Directly proportional to the distance from the axis
(B) Inversely proportional to the distance from the axis
(C) Inversely proportional to the polar moment of inertia
(D) Directly proportional to the applied torque

97. Pick up the correct assumption of the theory of simple bending

(A) The value of the Young's modulus is the same in tension as well as in compression

(B) Transverse section of a beam remains plane before and after bending

(C) The material of the beam is homogeneous and isotropic

(D) All the above

98. A closely coiled helical spring of radius R, contains n turns and is subjected to an axial load W. If the radius of the coil wire is r and modulus of rigidity of the coil material is C, the deflection of the coil is

(A) WR3 n/Cr4 (B) 2WR3 n/Cr4

(C) 3WR3 n/Cr4 (D) 4WR3 n/Cr4

99. The slenderness ratio of a vertical column of a square cross-section of 2.5 cm sides and 300 cm length, is

(A) 200 (B) 240

(C) 360 (D) 416 14

100. A cast iron T section beam is subjected to pure bending. For maximum compressive stress to be three times the maximum tensile stress, centre of gravity of the section from flange side is

(A) h/4 (B) h/3

(C) h/2 (D) 2/3 h

101. The units of moment of inertia of an area are

(A) kg m² (B) m4

(C) kg/m² (D) m3

102. The phenomenon of slow extension of materials having constant load, i.e. increasing with the time is called

(A) Creeping (B) Yielding

(C) Breaking (D) None of these

103. The maximum deflection of

(A) A simply supported beam carrying a uniformly increasing load from either end and having the apex at the mid span is WL3/60EI

(B) A fixed ended beam carrying a distributed load over the span is WL3/384EI

(C) A fixed ended beam carrying a concentrated load at the mid span is WL3/192EI

(D) All the above

104. The B.M. of a cantilever beam shown in below figure at A, is

(A) Zero (B) 8 Tm

(C) 12 Tm (D) 20 Tm

105. A cantilever carries is uniformly distributed load W over its whole length and a force W acts at its free end upward. The net deflection of the free end will be
(A) Zero (B) (5/24) (WL3/EI) upward 15
(C) (5/24) (WL3/EI) downward (D) None of these

106. Strain energy of a member may be equated to
(A) Average resistance × displacement
(B) ½ stress × strain × area of its cross-section
(C) ½ stress × strain × volume of the member
(D) ½ (stress)2 × volume of the member + Young's modulus E

107. The ratio of strengths of solid to hollow shafts, both having outside diameter D and hollow having inside diameter D/2, in torsion, is
(A) ¼ (B) 1/2
(C) 1/16 (D) 15/15

108. Along the neutral axis of a simply supported beam
(A) Fibres do not undergo strain (B) Fibres undergo minimum strain
(C) Fibres undergo maximum strain (D) None of these

109. A composite member shown in below figure was formed at 25°C and was made of two materials a and b. If the coefficient of thermal expansion of a is more than that of b and the composite member is heated upto 45°C, then
(A) a will be in tension and b in compression
(B) Both will be in compression
(C) Both will be in tension
(D) a will be in compression and b in tension

110. If a constant section beam is subjected to a uniform bending moment throughout, its length bends to 16
(A) A circular arc (B) A parabolic arc
(C) A catenary (D) None of these

111. The shape of the bending moment diagram over the length of a beam, carrying a uniformly increasing load, is always
(A) Linear (B) Parabolic
(C) Cubical (D) Circular

112. The shape of the bending moment diagram over the length of a beam, carrying a uniformly distributed load is always
(A) Linear (B) Parabolic
(C) Cubical (D) Circular

113. The moment diagram for a cantilever whose free end is subjected to a bending moment, will be a
(A) Triangle (B) Rectangle
(C) Parabola (D) Cubic parabola

114. The law which states, "Within elastic limits strain produced is proportional to the stress producing it", is known as
(A) Bernoulli's law (B) Stress law
(C) Hooke's law (D) Poisson's law

115. Simple bending equation is
(A) $M/I = R/E = F/Y$ (B) $I/M = E/R = Y/F$
(C) $M/I = E/R = F/Y$ (D) $M/I = R/E = Y/F$

116. The equivalent length of a column fixed at both ends, is
(A) $0.5\,l$ (B) $0.7\,l$
(C) l (D) $1.5\,l$ 17

117. A simply supported beam of span L carries a concentrated load W at its mid-span. The maximum bending moment M is
(A) $WL/2$ (B) $WL/4$
(C) $WL/8$ (D) $WL/12$

118. The following assumption is not true in the theory of pure torsion:
(A) The twist along the shaft is uniform
(B) The shaft is of uniform circular section throughout
(C) Cross-section of the shaft, which is plane before twist remains plane after twist
(D) All radii get twisted due to torsion

119. Shear force for a cantilever carrying a uniformly distributed load over its length, is
(A) Triangle (B) Rectangle
(C) Parabola (D) Cubic parabola

120. For structural analysis of forces, the method refers to
(A) Moment-area- theorem (B) Three-moment equation

(C) Maxwell's reciprocal theorem (D) None of these

121. If the shear force along a section of a beam is zero, the bending moment at the section is
(A) Zero (B) Maximum
(C) Minimum (D) Average of maximum-minimum

122. The moment diagram for a cantilever carrying a concentrated load at its free end, will be
(A) Triangle (B) Rectangle
(C) Parabola (D) Cubic parabola 18

123. The shear stress at any section of a shaft is maximum
(A) At the centre of the section (B) At a distance r/2 from the centre
(C) At the top of the surface (D) At a distance 3/4 r from the centre

124. A member which is subjected to reversible tensile or compressive stress may fail at a stress lower than the ultimate stress of the material. This property of metal, is called
(A) Plasticity of the metal (B) Elasticity of the metal
(C) Fatigue of the metal (D)Workability of the metal

125. A reinforced concrete beam is assumed to be made of
(A) Homogeneous material (B) Heterogeneous material
(C) Isotropic material (D) None of these

126. If is the internal pressure in a thin cylinder of diameter and thickness , the developed hoop stress, is
(A) pd/2t (B) pd/4t
(C) pd/t (D) 2pd/ t

127.The buckling load for a given material depends on
(a) Slenderness ratio and area of cross-section
(b) Poisson's ratio and modulus of elasticity
(c) Slenderness ratio and modulus of elasticity
(d) Slenderness ratio, area of cross-section and modulus of elasticity
(e) Poisson's ratio and slenderness ratio.

MACHINE TOOLS AND OPERATION

1.The forces required for metal cutting operation
a. increase with increase in the feed of the tool and decreases with increase in the depth of cut

b. decrease with increase in the feed of the tool and increases with increase in the depth of cut

c. increase with increase in both the feed of the tool and the depth of cut

d. decrease with increase in both the feed of the tool and the depth of cut

Answer Explanation

ANSWER: increase with increase in both the feed of the tool and the depth of cut

2. Which type of chips form while machining of brittle materials?

a. continuous chips

b. discontinuous chips

c. Built-up chips

d. all of the above with some proportion

Answer Explanation

ANSWER: discontinuous chips

3. The angle between side cutting edge and end cutting edge is called as

a. approach angle

b. nose angle

c. side relief angle

d. end relief angle

Answer Explanation

ANSWER: nose angle

4. In metal cutting process

a. material removal is affected by relative motion between tool and the workpiece

b. material removal is not affected by relative motion between tool and the workpiece

Answer Explanation

ANSWER: material removal is affected by relative motion between tool and the workpiece

5. The cutting tool removes the metal from workpiece in the form of

a. solid blocks

b. powder

c. chips

d. all of the above

Answer Explanation

ANSWER: chips

6. In the metal cutting process, when the compression limit of the metal in front of the cutting tool has been exceeded then it is separated from workpiece and flows

a. elastically

b. plastically

c. rigidly

d. none of the above

Answer Explanation

ANSWER: plastically

7. Continuous chips are formed during metal cutting operation due to

a. ductile work materials

b. large rake angle

c. high cutting speed

d. all of the above

Answer Explanation

ANSWER: all of the above

8. The surface of the single point cutting tool on which the chips formed in cutting operation slide is called as

a. flank

b. heel

c. face

d. shank

Answer Explanation

ANSWER: face

9. Lead angle in the single point cutting tool is the angle between

a. the end cutting edge and the normal to the tool shank

b. the portion of side shank immediately below the side cutting edge and the line perpendicular to the

base of the tool

c. the tool face and the parallel to the base of the tool

d. side cutting edge and the side of the tool shank

Answer Explanation

ANSWER: side cutting edge and the side of the tool shank

10. Tool life in orthogonal cutting is

a. more than the tool life in oblique cutting

b. less than the tool life in oblique cutting

c. equal to the tool life in oblique cutting

d. cannot say

Answer Explanation

ANSWER: less than the tool life in oblique cutting

11. What is the angle Φ shown in the below diagram of basic mechanism of chip formation?

a. Shear angle

b. Tool rake angle

c. Chip angle

d. Cutting angle

Answer Explanation

ANSWER: Shear angle

12. In metal cutting operation, maximum heat (i.e. 80-85%) is generated in

a. the shear zone

b. the chip-tool interface zone

c. the tool-work interface zone

d. none of the above

Answer Explanation

ANSWER: the shear zone

13. Which cutting condition affects the cutting temperature predominantly?

a. depth of cut

b. cutting speed

c. feed

d. none of the above has any effect on cutting temperature

Answer Explanation

ANSWER: cutting speed

14. The point at which the cutting tool reaches, beyond which it will not function
satisfactorily until it is reground, is called as

a. tool wear

b. tool failure

c. too diffusion

d. none of the above

Answer Explanation

ANSWER: tool failure

15. The point at which the cutting tool reaches, beyond which it will not function satisfactorily
until

it is reground, is called as

a. tool wear

b. tool failure

c. too diffusion

d. none of the above

Answer Explanation Related Ques

ANSWER: tool failure

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a. the shear zone

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c. the tool-work interface zone

d. none of the above

Answer Explanation Related Ques

ANSWER: the shear zone

18. The forces required for metal cutting operation

a. increase with increase in the feed of the tool and decreases with increase in the depth of cut

b. decrease with increase in the feed of the tool and increases with increase in the depth of cut

c. increase with increase in both the feed of the tool and the depth of cut

d. decrease with increase in both the feed of the tool and the depth of cut

Answer Explanation Related Ques

ANSWER: increase with increase in both the feed of the tool and the depth of cut

19. Which fixtures are used for machining parts which must have machined details evenly spaced?

a. Profile fixtures

b. Duplex fixtures

c. Indexing fixtures

d. None of the above

Answer Explanation Related Ques

ANSWER: Indexing fixtures

20.The device which is used to remove workpiece from close-fitting locators, after the workpiece has been removed is called as

a. remover

b. ejector

c. escaper

d. blocker

Answer Explanation Related Ques

ANSWER: ejector

21. V-blocks (Vee locators) are used for clamping as well as locating when faces are inclined upto

a. 30o

b. 12o

c. 9o

d. 3o

Answer Explanation Related Ques

ANSWER: 3o

22. Which type of Support pin or rest button is shown in below diagram?

a. Fixed type support pin

b. Adjustable type support pin

c. Support pad

d. Wedge type support pin

Answer Explanation Related Ques

ANSWER: Fixed type support pin

23. The device which place the workpiece in the same position, in jig and fixture, cycle after cycle
is called as

a. placing device

b. fixing device

c. locating device

d. positioning device

Answer Explanation Related Ques

ANSWER: locating device

24. Which machine tool reduces the number of set-ups in machining operation, time spent in setting machine tools and transportation between sections of machines?

a. Computer Numerical Control machine tool

b. Direct Numerical Control machine tool

c. Adaptive Control Systems

d. Machining centre

Answer Explanation Related Ques

ANSWER: Machining centre

25. The machine tool, in which calculation and setting of the operating conditions like depth of cut, feed, speed are done during the machining by the control system itself, is called

a. Computer Numerical Control System

b. Direct Numerical Control System

c. Machining Centre System

d. Adaptive Control System

Answer Explanation Related Ques

ANSWER: Adaptive Control System

26. Part-programming mistakes can be avoided in

a. NC (Numerical Control) machine tool

b. CNC (Computer Numerical Control) machine tool

c. Both a. and b.

d. None of the above

Answer Explanation Related Ques

ANSWER: CNC (Computer Numerical Control) machine tool

27. Several machine tools can be controlled by a central computer in

a. NC (Numerical Control) machine tool

b. CNC (Computer Numerical Control) machine tool

c. DNC (Direct Numerical Control) machine tool

d. CCNC (Central-Computer Numerical Control) machine tool

Answer Explanation Related Ques

ANSWER: DNC (Direct Numerical Control) machine tool

28. Which of the following statements are correct for CNC machine tool?

1. CNC control unit does not allow compensation for any changes in the dimensions of cutting tool

2. CNC machine tool are suitable for long run applications

3. It is possible to obtain information on machine utilization which is useful to management in CNC machine tool

4. CNC machine tool has greater flexibility

5. CNC machine can diagnose program and can detect the machine defects even before the part is produced

a. (1), (2) and (3)

b. (2), (4) and (5)

c. (3), (4) and (5)

d. (2), (3), (4) and (5)

Answer Explanation Related Ques

ANSWER: (3), (4) and (5)

29. Which of the following process has highest rate of metal removal?

a. Electric Discharge Machining (EDM)

b. Electro-Chemical Machining (ECM)

c. Ultrasonic Machining (USM)

d. Laser Beam Machining (LBM)

Answer Explanation Related Ques

ANSWER: Electro-Chemical Machining (ECM)

30. The Laser Beam Machining process can be carried out, when the media for energy transfer between tool and workpiece is

a. air

b. liquid

c. vacuum

d. any of the above medium

Answer Explanation Related Ques

ANSWER: any of the above medium

31. Which of the following processes is generally applied for dentistry work like to drill fine holes

of particular shape in teeth?

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a. Electrical Discharge Machining (EDM)

b. Electron Beam Machining (EBM)

c. Laser Beam Machining (LBM)

d. Ultrasonic Machining (USM)

Answer Explanation Related Ques

ANSWER: Ultrasonic Machining (USM)

32. In which process the material is removed due to the action of abrasive grains?

a. Electro-Chemical Grinding (ECG)

b. Ultrasonic Machining (USM)

c. Laser Beam Machining (LBM)

d. Electrical Discharge Machining (EDM)

Answer Explanation Related Ques

ANSWER: Ultrasonic Machining (USM)

33. Which of the following statements are true for Electro-Chemical Machining (ECM)?

1. ECM is capable of machining metals and alloys irrespective of their strength and hardness

2. No cutting forces are involved in ECM process

3. ECM process consumes very high power

4. Very small space is required to set up ECM process

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a. (1), (2) and (3)

b. (2), (3) and (4)

c. (1), (3) and (4)

d. (1), (2) and (4)

Answer Explanation Related Ques

ANSWER: (1), (2) and (3)

34. Tool life in orthogonal cutting is

a. more than the tool life in oblique cutting

b. less than the tool life in oblique cutting

c. equal to the tool life in oblique cutting

d. cannot say

Answer Explanation Related Ques

ANSWER: less than the tool life in oblique cutting

35. The angle between side cutting edge and end cutting edge is called as

a. approach angle

b. nose angle

c. side relief angle

d. end relief angle

Answer Explanation Related Ques

ANSWER: nose angle

36. Lead angle in the single point cutting tool is the angle between

a. the end cutting edge and the normal to the tool shank

b. the portion of side shank immediately below the side cutting edge and the line perpendicular to the base of the

tool

c. the tool face and the parallel to the base of the tool

d. side cutting edge and the side of the tool shank

Answer Explanation Related Ques

ANSWER: side cutting edge and the side of the tool shank

37. The surface of the single point cutting tool on which the chips formed in cutting operation slide is called as

a. flank

b. heel

c. face

d. shank

Answer Explanation Related Ques

ANSWER: face

38. When the finishing is more important than the dimension then

a. honing operation is carried out for finishing

b. lapping operation is carried out for finishing

c. grinding operation is carried out for finishing

d. all of the above

Answer Explanation Related Ques

ANSWER: lapping operation is carried out for finishing

39. The productivity of honing operation is

a. less than the productivity of lapping operation

b. more than the productivity of lapping operation

c. equal to the productivity of lapping operation for the same workpiece

d. unpredictable

Answer Explanation Related Ques

ANSWER: more than the productivity of lapping operation

40. Which of the following is/are example/s of honing operation?

a. Roller bearing races

b. Diesel engine cylinder bore

c. Hub holes in gears of gear boxes

d. All of the above

Answer Explanation Related Ques

ANSWER: All of the above

41. Which type of grinding wheel is shown in below diagram?

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a. Dish wheel

b. Cup wheel

c. Saucer wheel

d. Cylinder wheel

Answer Explanation Related Ques

ANSWER: Saucer wheel

42. The performance of grinding wheel is evaluated in terms of grinding ratio (G) which is given by the ratio of

a. the volume of material required to the volume of wheel wear

b. the volume of wheel wear to the volume of material required

Answer Explanation Related Ques

ANSWER: the volume of material required to the volume of wheel wear

43. The thickness of layer material removed in one pass of workpiece under the cutter is called as

a. single pass cut

b. depth of cut

c. width of cut

d. face cut

Answer Explanation Related Ques

ANSWER: depth of cut

44. How is the workpiece fed of in down milling process?

a. In down milling process, the workpiece is fed in the same direction as that of cutter's tangential

velocity

b. In down milling process, the workpiece is fed in the opposite direction as that of cutter's tangential

velocity

Answer Explanation Related Ques

ANSWER: In down milling process, the workpiece is fed in the same direction as that of cutter's tangential velocity

45. Which operation can correct hole location, size or alignment of the hole which is already drilled in workpiece?

a. Boring

b. Rimming

c. Both a. and b

d. None of the above

Answer Explanation Related Ques

ANSWER: Boring

46. Calculate the cutting speed of drilling operation when diameter of drill is 10 mm and rotational speed of drill is 200 r.p.m.

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a. 6.283 m/min

b. 3.142 m/min

c. 8.362 m/min

d. 10.216 m/min

Answer Explanation Related Ques

ANSWER: 6.283 m/min

47. Which type of drilling operation is shown in below diagram?

a. Boring

b. Counterboring

c. Sinking

d. Countersinking

Answer Explanation Related Ques

ANSWER: Countersinking

48. Which of the following sentences are true for jigs and fixtures?

1. Using jigs and fixture produce work rapidly

2. High speed, feed and depth of cut can be used in machining with the help of jigs and fixtures

3. Jigs and fixture cannot be used in machining of complex and heavy components

a. (1) and (2)

b. (2) and (3)

c. (1) and (3)

d. All of the (1), (2) and (3)

Answer Explanation Related Ques

ANSWER: (1) and (2)

49. How jigs are in terms of weight compared to fixtures?

a. Jigs are lighter than fixtures

b. Jigs are heavier than fixtures

c. Jigs are equal in weight to fixtures for same operation

d. cannot say

Answer Explanation Related Ques

ANSWER: Jigs are lighter than fixtures

50. Fixtures are used in connection with

a. drilling operation

b. reaming operation

c. tapping operation

d. milling operation

Answer Explanation Related Ques

ANSWER: milling operation

51. A device, in which a component is held and located for a specific operation and bushes are integrated that guide the tool, is called as

a. jig

b. fixture

c. both a. and b.

d. none of the above

Answer Explanation Related Ques

ANSWER: jig

52. Jigs and fixtures are

a. machining tools

b. precision tools

c. both a. and b.

d. none of the above

Answer Explanation Related Ques

ANSWER: precision tools

53. In CNC machine tool, the part program entered into the computer memory

a. can be used only once

b. can be used again and again

c. can be used again but it has to be modified every time

d. cannot say

Answer Explanation Related Ques

ANSWER: can be used again and again

54. Which of the following options is correct for the control unit and panel of NC (Numerical Control) and CNC (Computer Numerical Control) machine tools?

a. The control unit of NC machine tool works in ON-line mode and the control unit of CNC machine

tool works in batch processing mode

b. The control unit of NC machine tool works in batch processing mode and the control unit of CNC

machine tool works in ON-line mode

c. The control units of both NC and CNC machines work in ON-line mode

d. The control units of both NC and CNC machines work in batch processing mode

Answer Explanation Related Ques

ANSWER: The control unit of NC machine tool works in batch processing mode and the control unit of CNC machine tool works in ON-line mode

55. In NC (Numerical Control) machine tool, the position feedback package is connected between

a. control unit and programmer

b. programmer and machine tool

c. control unit and machine tool

d. programmer and process planning

Answer Explanation Related Ques

ANSWER: control unit and machine tool

56. The device, fed to the control unit of NC machine tool which sends the position command signals to sideway transmission elements of the machine, is called as

a. controller

b. tape

c. feedback unit

d. none of the above

Answer Explanation Related Ques

ANSWER: tape

57. Arrange the below operations in operator controlled machine tool in correct order.

(A) Operator

(B) Process planning

(C) Machine tool

(D) Component drawing

(E) Completed component

a. (A) – (D) – (B) – (C) – (E)

b. (D) – (B) – (C) – (A) – (E)

c. (B) – (D) – (C) – (A) – (E)

d. (D) – (B) – (A) – (C) – (E)

Answer Explanation Related Ques

ANSWER: (D) – (B) – (A) – (C) – (E)

58. The cutting tool removes the metal from workpiece in the form of

a. solid blocks

b. powder

c. chips

d. all of the above

Answer Explanation Related Ques

ANSWER: chips

59. In Electrical Discharge Machining (EDM) process the metal removal is carried out by

a. electrolysis

b. melting and vaporization

c. fracture of work material due to impact of grains

d. none of the above

Answer Explanation Related Ques

ANSWER: melting and vaporization

60. Which of the following materials is/are used for Electrical Discharge Machining (EDM) process?

a. Brass

b. Copper

c. Graphite

d. All of the above

Answer Explanation Related Ques

ANSWER: All of the above

Explanation:

No explanation is available for this question!

61.The spark gap in Electrical Discharge Machining (EDM) process is maintained such that

a. the gap voltage is around 99% of supply voltage

b. the gap voltage is around 70% of supply voltage

c. the gap voltage is around 50% of supply voltage

d. the gap voltage is around 10% of supply voltage

Answer Explanation Related Ques

ANSWER: the gap voltage is around 70% of supply voltage

62. Which of the following is not a media of energy transfer on which the advanced machining processes are classified?

a. Reactive atmosphere

b. Electrons

c. Electrolyte

d. Chemical ablation

Answer Explanation Related Ques

ANSWER: Chemical ablation

63. What is the reason for using unconventional or advanced machining processes?

a. Complex surfaces

b. High accuracy and surface finish

c. High strength alloys

d. All of the above

Answer Explanation Related Ques

ANSWER: All of the above

64. Continuous chips are formed during metal cutting operation due to

a. ductile work materials

b. large rake angle

c. high cutting speed

d. all of the above

Answer Explanation Related Ques

ANSWER: all of the above

65. In metal cutting process

a. material removal is affected by relative motion between tool and the workpiece

b. material removal is not affected by relative motion between tool and the workpiece

Answer Explanation Related Ques

ANSWER: material removal is affected by relative motion between tool and the workpiece

66. Which of the following statements are true for centreless grinding?

1. Less metal needs to be removed in centreless grinding operation

2. The setup time for centreless grinding operation is small

3. The requirement of wheel adjustment in centreless grinding operation is minimum

4. The centreless grinding operation can be applied equally to both internal and external grinding

a. (1), (2) and (3)

b. (2), (3) and (4)

c. (1), (3) and (4)

d. (1), (2) and (4)

Answer Explanation Related Ques

ANSWER: (1), (3) and (4)

67. Which process is used for grinding splined shafts?

a. External cylindrical grinding

b. Internal cylindrical grinding

c. Surface grinding

d. Form grinding

Answer Explanation Related Ques

ANSWER: Form grinding

68. Rough grinding process is commonly used for

a. removing excess material from casting

b. cutting materials that are too hard to be machined by other conventional tools

c. producing surfaces on parts to higher dimensional accuracy

d. obtaining finer finish

Answer Explanation Related Ques

ANSWER: removing excess material from casting

69. The grinding process results in good surface finishing because

a. the chip removed during the process is small

b. the process is carried out at high cutting speed

c. both a. and b.

d. none of the above

Answer Explanation Related Ques

ANSWER: both a. and b.

70. The material which holds the fine grains of abrasive material in grinding wheel is called

as

a. compound

b. bond

c. hold

d. none of the above

Answer Explanation Related Ques

ANSWER: bond

71. Which drilling machine is used to perform drilling operation on the workpieces which

are too heavy and also maybe too large to mount on worktable?

a. Portable drilling machine

b. Sensitive drilling machine

c. Radial drilling machine

d. none of the above

Answer Explanation Related Ques

ANSWER: Radial drilling machine

72. What does the boring mean?

a. a process of making a hole in an object

b. a process of enlarging a hole which is already in an object

c. a process of finishing an existing hole very smoothly and accurately in size

d. none of the above

Answer Explanation Related Ques

ANSWER: a process of enlarging a hole which is already in an object

73. Which type of machine tool is shown below, which is used in shaping machine?

a. Goose neck

b. Parting off

c. Side recessing

d. Finishing

Answer Explanation Related Ques

ANSWER: Goose neck

74. Which type of mechanism is used in shaper machine?

a. Indexing mechanism

b. Four-bar chain mechanism

c. Quick return mechanism

d. None of the above

Answer Explanation Related Ques

ANSWER: Quick return mechanism

75. What is the motion of cutting tool and its cutting phenomenon in shaper machine?

a. Cutting tool in shaper machine has a spinning motion and it cuts only in one direction of rotation

b. Cutting tool in shaper machine has a spinning motion and it cuts in both the clockwise and anticlockwise direction of rotation

c. Cutting tool in shaper machine has a reciprocating motion and it cuts only in forward direction of stroke

d. Cutting tool in shaper machine has a reciprocating motion and it cuts only in backward direction of stroke

Answer Explanation Related Ques

ANSWER: Cutting tool in shaper machine has a reciprocating motion and it cuts only in f orward direction of stroke.

INVENTORY CONTROL

1.Which of the following is not an inventory?

Machines
Raw material
Finished products
Consumable tools
(Ans:a)

2.The following classes of costs are usually involved in inventory decisions except
Cost of ordering
Carrying cost
Cost of shortages
Machining cost
(Ans:d)

3.The cost of insurance and taxes are included in
Cost of ordering
Set up cost
Inventory carrying cost
Cost of shortages
(Ans:c)

4.'Buffer stock' is the level of stock
Half of the actual stock
At which the ordering process should start
Minimum stock level below which actual stock should not fall
Maximum stock in inventory
(Ans:c)

5.The minimum stock level is calculated as
Reorder level – (Nornal consumption x Normal delivery time)
Reorder level + (Nornal consumption x Normal delivery time)
(Reorder level + Nornal consumption) x Normal delivery time
(Reorder level + Nornal consumption) / Normal delivery time
(Ans:a)

6.Which of the following is true for Inventory control?
Economic order quantity has minimum total cost per order
Inventory carrying costs increases with quantity per order
Ordering cost decreases with lo size
All of the above
(Ans:d)

7.The time period between placing an order its receipt in stock is known as
Lead time
Carrying time
Shortage time
Over time
(Ans:a)

8Re-ordering level is calculated as
Maximum consumption rate x Maximum re-order period
Minimum consumption rate x Minimum re-order period
Maximum consumption rate x Minimum re-order period
Minimum consumption rate x Maximum re-order period
(Ans:a)

9.Average stock level can be calculated as
Minimum stock level + ½ of Re-order level
Maximum stock level + ½ of Re-order level
Minimum stock level + 1/3 of Re-order level
Maximum stock level + 1/3 of Re-order level
(Ans:a)

10.The Economic Order Quantity (EOQ) is calculated as
$(2D*S/h)^{1/2}$
$(DS*/h)^{1/2}$
$(D*S/2h)^{1/2}$
$(D*S/3h)^{1/2}$
Where, D=Annual demand (units), S=Cost per order, h=Annual carrying cost per unit
(Ans:a)

11.The order cost per order of an inventory is Rs. 400 with an annual carrying cost of Rs. 10 per unit. The Economic Order Quantity (EOQ) for an annual demand of 2000 units is
400
440
480
500
(Ans:a)

12.The aim of value engineering is to

A. find the depreciation value of a machine
B. determine the selling price of a product
C. minimise the cost without change in quality of the product
D. all of the above

Answer: Option C

13.n time study, the rating factor is applied to determine

A. standard time of a job
B. merit rating of the worker
C. fixation of incentive rate
D. normal time of a worker

Answer: Option D

14.Gantt chart is used for

A. inventory control
B. material handling
C. production schedule
D. machine repair schedules

Answer: Option C

15.The main object of scientific layout is

A. to produce better quality of product
B. to utilise maximum floor area
C. to minimise production delays
D. all of these

Answer: Option D

.

16.The probabilistic time is given by (where t_o = Optimistic time, t_p = Pessimistic time, and t_n = Most likely time)

A. $\dfrac{t_o + t_p + t_n}{3}$

B. $\dfrac{t_o + 2t_p + t_n}{4}$

C. $\dfrac{t_o + 4t_p + t_n}{5}$

D. $\dfrac{t_o + t_p + 4t_n}{6}$

Answer: Option D

17. In value engineering, the term value refers to

A. manufacturing cost of the product
B. selling price of the product
C. total cost of the product
D. utility of the product

Answer: Option D

17. In inventory control theory, the economic order quantity is

A. average level of inventory
B. optimum lot size
C. capacity of a warehouse
D. lot size corresponding to break-even analysis

Answer: Option B

18. Production cost refers to prime cost plus

A. factory overheads
B. factory and administration overheads
C. factory, administration and sales overheads
D. factory, administration, sales overheads and profit

Answer: Option A

19. A systematic job improvement sequence will consist of

A. motion study
B. time study
C. job enrichment
D. all of these

Answer: Option D

20. Work sampling is applied for

A. estimation of the percentage utilisation of machine tools

B. estimating the percentage of the time consumed by various job activities

C. finding out time standards, specially where the job is not repetitive and where time study by stop watch method is not possible

D. all of the above

Answer: Option D

21. Military type of organisation is known as

A. line organisation

B. functional organisation

C. line and staff organisation

D. line, staff and functional organisation

Answer: Option A

22. When slack of an activity is negative

A. it represents a situation where extra resources are available and the completion of project is not delayed

B. it represents that a programme falls behind schedule and additional resources are required to complete the project in time

C. the activity is critical and any delay in its performance will delay the completion of whole project

D. all of the above

Answer: Option B

23. The procedure of modifying work content to give more meaning and enjoyment to the job by involving employees in planning, organisation and control of their work, is termed as

A. job enlargement

B. job enrichment

C. job rotation

D. job evaluation

Answer: Option B

24. Fixed position layout is also known as

A. analytical layout

B.   synthetic layout
C.   static product layout
D.   none of these
Answer: Option C

25.In a network shown in the below figure, the critical path is along
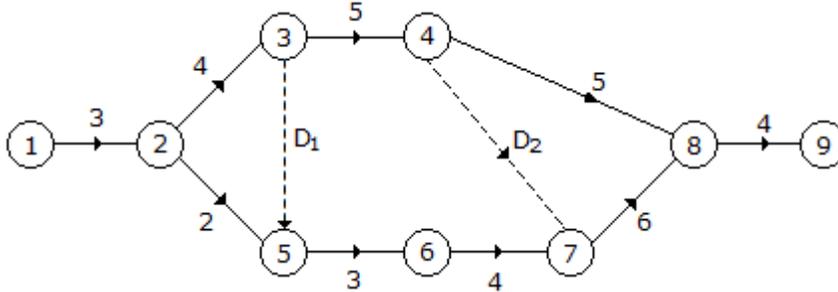
A. 1-2-3-4-8-9

B. 1-2-3-5-6-7-8-9

C. 1-2-3-4-7-8-9

D. 1-2-5-6-7-8-9

Answer: Option B

26.Bar chart is suitable for

A.   large project
B.   major work
C.   minor work
D.   all of these
Answer: Option C

27.Which one of the following chart gives simultaneously information about the progress of work and machine loading?

A.   Process chart
B.   Machine load chart
C.   Man-machine chart
D.   Gantt chart
Answer: Option C

28.Probabilistic time for completion of any activity can be found out from

A. optimistic time
B. pessimistic time
C. most likely time
D. all of these
Answer: Option D

29.Line organisation is suitable for a big organisation.

A. Correct
B. Incorrect
Answer: Option B

30.PERT is an event oriented technique.

A. Correct
B. Incorrect
Answer: Option A

31.Linear programming model can be applied to line balancing problem and transportation problem.

A. True
B. False
Answer: Option A

32.The chart which gives an estimate about the amount of materials handling between various work stations is known as

A. flow chart
B. process chart
C. travel chart
D. operation chart
Answer: Option C

33.The type of organisation preferred for a steel industry, is

A. line organisation
B. functional organisation

C. line and staff organisation
D. line, staff and functional organisation
Answer: Option D

34. A device used for lifting or lowering objects suspended from a hook at the end of retractable chains or cable is called

A. hoist
B. jib crane
C. portable elevator
D. chain conveyor
Answer: Option A

35. A diagram showing the path followed by men and materials while performing a task is known as

A. string diagram
B. flow process chart
C. travel chart
D. flow diagram
Answer: Option D

36. The determination of standard time in a complex job system is best done through

A.
stop watch time study
B.
analysis of micromotions
C.
grouping timing technique
D.
analysis of standard data system

Answer: Option D

37. In CPM, the cost slope is determined by

A. $\dfrac{\text{Crash cost}}{\text{Normal cost}}$

B. $\dfrac{\text{Crash cost - Normal cost}}{\text{Normal time - Crash time}}$

C. $\dfrac{\text{Normal cost}}{\text{Crash cost}}$

D. $\dfrac{\text{Normal cost - Crash cost}}{\text{Normal time - Crash time}}$

Answer: Option B

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38. If (R) is the base rate guaranteed per hour, (S) is the standard time for the job and (T) is the actual time, then according to Rowan plan, wages for the job will be

   A. TR

   B. $TR + \dfrac{S - T}{2} \times R$

   C. $TR + (S - T)R$

   D. $TR + \dfrac{S - T}{S} \times R$

Answer: Option D

---

39. In a line organisation

   A. responsibility of each individual is fixed

   B. discipline is strong

   C. quick decisions are taken

   D. all of these

Answer: Option D

40.Which of the following are the guidelines for the construction of a network diagram?

A. Each activity is represented by one and only one arrow in the network.

B. Dangling must be avoided in a network diagram.

C. Dummy activity consumes no time or resource.

D. all of the above

Answer: Option D

41.Work study involues

A.   only method study
B.   only work measurement
C.   method study and work measurement
D.   only motion study

Answer: Option C

.

42.A-B-C analysis is used in

A.   CPM
B.   PERT
C.   inventory control
D.   all of these

Answer: Option C

43.PERT analysis is based upon

A.   optimistic time
B.   pessimistic time
C.   most likely time
D.   all of these

Answer: Option D

44.In order to avoid excessive multiplication of facilities, the layout preferred is

A.   product layout
B.   process layout

C.   group layout
D.   static layout
Answer: Option B

45.In A-B-C analysis, which class of items are generally large in number?

A.   A
B.   B
C.   C
D.   none of these
Answer: Option C

46.Simplex method is the method used for

A.   value analysis
B.   network analysis
C.   linear programming
D.   queuing theory
Answer: Option C

47.Dispatching

A.   prescribes the sequence of operations to be followed
B.   determines the programme for the operations
C.   is concerned with the starting of processes
D.   regulates the progress of job through various processes
Answer: Option C

.

48.Which of the following wage incentive plan guarantees minimum wage to a worker and bonus is paid for the fixed percentage of time saved?

A.   Halsey plan
B.   Gantt plan
C.   Rowan plan
D.   Emerson's efficiency plan
Answer: Option A

49.Job evaluation is the method of determining the

A. relative values of a job
B. worker's performance on a job
C. worth of the machine
D. value of overall production
Answer: Option A

50.The routing function in a production system design is concerned with

A. manpower utilisation
B. quality assurance of the product
C. machine utilisation
D. optimising material flow through the plant
Answer: Option C

51.In big automobile repair shop, for elevating and moving the heavy parts such as complete engine assembly, gear box etc., an overhead crane and a fork lift truck is used.

A. Yes
B. No
Answer: Option A

52. Discuss in Forum Workspace Report

Direct expenses include

A. factory expenses
B. selling expenses
C. administrative expenses
D. none of these
Answer: Option D

53.String diagram is used

A. for checking the relative values of various layouts
B. when a group of workers are working at a place
C. where processes require the operator to be moved from one work place to another
D. all of the above
View Answer Discuss in Forum Workspace Report

54. Which of the following type of layout is suitable for automobile manufacturing concern?

A. product layout
B. process layout
C. fixed position layout
D. combination layout

Answer: Option A

55. Representative time is the average of times recorded by work study man for an operation.

A. Agree
B. Disagree

Answer: Option A

56. Queuing theory is associated with

A. inventory
B. sales
C. waiting time
D. production time

Answer: Option C

57. PERT requires
A. single time estimate
B. double time estimate
C. triple time estimate
D. none of these

Answer: Option C

58. Which of the following statement is correct?
A. A-B-C analysis is based on Pareto's principle.
B. Simulation can be used for inventory control.
C. Economic order quantity formula ignores variations in demand pattern
D. all of the above

Answer: Option A

59.The product layout is more amenable to automation than process layout.

A. True

B. False

Answer: Option A

60.In break even analysis, total cost consists of

A. fixed cost + sales revenue

B. variable cost + sales revenue

C. fixed cost + variable cost

D. fixed cost + variable cost + profit

Answer: Option C

61.A critical activity has

A. maximum slack

B. minimum slack

C. zero slack

D. average slack

Answer: Option C

62.Sampling method of determining standard time is profitable for long cycle operation.

A. Correct

B. Incorrect

Answer: Option A

63.Break even analysis is a

A. short term analysis

B. long term analysis

C. average of short and long term analysis

D. any one of these

Answer: Option A

64.In a functional organisation

A. quality of work is better

B. wastage of material is minimum

C. specialised knowledge and guidance to individual worker is provided

D. all of the above

Answer: Option D

65. The purpose of micromotion study is to
A.   assist in finding out the most efficient way of doing work
B.   train the individual operator regarding the motion economy principles
C.   help in collecting the motion time data for synthetic time standards
D.   all of the above
Answer: Option D

66. Valve analysis is particularly of interest when
A.   jobbing work economics are involved
B.   production is on large scale
C.   only few components are involved
D.   costly equipment is used
Answer: Option B

67. The type of layout used for manufacturing steam turbines, is
A.   product layout
B.   process layout
C.   fixed position layout
D.   any one of these
Answer: Option C

68. For material transportation, conveyors are used when the prevailing conditions include
A.   loads are uniform
B.   routes do not vary
C.   materials move relatively continuously
D.   all of these
Answer: Option D

69. The planning and scheduling of job order manufacturing differ from planning and scheduling of mass production manufacturing.
A.   Correct
B.   Incorrect
Answer: Option A

70. Merit rating is the method of determining the
A.   relative values of a job
B.   worker's performance on a job

C.   worth of a machine

D.   value of overall production

Answer: Option B

71. PERT stands for

A.   Programme Estimation and Reporting Technique

B.   Process Estimation and Review Technique

C.   Programme Evaluation and Review Technique

D.   Planning Estimation and Resulting Technique

Answer: Option C

72. In Emerson's efficiency plan of wage incentive system, bonus is paid to a worker

A.   whose output exceeds 67% efficiency

B.   on the percentage of time saved

C.   on the percentage of time worked

D.   on the percentage of standard time

Answer: Option A

73. M.T.M. is used to

A.   improve existing methods

B.   establish time standards

C.   develop effective methods in advance of the beginning of production

D.   all of the above

Answer: Option D

74. A dummy activity in a net work diagram

A.   is represented by a dotted line

B.   is an artificial activity

C.   does not consume time or resources

D.   all of these

Answer: Option D

75. The production scheduling is simpler and high volume of output and high labour efficiency are achieved in the case of

A.   product layout

B.   process layout

C.   fixed position layout

D.   a combination of line and process layout

Answer: Option A

76.Standard time is equal to
A.   normal time minus allowances
B.   normal time plus allowances
C.   representative time multiplied by rating factor
D.   normal time taken by an operation

Answer: Option B

77.In inventory control, the economic ordering quantity is obtained by the quantity whose procurement cost is equal to inventory carrying cost.
A.   True
B.   False

Answer: Option A

78.The essential condition for the decompression of an activity is that
A.   the project time should change due to decompression
B.   after decompression the time of an activity invariably exceeds its normal time
C.   an activity could be decompressed to the maximum extent of its normal time
D.   none of the above

Answer: Option C

79.Time study is carried out
A.by finding all the significant informations regarding the job, work place and machine tool etc.
B.by breaking up each operation into small elements which are measurable with the help of the measuring device accurately
C.by observing and recording the time taken by the operator for an operation
D.all of the above

80.Two alternatives can produce a product. First has a fixed cost of Rs. 2000 and a variable cost of Rs. 20 per piece. The second method has a fixed cost of Rs. 1500 and a variable cost of Rs. 30. The break even quantity between the two alternatives is
A.   25
B.   50
C.   75
D.   100

Answer: Option B

81.Which of the following are the principles of material handling?
A.   keep all the handling to the minimum
B.   select only efficient handling equipment
C.   move the heaviest weight to the least distance

D.   all of the above

Answer: Option D

82.The product layout

A.   lowers overall manufacturing time

B.   requires less space for placing machines

C.   utilises machine and labour better

D.   all of these

Answer: Option D

83.An event is a function of two or more activities.

A.   Correct

B.   Incorrect

Answer: Option A

84.The mathematical technique for finding the best use of limited resources of a company in the maximum manner is known as

A.   value analysis

B.   network analysis

C.   linear programming

D.   queuing theory

Answer: Option C

85.The factors to be considered for production scheduling are

A.   component design

B.   route sheet

C.   time standards

D.   all of these

Answer: Option D

86.Product layout is best suited where

A.   one type of product is produced

B.   product is standardised

C.   product is manufactured in large quantities

D.   all of the above

Answer: Option D

87.Break even analysis consists of

A. fixed expenses
B. variable cost
C. sales revenue
D. all of these

Answer: Option D

88.Line organisation is suitable for

A. sugar industries
B. oil refining industries
C. spinning and weaving industries
D. all of these

Answer: Option D

89.Slack represents the difference between the

A. earliest completion time and latest allowable time
B. latest allowable time and earliest completion time
C. earliest completion time and normal expected time
D. latest allowable time and normal allowable time

Answer: Option A

90.Acceptance sampling is used in

A. job production
B. batch production
C. mass production
D. all of these

Answer: Option C

. 91.Queuing theory is used for

A. job-shop scheduling
B. inventory problems
C. traffic congestion studies
D. all of these

Answer: Option D

92.Which of the following statement is correct?

A. When slack of an activity is zero, it falls only on critical path.
B. CPM technique is useful to minimise the direct and indirect expenses.

C. Critical path of a net work represents the minimum time required for completion of project.

D. all of the above

Answer: Option D

93. Break even point is the point where

A. fixed and variable cost lines intersect

B. fixed and total cost lines intersect

C. variable and total cost lines intersect

D. sales revenue and total expensive lines intersect

Answer: Option D

94. In a thermal power plant, coal from the coal handling plant is moved to the boiler bunker through a

A. belt conveyor

B. bucket conveyor

C. fork lift truck

D. overhead crane

Answer: Option A

95. When slack of an activity is positive

A. it represents a situation where extra resources are available and the completion of project is not delayed

B. it represents that a programme falls behind schedule and additional resources are required to complete the project in time

C. the activity is critical and any delay in its performance will delay the completion of whole project

D. any one of the above

Answer: Option D

96. For a small scale industry, the fixed cost per month is Rs. 5000. The variable cost per product is Rs. 20 and sales price is Rs. 30 per piece. The break even production per month will be

A. 300

B. 460

C. 500

D. 1000

Answer: Option C

97. Follow-up prescribes the sequence of operations to be followed.

A.	Correct

B.	Incorrect

Answer: Option A

98.Dummy activities are used to

A.	determine the critical path

B.	determine the project completion time

C.	maintain the required net work

D.	none of these

Answer: Option C

.

99.Which of the following statement is wrong?

A.	An activity consume time and resources whereas an event do not consume time or resources.

B.	The performance of a specific task is called an activity.

C.	An event is an instantaneous point in time at which an activity begins or ends.

D.	The turning of a job on lathe is an event whereas job turned is an activity.

Answer: Option D

100. In a line organisation

   A.	responsibility of each individual is fixed

   B.	discipline is strong

   C.	quick decisions are taken

   D.	all of these

   Answer: Option D

HEAT AND MASS TRANSFER

1. Unit of thermal conductivity in M.K.S. units is

(a) kcal/kg m2 °C

(b) kcal-m/hr m2 °C

(c) kcal/hr m2 °C

(d) kcal-m/hr °C

(e) kcal-m/m2 °C.

Ans: b

2. Unit of thermal conductivity in S.I. units is

(a) J/m2 sec

(b) J/m °K sec

(c) W/m °K

(d) (a) and (c) above

(e) (b) and (c) above.

Ans: e

3. Thermal conductivity of solid metals with rise in temperature normally

(a) increases

(b) decreases

(c) remains constant

(d) may increase or decrease depending on temperature

(e) unpredictable.

Ans: b

4. Thermal conductivity of non-metallic amorphous solids with decrease in temperature

(a) increases

(b) decreases

(c) remains constant

(d) may increase or decrease depending on temperature

(e) unpredictable.

Ans: b

5. Heat transfer takes place as per –

(a) zeroth law of thermodynamics

(b) first law of thermodynamic

(c) second law of the thermodynamics

(d) Kirchoff's law (e) Stefan's law.

Ans: c

6. When heat is transferred from one particle of hot body to another by actual motion of the heated particles, it is referred to as heat transfer by

(a) conduction

(b) convection

(c) radiation

(d) conduction and convection

(e) convection and radiation.

Ans: a

7. When heat is transferred form hot body to cold body, in a straight line, without affecting the intervening medium, it is referred as heat transfer by

(a) conduction

(b) convection

(c) radiation

(d) conduction and convection

(e) convection and radiation.

Ans: c

8. Sensible heat is the heat required to

(a) change vapour into liquid

(b) change liquid into vapour

(c) increase the temperature of a liquid of vapour

(d) convert water into steam and superheat it

(e) convert saturated steam into dry steam.

Ans: c

9. The insulation ability of an insulator with the presence of moisture would

(a) increase

(b) decrease

(c) remain unaffected

(d) may increase/decrease depending on temperature and thickness of insulation

(e) none of the above.

Ans: b

10. When heat is Transferred by molecular collision, it is referred to as heat transfer by

(a) conduction

(b) convection

(c) radiation

(d) scattering

(e) convection and radiation.

Ans: b

11. Heat transfer in liquid and gases takes place by

(a) conduction

(b) convection

(c) radiation

(d) conduction and convection

(e) convection and radiation.

Ans: b

12. Which of the following is the case of heat transfer by radiation
(a) blast furnace
(b) heating of building
(c) cooling of parts in furnace
(d) heat received by a person from fireplace
(e) all of the above.
Ans: d

13. Heat is closely related with
(a) liquids
(b) energy
(c) temperature
(d) entropy
(e) enthalpy.
Ans: c

14. Pick up the wrong case. Heat flowing from one side to other depends directly on
(a) face area
(b) time
(c) thickness
(d) temperature difference
(e) thermal conductivity.
Ans: c

15. Metals are good conductors of heat because
(a) their atoms collide frequently
(b) their atoms-are relatively far apart
(c) they contain free electrons
(d) they have high density
(e) all of the above.
Ans: a

16. Which of the following is a case of steady state heat transfer
(a) I.C. engine
(b) air preheaters

(c) heating of building in winter

(d) all of the above

(e) none of the above.

Ans: e

17. Total heat is the heat required to

(a) change vapour into liquid

(b) change liquid into vapour

(c) increase the temperature of a liquid or vapour

(d) convert water into steam and superheat it

(e) convert saturated steam into dry steam.

Ans: d

18. Cork is a good insulator because it has

(a) free electrons

(b) atoms colliding frequency

(c) low density

(d) porous body

(e) all of the above.

Ans: d

19. Thermal conductivity of water in general with rise in temperature

(a) increases

(b) decreases

(c) remains constant

(d) may increase or decrease depending on temperature

(e) none of the above.

Ans: d

20. Thermal conductivity of water at 20°C is of the order of

(a) 0.1

(b) 0.23

(c) 0.42

(d) 0.51

(e) 0.64.

Ans: d

21. Temperature of steam at around 540°C can be measured by

(a) thermometer

(b) radiatiouv pyrometer

(c) thermistor

(d) thermocouple

(e) thermopile.

Ans: d

22. Thermal conductivity of air at room temperature in kcal/m hr °C is of the order of

(a) 0.002

(b) 0.02

(c) 0.01

(d) 0.1

(e) 0.5.

Ans: b

23. The time constant of a thermocouple is

(a) the time taken to attain the final temperature to be measured

(b) the time taken to attain 50% of the value of initial temperature difference

(c) the time taken to attain 63.2% of the value of initial temperature difference

(d) determined by the time taken to reach 100°C from 0°C

(e) none of the above.

Ans: c

24. Thermal conductivity of air with rise in temperature

(a) increases

(b) decreases

(c) remains constant

(d) may increase or decrease depending on temperature

(e) none of the above.

Ans: a

25. Heat flows from one body to other when they have

(a) different heat contents

(b) different specific heat

(c) different atomic structure

(d) different temperatures

(e) none of the above.

Ans: d

26. The concept of overall coefficient of heat transfer is used in heat transfer problems of

(a) conduction

(b) convection

(c) radiation

(d) all the three combined

(e) conduction and comte_ction.

Ans: e

27. In heat transfer, conductance equals conductivity (kcal/hr/sqm/°C/cm) divided by

(a) hr (time)

(b) sqm (area)

(c) °C (temperature)

(d) cm (thickness)

(e) kcal (heat).

Ans: d

28. The amount of heat flow through a body by conduction is

(a) directly proportional to the surface area of the body

(b) directly proportional to the temperature difference on the two faces of the body

(c) dependent upon the material of the body

(d) inversely proportional to the thickness of the body

(e) all of the above.

Ans: e

29. Which of the following has least value of conductivity

(a) glass

(b) water

(c) plastic

(d) rubber

(e) air.

Ans: e

30. Which of the following is expected to have highest thermal conductivity

(a) steam

(b) solid ice

(c) melting ice

(d) water

(e) boiling water.

Ans: b

31. Thermal conductivity of glass-wool varies from sample to sample because of variation in

(a) composition

(b) density

(c) porosity

(d) structure

(e) all of the above.

Ans: e

32. Thermal conductivity of a material may be defined as the

(a) quantity of heat flowing in one second through one cm cube of material when opposite faces ^re maintained at a temperature difference of 1°C

(b) quantity of heat flowing in one second through a slab of the material of area one cm square, thickness 1 cm when its faces differ in temperature by 1°C

(c) heat conducted in unit time across unit area through unit thickness when a temperature difference of unity is maintained between opposite faces

(d) all of the above

(e) none of the above.

Ans: d

33. Which of the following has maximum value of thermal conductivity

(a) aluminium

(b) steel

(c) brass

(d) copper

(e) lead.

Ans: a

34. Moisture would find its way into insulation by vapour pressure unless it is prevented by

(a) high thickness of insulation

(b) high vapour pressure

(c) less thermal conductivity insulator

(d) a vapour seal

(e) all of the above.

Ans: d

35. Heat is transferred by all three modes of transfer, viz, conduction, convection and radiation in

(a) electric heater

(b) steam condenser

(c) melting of ice

(d) refrigerator condenser coils

(e) boiler.

Ans: e

36. According to Prevost theory of heat exchange
(a) it is impossible to transfer heat from low temperature source to t high temperature source
(b) heat transfer by radiation requires no medium
(c) all bodies above absolute zero emit radiation
(d) heat transfer in most of the cases takes place by combination of conduction, convection and radiation
(e) rate of heat transfer depends on thermal conductivity and temperature difference.
Ans: c

37. The ratio of heat flow Q1/Q2 from two walls of same thickness having their thermal conductivities as ATj – 2K2 will be
(a) I
(b) 0.5
(c) 2
(d) 0.25
(e) 4.0
Ans: c

38. Heat transfer by radiation mainly depends upon
(a) its temperature
(b) nature of the body
(c) kind and extent of its surface
(d) all of the above
(e) none of the above.
Ans: d

39. Thermal diffusivity is
(a) a dimensionless parameter
(b) function of temperature
(c) used as mathematical model
(d) a physical property of the material
(e) useful in case of heat transfer by radiation.
Ans: d

40. Thermal diffusivity of a substance is .
(a) proportional of thermal conductivity
(b) inversely proportional to k
(c) proportional to (k)
(d) inversely proportional to k2
(e) none of the above.

Ans: a

41. Unit of thermal diffusivity is
(a) m2/hr
(b) m2/hr°C
(c) kcal/m2 hr
(d) kcal/m.hr°C
(e) kcal/m2 hr°C.
Ans: a

43. Thermal conductivity of wood depends on
(a) moisture
(b) density
(c) temperature
(d) all of the above
(e) none of the above.
Ans: d

44. In convection heat transfer from hot flue gases to water tube, even though flow may be turbulent, a laminar flow region (boundary layer of film) exists close to the tube. The heat transfer through this film takes place by
(a) convection
(b) radiation
(c) conduction
(d) both convection and conduction
(e) none of the above.
Ans: c

45. Film coefficient is defined as Inside diameter of tube
(a) Equivalent thickness of film
(b) Thermal conductivity Equivalent thickness of film Specific heat x Viscocity
(c) Thermal conductivity Molecular diffusivity of momentum Thermal diffusivity
(d) Film coefficient x Inside diameter Thermalconductivity
(e) none of the above.
Ans: b

46. Heat conducted througfi unit area and unit thick face per unit time when temperature difference between opposite faces is unity,is called
(a) thermal resistance
(b) thermal coefficient

(c) temperature gradient

(d) thermal conductivity

(e) heat-transfer.

Ans: d

49. The rate of energy emission from unit surface area through unit solid angle, along a normal to the surface, is known as

(a) emissivity

(b) transmissivity

(c) reflectivity

(d) intensity of radiation

(e) absorptivity.

Ans: d

50. Emissivity of a white polished body in comparison to a black body is

(a) higher

(b) lower

(c) same

(d) depends upon the shape of body

(e) none of the above.

Ans: b

Heat Transfer Interview Questions and Answers pdf :-

51. A grey body is one whose absorptivity

(a) varies with temperature

(b) varies with wavelength of the incident ray

(c) is equal to its emissivity

(d) does not vary with temperature and. wavelength of the incident ray

(e) none of the above.

Ans: c

53. Two balls of same material and finish have their diameters in the ratio of 2 : 1 and both are heated to same temperature and allowed to cool by radiation. Rate of cooling by big ball as compared to smaller one will be in the ratio of

(a) 1 :1

(b) 2: 1

(c) 1 : 2

(d) 4 : 1

(e) 1 : 4.

Ans: c

55. A non-dimensional number generally associated with natural convection heat transfer is
(a) Grashoff number
(b) Nusselt number
(c) Weber number
(d) Prandtl number
(e) Reynold number.
Ans: a

56. LMTD in case of counter flow heat exchanger as compared-to parallel flow heat exchanger is
(a) higher
(b) lower
(c) same
(d) depends on the area of heat exchanger
(e) depends on temperature conditions.
Ans: a

57. In heat exchangers, degree of approach is defined as the difference between temperatures of
(a) cold water inlet and outlet
(b) hot medium inlet and outlet
(c) hot medium outlet and cold water inlet
(d) hot medium outlet and cold water outlet
(e) none of the above.
Ans: d

58. In counter flow heat exchangers
(a) both the fluids at inlet (of heat ex¬changer where hot fluid enters) are in their coldest state
(b) both the fluids at inlet are in their hot¬test state
(c) both the fluids .at exit are in their hottest state
(d) one fluid is in hottest state and other in coldest state at inlet
(e) any combination is possible depending on design of heat exchanger.
Ans: b

59. A steam pipe is to be insulated by two insulating materials put over each other. For best results
(a) better insulation should be put over pipe and better one over it
(b) inferior insulation should be put over pipe and better one over it
(c) both may be put in any order
(d) whether to put inferior OIL over pipe or the better one would depend on steam temperature

(e) unpredictable.

Ans: a

61. Fourier's law of heat conduction is valid for

(a) one dimensional cases only

(b) two dimensional cases only

(c) three dimensional cases only

(d) regular surfaces having non-uniform temperature gradients

(e) irregular surfaces.

Ans: a

62. According of Kirchhoff's law,

(a) radiant heat is proportional to fourth power of absolute temperature

(b) emissive power depends on temperature

(c) emissive power and absorptivity are constant for all bodies

(d) ratio of emissive power to absorptive power is maximum for perfectly black body

(e) ratio of emissive power to absorptive power for all bodies is same and is equal to the emissive power of a perfectly black body.

Ans: e

63. All radiations in a black body are

(a) reflected

(b) refracted

(c) transmitted

(d) absorbed

(e) partly reflected and partly absorbed.

Ans: d

64. According to Kirchoff's law, the ratio of emissive power to absorptivity for all bodies is equal to the emissive power of a

(a) grey body

(b) brilliant white polished body

(c) red hot body

(d) black body

(e) none of the above.

Ans: d

65. The concept of overall coefficient of heat transfer is used in case of heat transfer by

(a) conduction

(b) convection

(c) radiation

(d) conduction and convection

(e) convection and radiation.

Ans: d

66. The unit of overall coefficient of heat transfer is

(a) kcal/m2

(b) kcal/hr °C

(c) kcal/m2 hr °C

(4) kacl/m hr °C

(e) kcal/m3 hr °C.

Ans: c

68. Joule sec is the unit of

(a) universal gas constant

(b) kinematic viscosity

(c) thermal conductivity

(d) Planck's constant

(e) none of the above.

Ans: d

69. The value of Prandtl number for air is about

(a) 0.1

(b) 0.3

(c) 0.7

(d) 1.7

(e) 10.5.

Ans: c

70. The value of the wavelength for maximum emissive power is given by —

(a) Wien's law

(b) Planck's law

(c) Stefan's law

(d) Fourier's law

(e) Kirchhoff's law.

Ans: a

72. Log mean temperature difference in case of counter flow compared to parallel flow will be

(a) same

(b) more

(c) less

(d) depends on other factors

(e) none of the above.

Ans: b

73. The energy distribution of an ideal reflector at higher temperatures is largely in the range of

(a) shorter wavelength

(b) longer wavelength

(c) remains same at all wavelengths

(d) wavelength has nothing to do with it

(e) none of the above.

Ans: a

74. Total emissivity of polished silver compared to black body is

(a) same

(b) higher

(c) more or less same

(d) very much lower

(e) very much higher.

Ans: d

75. According to Stefan-Boltzmann law, ideal radiators emit radiant energy at a rate proportional to

(a) absolute temperature

(b) square of temperature

(c) fourth power of absolute temperature

(d) fourth power of temperature

(e) cube of absolute temperature.

Ans: c

76. Which of the following property of air does not increase with rise in temperature

(a) thermal conductivity

(b) thermal diffusivity

(c) density

(d) dynamic viscosity

(e) kuiematic viscosity.

Ans: c

77. The unit of Stefan Boltzmann constant is

(a) watt/cm2 °K

(b) watt/cm4 °K

(c) watt2/cm °K4

(d) watt/cm2 °K4

(e) watt/cm2 °K2.

Ans: d

78. In free con-vection heat transfer, Nusselt number is function of

(a) Grashoff no. and Reynold no.

(b) Grashoff no. and Prandtl no.

(c) Prandtl no. and Reynold no.

(d) Grashoff no., Prandtl no. and Reynold no.

(e) none of the above.

Ans: b

79. Stefan Boltzmann law is applicable for heat transfer by

(a) conduction

(b) convection

(c) radiation

(d) conduction and radiation combined

(e) convection and radiation combined.

Ans: c

80. The thermal diffusivities for gases are generally

(a) more than those for liquids

(b) less than those for liquids

(c) more than those for solids

(d) dependent on the viscosity

(e) same as for the liquids.

Ans: a

81. The thermal diffusivities for solids are generally

(a) less than those for gases

(b) jess than those for liquids

(c) more than those for liquids and gases

(d) more or less same as for liquids and gases

(e) zerci.

Ans: c

83. Thermal diffusivity of a substance is

(a) directly proportional to thermal con¬ductivity

(b) inversely proportional to density of substance

(c) inversely proportional to specific heat

(d) all of the above

(e) none of the above.

Ans: d

85. The ratio of the emissive power and absorptive power of all bodies is the same and is equal to the emissive power of a perfectly black body. This statement is known as

(a) Krichoff's law

(b) Stefan's law

(c) Wien' law

(d) Planck's law

(e) Black body law.

Ans: a

86. According to Stefan's law, the total radiation from a black body per second per unit area is proportional to

(a) absolute temperature

(b) T2

(c) T5

(d) t

(e) l/T.

Ans: d

87. According to Wien's law, the wavelength corresponding to maximum energy is proportion to

(a) absolute temperature (T)

(b) I2

(c) f

(d) t

(e) 1/r.

Ans: a

88. Depending on the radiating properties, a body will be white when

(a) p = 0, x = 0 and a = 1

(b) p=l, T = 0 and a = 0

(c) p = 0, x = 1 and a = 0

(d) x = 0, a + p = 1

(e) a = 0, x + p = 1.

where a = absorptivity, p = reflectivity, x = transmissivity

Ans: b

89. Depending on the radiating properties, a body will be black when
(a) p = 0, x = 0 and a = 1
(b) p= l,T = 0anda = 0
(c) p = 0, x = 1 and a = 0
(d) x = 0, a + p = 0
(e) a = 0,x + p= 1.
where a = absorptivity, p == reflectivity, X = transmissivity.
Ans: a

90. Depending on the radiating properties, a body will be opaque when
(a) p = 0, x = 0 and a = 1
(b) p=l,x = 0anda = 0
(c) p = 0, x = 1 and a = 0
(d) x − 0, a + p = 1
(e) a=0,x + p= 1.
where a = absorptivity, p = reflectivity, X = transmissivity.
Ans: d

91. The total emissivity power is .defined as the total amount of radiation emitted by a black body per unit
(a) temperature
(b) thickness
(c) area
(d) time
(e) area and time.
Ans: d

92. The ratio of the energy absorbed by the body to total energy falling on it is called
(a) absorptive power
(b) emissive power
(c) absorptivity
(d) emissivity
(e) none of the above.
Ans: a

93. 40% of incident radiant energy on the surface of a thermally transparent body is reflected back. If the transmissivity of the body be 0.15, then the emissivity of surface is
(a) 0.45
(b) 0.55

(c) 0.40
(d) 0.75
(e) 0.60.
Ans: a

94. The amount of radiation mainly depends on
(a) nature of body
(b) temperature of body
(c) type of surface of body
(d) all of the above
(e) none of the above.
Ans: d

95. The emissive power of a body depends upon its
(a) temperature
(b) wave length
(c) physical nature
(d) all of the above
(e) none of the above.
Ans: d

96. Two plates spaced 150 mm apart are maintained at 1000°C and 70°C. The heat transfer will take place mainly by
(a) convection
(b) free convection
(c) forced convection
(d) radiation
(e) radiation and convection.
Ans: d

97. Absorptivity of a body will be equal to its emissivity
(a) at all temperatures
(b) at one particular temperature
(c) when system is under thermal equi-librium
(d) at critical temperature
(e) for a polished body.
Ans: c

98. In regenerator type heat exchanger, heat transfer takes place by

(a) direct mixing of hot and cold fluids

(b) a complete separation between hot and cold fluids

(c) flow of hot and cold fluids alternately over a surface

(d) generation of heat again and again

(e) indirect transfer.

Ans: c

99. A perfect black body is one which

(a) is black in colour

(b) reflects all heat

(c) transmits all heat radiations

(d) abslprbs heat radiations of all wave lengths falling on it

(e) fully opaque.

Ans: d

100. Planck's law holds good for

(a) black bodies

(b) polished bodies

(c) all coloured bodies

(d) all of the above

(e) none of the above.

Ans: a

COMPUTER INTEGRATED MANUFACTURING

In a CAD package, mirror image of a 2D point P (5, 10) is to be obtained about a line which passes through the origin and makes an angle of 45° counterclockwise with the X-axis. The coordinates of the transformed point will be   (GATE 2013)

(7.5, 5)

(10, 5)

(7.5, -5)

(10, -5)

Ans: B

In a CNC program block, N002 G02 G91 X40 Z40…, G02 AND G91 refer to
(GATE 2012)

Circular interpolation in counterclockwise direction and incremental dimension

Circular interpolation in counterclockwise direction and absolute dimension

Circular interpolation in clockwise direction and incremental dimension

Circular interpolation in clockwise direction and absolute dimension

Ans: C

For generating Coons patch we require
(GATE 2007)

A set of grid points on surface
A set of control points
Four bounding curves defining surface
Two bounding curves and a set of grid control points

Ans: C

NC contouring is an example of

Continuous path positioning
Point-to-point positioning
Absolute positioning
Incremental positioning

Ans: A

The tool of an NC machine has to move along a circular arc from (5, 5) to (10, 10) while performing an operation. The center of the arc is at (10, 5). Which one of the following NC tool path commands performs the above mentioned operation?

(GATE 2005)
(a) N010 G02 X10 Y10 X5 Y5 R5
(b) N010 G03 X10 Y10 X5 Y5 R5
(c) N010 G01 X5 Y5 X10 Y10 R5
(d) N010 G02 X5 Y5 X10 Y10 R5

Ans: D

During the execution of a CNC part program block NO20 GO2 X45.0 Y25.0 R5.0 the type of tool motion will be

(GATE 2004)
Circular Interpolation - clockwise

Circular Interpolation - counterclockwise
Linear Interpolation
Rapid feed

Ans: A

In a 2-D CAD package, clockwise circular arc of radius, 5, specified from P1 (15,10) to P2 (10,15)will have its center at

(GATE 2004)
(10, 10)
(15, 10)
(15, 15)
(10, 15)

Ans: A

In an NC machining operation, the tool has to be moved from point (5,4) to point (7,2) along a circular path with center at (5,2). Before starting the operation, the tool is at (5, 4). The correct G and M code for this motion is

(GATE 2001)
N010 G03 X7.0 Y2.0 I5.0 J2.0
N010 G02 X7.0 Y2.0 I5.0 J2.0
N010 G01 X7.0 Y2.0 I5.0 J2.0
N010 G00 X7.0 Y2.0 I5.0 J2.0

Ans: B

In computer aided drafting practice, an arc is defined by
(GATE 2000)

Two end points only
Center and radius
Radius and one end point
Two end points and center

Ans: D

In finish machining of an island on a casting with CNC milling machine, an end mill with 10 mm diameter is employed. The corner points of the island are represented by (0, 0), (0, 30), (50, 30) and (50, 0). By applying cutter radius right compensation, the trajectory of the cutter will be (GATE 2000)

(-5, 0), (-5, 35), (55, 35), (55,-5), (-5,-5)

(0,-5), (55,-5), (55, 35), (-5, 35), (-5,-5)

(5, 5), (5, 25), (45, 25), (45, 5), (5, 5)

(5, 5), (45, 5), (45, 25), (5, 25), (5, 5)

Ans: A

With reference to NC machines, which of the following statements is wrong (GATE 1993)

Both closed-loop and open-loop control systems are used

Paper tapes, floppy tapes and cassettes are used for data storage

Digitizers may be used as interactive input devices

Post processor is an item of hardware

Ans: C

In a point-to-point type of NC system (GATE 1992)

Control of position and velocity of the tool is essential

Control of only position of the tool is sufficient

Control of only velocity of the tool is sufficient

Neither position nor velocity need to be controlled

Ans: B

GUI is the acronym for Graphical User Interface.
(a)True
(b)False

(c)Don't know (d)Can't tell
Ans: A

The heart of a computer is:
CPU (b) ALU (c) Monitor (d) Keyboard

Ans: A

The widely employed computer architecture for CAD/CAM applications is:
Mainframe-based system (b) Minicomputer-based system
Microcomputer-based system (d) Workstation-based system

Ans: D

Keyboard is a_____ input device.
Graphical (b) Text (c) Numericals (d) All of the above

Ans: D

Locating devices are classified as:
Text input devices (b) Graphics input devices
Both a and b (d) None of the above

Ans: B

Mouse is a ____ type of input device.
Text (b) Graphics (c) Locating (d) All of the above

Ans: C

Light pen is a:
Writing device (b) Drawing device (c) Locating device (d) Lighting device

Ans: B

Digitizer is constructed on the basis of:
Magnetic tablet mechanism (b) Acoustic tablet mechanism
Optical tablet mechanism (d) both (a) and (b)

Ans: C

Thumbwheels are usually mounted on:
Keyboard (b) Monitor (c) CPU (d) Mouse

Ans: B

The screen is scanned from left to right. top to bottom all the time to generate graphics by:
Raster scans (b) Random scan (c) Vector scan (d) Stoke writing

Ans: A

Color raster display uses three electron guns. namely:
(a)Red. green and blue (b) Red, green and yellow
White, blue and black (d) Red, black and white

Ans: A

The software that is used for file manipulations. managing directories and subdirectories, programming and accounts setups is known as:

Graphics software (b) Operating system
Application software (d) Programming language

Ans: C

The software that provides users with various functions to perform geometric modelling and construction. Editing and manipulation of existing geometry. drafting and documentation is known as:

Operating system (b) Application software
Graphics software (d) Programming language

Ans: C

The software used for the purpose of mass property calculations, assembly analysis. Tolerance analysis. Finite element analysis. Mechanisms analysis. Sheet metal design. Analysis of plastic injection molding. And animation techniques. is:

Graphics software (b) Operating system
Application software (d) Programming language

Ans: C

The software that enables the user to implement custom applications or modify the system for specialized needs is known as:

Programming language (b) Operating system
Application software (d) Graphics software

Ans: A

The following is not a graphics standard:
GKS (b) IGBS (c) UNIX (d) PHIGS

Ans: C

In the following geometric modelling techniques which are not three-dimensional modelling?

Wireframe modelling (b) Drafting
Surface modelling (d) solid modelling

Ans: B

In the following three-dimensional modelling techniques. Which do not require much computer time and memory?

Surface modelling (b) Solid modelling
Wireframe modelling (d) All of the above

Ans: C

In the following geometric modelling techniques. which cannot be used for finite element analysis:

Wireframe modelling (b) Surface modelling
Solid modelling (d) none of the above

Ans: D

In the following geometric primitives. which is not a solid entity of CSG modelling:
Box (b) Cone (c) Cylinder (d) Circle

Ans: D

The number of lines required to represent a cub: in a wireframe model is:
8 (b) 6 (c) l2 (d) I6

Ans: C

Which of the following is not an analytical entity?

Line (b) Circle (c) Spline (d) Parabola

Ans: C

Which of the following is not a synthetic entity?
Hyperbola (b) Bezier curve (c) B-spline curve (d) Cubic spline curve

Ans: A

Which one of the following does not belong to the family of conics?
Parabola (b) Ellipse (c) Hyperbola (d) Line

Ans: D

The number of tangents required to describe cubic splines is:
2 (b) 1 (c) 3 (d) 4

Ans: B

The order of the cubic spline is the C.
2" order (b) 3" order (c) 1" order (d) 4" order

Ans: C

The shape of the Bezier curve is controlled by:

Control points (b) Knots (c) End points (d) All the above

Ans: A

The curve that follows a convex hull property is:
Cubic spline (b) B-spline (c) Bezier curve (d) Both (b) and (c)

Ans: B

The degree of the Bezier curve with n control points is:
n + 1 (b) n - I (c) n (d) 2n

Ans: A

The degree of the B-spline with varying knot vectors:
Increases with knot vectors (b) Decreases with knot vectors
Remains constant (d) none of the above

Ans: A

C" continuity refers to:
Common tangent (b) Common point
Common curvature (d) Common normal

Ans: A

C' continuity refers to:
Common tangent (b) Common point
Common curvature (d) Common normal

Ans: C

C^0 continuity refers to:
Common tangent (b) Common point

Common curvature (d) Common normal

Ans: B

The number of non-coincidental points required to define the simplest surface are:
4 (b) 3 (c) 2 (d) 5

Ans: B

convex hull property is satisfied by the following surface:
Bezier (b) B-spline (c) NURBS (d) All the above

Ans: B

The tensor product technique constraints surfaces by two curves.
Adding (b) Subtraction (c) Multiplying (d) Dividing

Ans: C

The degrees of freedom of a two-node bar element are:
1 (b) 2 (c) 3 (d) 4

Ans: C

The shape functions of a two-node bar element are:
Linear (b) Quadratic (c) Constant (d) None of the above

Ans: A

The sum of the shape functions over the element is always equal to:
Zero (b) Infinity (c) Unity (d) None of the above

Ans:

Stiffness is_____ to the length of the element.
Inversely proportional (b) Directly proportional
Exponential (d) Independent

Ans: D

Computer will perform the data processing functions in
NC (b) CNC (c) DNC (d) ACS

Ans: C

The first commercial CNC machine was developed in the year:
1970 (b) I972 (c) l976 (d) I980

Ans:

CNC drilling machine is considered to be a:
Point-to-point controlled machine (h) Straight line controlled machine

Continuous path controlled machine (d) Servo-controlled machine

Ans: A

The lost motion in CNC machine tool is on account of:
Backlash in gearing (b) Wind-up of drive shafts
Deflection of machine tool members (d) All the above

Ans: A

The axes of turning machine arc:
Z and X-axes (b) X and Y-axes (c) Z and Y-axes (d) X, Y and Z-axes

Ans: A

On turning lathes the machine zero point is generally at the:
Head stock of lathe spindle nose face (b) Dead center of tail stock
Tool point mounted on tool post (d) none of the above

Ans: B

Dwell is defined by:
G04 (b) G03 (c) G02 (d) G01

Ans: A

M30 stands for:
(a) End of program (b) End of block
End of tape and tape rewind (d) Coolant on/ off

Ans:
2C

MRP input requires:
MPS (b) BOM
Inventory file (d) All of the above

Ans: D

BOM structure is used to calculate:

Due dates (b) Net requirements
Manpower requirements (d) All of the above

Ans: B

FLUID MECHANICS AND MACHINERY

1. Fluid is a substance that
(a) cannot be subjected to shear forces
(b) always expands until it fills any container
(c) has the same shear stress.at a point regardless of its motion (
(d) cannot remain at rest under action of any shear force
(e) flows.
 Ans: d
2. Fluid is a substance which offers no resistance to change of
 (a) pressure
 (b) flow
 (c) shape
 (d) volume
 (e) temperature.
Ans: c
3. Practical fluids
 (a) are viscous
 (b) possess surface tension
 (c) are compressible
 (d) possess all the above properties
 (e) possess none of the above properties.
 Ans: d
4. In a static fluid
 (a) resistance to shear stress is small
 (b) fluid pressure is zero
 (c) linear deformation is small
 (d) only normal stresses can exist
 (e) viscosity is nil.
 Ans: d
5. A fluid is said to be ideal, if it is
 (a) incompressible
 (b) inviscous
 (c) viscous and incompressible

(d) inviscous and compressible

(e) inviscous and incompressible.

Ans: e

6. An ideal flow of any fluid must fulfill the following

(a) Newton's law of motion

(b) Newton's law of viscosity

(c) Pascal' law

(d) Continuity equation

(e) Boundary layer theory.

Ans: d

7. If no resistance is encountered by displacement, such a substance is known as

(a) fluid

(b) water

(c) gas

(d) perfect solid

(e) ideal fluid.

Ans: e

8. The volumetric change of the fluid caused by a resistance is known as

(a) volumetric strain

(b) volumetric index

(c) compressibility

(d) adhesion

(e) cohesion.

Ans: c

9. Liquids

(a) cannot be compressed

(b) occupy definite volume

(c) are not affected by change in pressure and temperature

(d) are not viscous

(e) none of the above.

Ans: e

10. Density of water is maximum at

(a) 0°C
(b) 0°K
(c) 4°C
(d) 100°C
(e) 20°C.
Ans: c

11. The value of mass density in kgsecVm4 for water at 0°C is

(a) 1
(b) 1000
(c) 100
(d) 101.9
(e) 91
Ans: d

12. Property of a fluid by which its own molecules are attracted is called

(a) adhesion
(b) cohesion
(c) viscosity
(d) compressibility
(e) surface tension.
Ans: b

13. Mercury does not wet glass. This is due to property of liquid known as

(a) adhesion
(b) cohesion
(c) surface tension
(d) viscosity
(e) compressibility.
Ans: c

14. The property of a fluid which enables it to resist tensile stress is known as

(a) compressibility
(b) surface tension
(c) cohesion
(d) adhesion
(e) viscosity.
Ans: c

15. Property of a fluid by which molecules of different kinds of fluids are attracted to each other is called

(a) adhesion
(b) cohesion
(c) viscosity
(d) compressibility
(e) surface tension.
Ans: a

16. The specific weight of water is 1000 kg/m"

(a) at normal pressure of 760 mm
(b) at 4°C temperature
(c) at mean sea level
(d) all the above
(e) none of the above.
Ans: d

17. Specific weight of water in S.I. units is equal to

(a) 1000 N/m3
(b) 10000 N/m3
(c) 9.81 xlO3 N/m3
(d) 9.81 xlO6N/m3
(e) 9.81 N/m3.
Ans: c

18. When the flow parameters at any given instant remain same at every point, then flow is said to be

(a) quasi static
(b) steady state

(c) laminar
(d) uniform
(e) static.
Ans: d

19. Which of the following is dimensionless

(a) specific weight
(b) specific volume
(c) specific speed
(d) specific gravity
(e) specific viscosity.
Ans: d

20. The normal stress in a fluid will be constant in all directions at a point only if

(a) it is incompressible
(b) it has uniform viscosity
(c) it has zero viscosity
(d) it is frictionless
(e) it is at rest.
Ans: e

21. The pressure at a point in a fluid will not be same in all the directions when the fluid is

(a) moving
(b) viscous
(c) viscous and static
(d) inviscous and moving
(e) viscous and moving.
Ans: e

22. An object having 10 kg mass weighs 9.81kg on a spring balance. The value of 'g' at this place is

(a) 10m/sec2
(b) 9.81 m/sec2
(c) 10.2/m sec

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(d) 9.75 m/sec2

(e) 9 m/sec .

Ans: a

23. The tendency of a liquid surface to contract is due to the following property

(a) cohesion

(b) adhesion

(c) viscosity

(d) surface tension

(e) elasticity.

Ans: d

24. The surface tension of mercury at normal temperature compared to that of water is

(a) more

(b) less

(c) same

(d) more or less depending on size of glass tube

(e) none of the above.

Ans: a

25. A perfect gas

(a) has constant viscosity

(b) has zero viscosity

(c) is in compressible

(d) is of theoretical interest

(e) none of the above.

Ans: e

26. For very great pressures, viscosity of moss gases and liquids

(a) remains same

(b) increases

(c) decreases

(d) shows erratic behavior

(e) none of the above.

Ans: d

27. A fluid in equilibrium can't sustain

(a) tensile stress
(b) compressive stress
(c) shear stress
(d) bending stress
(e) all of the above.
Ans: c

28. Viscosity of water in comparison to mercury is

(a) higher
(b) lower
(c) same
(d) higher/lower depending on temperature
(e) unpredictable.
Ans: a

29. The bulk modulus of elasticity with increase in pressure

(a) increases
(b) decreases
(c) remains constant
(d) increases first up to certain limit and then decreases
(e) unpredictable.
Ans: a

30. The bulk modulus of elasticity

(a) has the dimensions of 1/pressure
(b) increases with pressure
(c) is large when fluid is more compressible
(d) is independent of pressure and viscosity
(e) is directly proportional to flow.
Ans: b

31. A balloon lifting in air follows the following principle

(a) law of gravitation
(b) Archimedes principle

(c) principle of buoyancy

(d) all of the above

(e) continuity equation.

Ans: d

32. The value of the coefficient of compressibility for water at ordinary pressure and temperature in kg/cm is equal to

(a) 1000

(b) 2100

(c) 2700

(d) 10,000

(e) 21,000.

Ans: e

33. The increase of temperature results in

(a) increase in viscosity of gas

(b) increase in viscosity of liquid

(c) decrease in viscosity of gas

(d) decrease in viscosity of liquid

(e) (a) and (d) above.

Ans: d

34. Surface tension has the units of

(a) newtons/m

(b) newtons/m

(c) new tons/m

(d) newtons

(e) newton m.

Ans: c

35. Surface tension

(a) acts in the plane of the interface normal to any line in the surface

(b) is also known as capillarity

(c) is a function of the curvature of the interface

(d) decreases with fall in temperature

(e) has no units.

Ans: a

36. The stress-strain relation of the newtoneon fluid is

(a) linear
(b) parabolic
(c) hyperbolic
(d) inverse type
(e) none of the above.
Ans: a

37. A liquid compressed in cylinder has a volume of 0.04 m3 at 50 kg/cm2 and a volume of 0.039 m3 at 150 kg/cm2. The bulk modulus of elasticity of liquid is

(a) 400 kg/cm2
(b) 4000 kg/cm2
(c) 40 x 105 kg/cm2
(d) 40 x 106 kg/cm2
(e) none of the above.
Ans: b

38. The units of viscosity are

(a) metres2 per sec
(b) kg sec/metre
(c) newton-sec per metre2
(d) newton-sec per meter
(e) none of the above.
Ans: b

39. Kinematic viscosity is dependent upon

(a) pressure
(b) distance
(c) level
(d) flow
(e) density.
Ans: e

40. Units of surface tension are

(a) energy/unit area
(b) distance
(c) both of the above
(d) it has no units
(e) none of the above.
Ans: c

41. Which of the following meters is not associated with viscosity

(a) Red wood
(b) Say bolt
(c) Engler
(d) Orsat
(e) none of the above.
Ans: d

42. Choose the correct relationship

(a) specific gravity = gravity x density
(b) dynamicviscosity = kinematicviscosity x density
(c) gravity = specific gravity x density
(d) kinematicviscosity = dynamicviscosity x density
(e) hydrostaticforce = surface tension x gravity.
Ans: b

43. Dimensions of surface tension are

(a) MlL°T2
(b) MlL°Tx
(c) MlL r2
(d) MlL2T2
(e) MlL°t.
Ans: a

44. For manometer, a better liquid combination is one having

(a) higher surface tension
(b) lower surface tension

(c) surface tension is no criterion

(d) high density and viscosity

(e) low density and viscosity.

Ans: a

45. If mercury in a barometer is replaced by water, the height of 3.75 cm of mercury will be following cm of water

(a) 51 cm

(b) 50 cm

(c) 52 cm

(d) 52.2 cm

(e) 51.7 cm.

Ans: a

46. Choose the wrong statement.
Alcohol is used in manometer, because

(a) its vapour pressure is low

(b) it provides suitable meniscus for the inclined tube

(c) its density is less

(d) it provides longer length for a given pressure difference

(e) it provides accurate readings.

Ans: a

47. Increase in pressure at the outer edge of a drum of radius R due to rotation at corad/sec, full of liquid of density p will be

(a) pco2/?2

(b) pco2/?2/2

(c) 2pa2R2

(d) pa2R/2

(e) none of the above.

Ans: b

48. The property of fluid by virtue of which it offers resistance to shear is called

(a) surface tension

(b) adhesion

(c) cohesion

(d) viscosity

(e) all of the above.
Ans: d

49. Choose the wrong statement

(a) fluids are capable of flowing
(b) fluids conform to the shape of the containing vessels
(c) when in equilibrium, fluids cannot sustain tangential forces
(d) when in equilibrium, fluids can sustain shear forces
(e) fluids have some degree of comprehensibility and offer little resistance to form.
Ans: d

50. The density of water is 1000 kg/m3 at
(a) 0°C
(b) 0°K
(c) 4°C
(d) 20°C
(e) all temperature.
Ans: c

51. If w is the specific weight of liquid and k the depth of any point from the surface, then pressure intensity at that point will be

(a) h
(b) wh
(c) w/h
(d) h/w
(e) h/wh.
Ans: b

52. Choose the wrong statement

(a) Viscosity of a fluid is that property which determines the amount of its resistance to a shearing force
(b) Viscosity is due primarily to interaction between fluid molecules
(c) Viscosity of liquids decreases with in-crease in temperature
(d) Viscosity of liquids is appreciably affected by change in pressure
(e) Viscosity is expressed as poise, stoke, or saybolt seconds.
Ans: d

53. The units of kinematic viscosity are

(a) metres2 per sec
(b) kg sec/metre
(c) newton-sec per metre
(d) newton-sec per metre
(e) none of the above.
Ans: a

54. The ratio of absolute viscosity to mass density is known as

(a) specific viscosity
(b) viscosity index
(c) kinematic viscosity
(d) coefficient of viscosity
(e) coefficient of compressibility.
Ans: c

55. Kinematic viscosity is equal to

(a) dynamic viscosity/density
(b) dynamicviscosity x density
(c) density/dynamic viscosity
(d) 1/dynamicviscosity x density
(e) same as dynamic viscosity.
Ans: a

56. Which of the following is the unit of kinematic viscosity

(a) pascal
(b) poise
(c) stoke
(d) faraday
(e) none of the above.
Ans: c

57. A one dimensional flow is one which

(a) is uniform flow
(b) is steady uniform flow
(c) takes place in straight lines
(d) involves zero transverse component of flow
(e) takes place in one dimension.
Ans: d

58. Alcohol is used in manometers because

(a) it has low vapour pressure
(b) it is clearly visible
(c) it has low surface tension
(d) it can provide longer column due to low density
(e) is provides suitable meniscus.
Ans: d

59. A pressure of 25 m of head of water is equal to

(a) 25 kN/m2
(b) 245 kN/m2
(c) 2500 kN/m2
(d) 2.5kN/m2
(e) 12.5 kN/m2.
Ans: b

60. Specific weight of sea water is more that of pure water because it contains

(a) dissolved air
(b) dissolved salt
(c) suspended matter
(d) all of the above
(e) heavy water.
Ans: d

61. If 850 kg liquid occupies volume of one cubic meter, men 0.85 represents its

(a) specific weight
(b) specific mass

(c) specific gravity

(d) specific density

(e) none of the above.

Ans: c

62. Free surface of a liquid tends to contract to the smallest possible area due to force of

(a) surface tension

(b) viscosity

(c) friction

(d) cohesion

(e) adhesion.

Ans: a

63. A bucket of water is hanging from a spring balance. An iron piece is suspended into water without touching sides of bucket from another support. The spring balance reading will

(a) increase

(b) decrease

(c) remain same

(d) increase/decrease depending on depth of immersion

(e) unpredictable.

Ans: c

64. Falling drops of water become spheres due to the property of

(a) adhesion

(b) cohesion

(c) surface tension

(d) viscosity

(e) compressibility.

Ans: c

65. A liquid would wet the solid, if adhesion forces as compared to cohesion forces are

(a) less

(b) more

(c) equal

(d) less at low temperature and more at high temperature

(e) there is no such criterion.

Ans: b

66. If cohesion between molecules of a fluid is greater than adhesion between fluid and glass, then the free level of fluid in a dipped glass tube will be

(a) higher than the surface of liquid
(b) the same as the surface of liquid
(c) lower than the surface of liquid
(d) unpredictable
(e) none of the above.

Ans: c

67. The point in the immersed body through which the resultant pressure of the liquid may be taken to act is known as

(a) meta center
(b) center of pressure
(c) center of buoyancy
(d) center of gravity
(e) none of the above.

Ans: b

68. The total pressure on the surface of a vertical sluice gate 2 m x 1 m with its top 2 m surface being 0.5 m below the water level will be

(a) 500 kg
(b) 1000 kg
(c) 1500 kg
(d) 2000 kg
(e) 4000 kg.

Ans: d

69. The resultant upward pressure of a fluid on a floating body is equal to the weight of the fluid displaced by the body. This definition is according to

(a) Buoyancy
(b) Equilibrium of a floating body
(c) Archimedes' principle
(d) Bernoulli's theorem
(e) Metacentric principle.

Ans: c

70. The resultant upward pressure of the fluid on an immersed body is called

(a) upthrust
(b) buoyancy
(c) center of pressure
(d) all the above are correct
(e) none of above is correct.
Ans: b

71. The conditions for the stable equilibrium of a floating body are

(a) the meta-center should lie above the center of gravity
(b) the center of buoyancy and the center of gravity must lie on the same vertical line
(c) a righting couple should be formed
(d) all the above are correct
(e) none of the above is correct.
Ans: d

72. Poise is the unit of

(a) surface tension
(b) capillarity
(c) viscosity
(d) shear stress in fluids
(e) buoyancy.
Ans: c

73. Metacentric height is given as the distance between

(a) the center of gravity of the body and the meta center
(b) the center of gravity of the body and the center of buoyancy
(c) the center of gravity of the body and the center of pressure
(d) center of buoyancy and metacentre
(e) none of the above.
Ans: a

74. The buoyancy depends on

(a) mass of liquid displaced
(b) viscosity of the liquid

(c) pressure of the liquid displaced

(d) depth of immersion

(e) none of the above.

Ans: a

75. The center of gravity of the volume of the liquid displaced by an immersed body is called

(a) meta-center

(b) center of pressure

(c) center of buoyancy

(d) center of gravity

(e) none of the above.

Ans: c

76. A piece of metal of specific gravity 13.6 is placed in mercury of specific gravity 13.6, what fraction of it volume is under mercury?

(a) the metal piece will simply float over the mercury

(b) the metal piece will be immersed in mercury by half

(c) whole of the metal piece will be immersed with its top surface just at mercury level

 (d) metal piece will sink to the bottom

(e) none of the above.

Ans: c

77. The angle of contact in case of a liquid depends upon

(a) the nature of the liquid and the solid

(b) the material which exists above the free surface of the liquid

(c) both of die above

(d) any one of the above

(e) none of die above.

Ans: c

78. Free surface of a liquid behaves like a sheet and tends to contract to smallest possible area due to the

(a) force of adhesion

(b) force of cohesion

(c) force of friction

(d) force of diffusion

(e) none of die above.
Ans: b

79. Rain drops are spherical because of

(a) viscosity
(b) air resistance
(c) surface tension forces
(d) atmospheric pressure
(e) none of the above.
Ans: c

80. Surface energy per unit area of a surface is numerically equal to...

(a) atmospheric pressure
(b) surface tension
(c) force of adhesion
(d) force of cohesion
(e) viscosity.
Ans: b

81. The capillary rise at 20°C in a clean glass tube of 1 mm bore containing water is approximately

(a) 1 mm
(b) 5 mm
(c) 10 mm
(d) 20 mm
(e) 30 mm.
Ans: e

82. The difference of pressure between the inside and outside of a liquid drop is

(a) $p = T x r$
(b) $p = T/r$
(c) $p = T/2r$
(d) $p = 2T/r$
(e) none of the above.
Ans: d

83. If the surface of liquid is convex, men

(a) cohesion pressure is negligible
(b) cohesion pressure is decreased
(c) cohesion pressure is increased
(d) there is no cohesion pressure
(e) none of the above.
Ans: c

84. To avoid vaporisation in the pipe line, the pipe line over the ridge is laid such that it is not more than

(a) 2.4 m above the hydraulic gradient
(b) 6.4 m above the hydraulic gradient
(c) 10.0 m above the hydraulic gradient
(d) 5.0 above the hydraulic gradient
(e) none of the above.
Ans: b

85. To avoid an interruption in the flow of a syphon, an air vessel is provided

(a) at the inlet
(b) at the outlet
(c) at the summit
(d) ay nay point between inlet and outlet
(e) none of the above.
Ans: c

86. The vapour pressure over the concave surface is

(a) less man the vapour pressure over the plane surface
(b) equal to the vapour pressure over the plane surface
(c) greater than the vapour pressure over the plane surface
(d) zero
(e) none of the above.
Ans: a

87. The property by virtue of which a liquid opposes relative motion between its different layers is called
(a) surface tension

(b) co-efficient of viscosity
(c) viscosity
(d) osmosis
(e) cohesion.
Ans: c

88. The process of diffusion of one liquid into the other through a semi-permeable membrane is called

(a) viscosity
(b) osmosis
(c) surface tension
(d) cohesion
(e) diffusivity.
Ans: b

89. The units of dynamic or absolute viscosity are

(a) metres2 per sec
(b) kg sec/meter
(c) newton-sec per meter
(d) newton-sec2 per meter
(e) none of the above.
Ans: c

90. The continuity equation is connected with

(a) viscous/unviscous fluids
(b) compressibility of fluids
(c) conservation of mass
(d) steady/unsteady flow
(e) open channel/pipe flow.
Ans: c

91. The rise or depression of liquid in a tube due to surface tensionwim increase in size of tube will

(a) increase
(b) remain unaffected
(c) may increase or decrease depending on the characteristics of liquid

(d) decrease

(e) unpredictable.

Ans: d

92. Liquids transmit pressure equally in all the directions. This is according to

(a) Boyle's law

(b) Archimedes principle

(c) Pascal's law

(d) Newton's formula

(e) Chezy's equation.

Ans: c

93. Capillary action is due to the

(a) surface tension

(b) cohesion of the liquid

(c) adhesion of the liquid molecules and the molecules on the surface of a solid

(d) all of the above

(e) none of the above.

Ans: d

94. Newton's law of viscosity is a relationship between

(a) shear stress anctthejiate of angular distortion

(b) shear stress and viscosity

(c) shear stress, velocity and viscosity

(d) pressure, velocity and viscosity

(e) shear stress, pressure and rate of angular distortion.

Ans: a

95. The atmospheric pressure with rise in altitude decreases

(a) linearly

(b) first slowly and then steeply

(c) first steeply and then gradually

(d) unpredictable

(e) none of the above.

Ans: b

96. Pressure of the order of 10''' torr can be measured by

(a) Bourdon tube
(b) Pirani Gauge
(c) micro-manometer
(d) ionisastion gauge
(e) McLeod gauge.
Ans: d

97. Operation of McLeod gauge used for low pressure measurement is based on the principle of

(a) gas law
(b) Boyle's law
(c) Charle's law
(d) Pascal's law
(e) McLeod's law.
Ans: b

98. An odd shaped body weighing 7.5 kg and occupying 0.01 m3 volume will be completely submerged in a fluid having specific gravity of

(a) 1
(b) 1.2
(c) 0.8
(d) 0.75
(e) 1.25.
Ans: d

99. In an isothermal atmosphere, the pressure

(a) decreases linearly with elevation
(b) remains constant
(c) varies in the same way as the density
(d) increases exponentially with elevation
(e) unpredictable.
Ans: c

100. Mercury is often used in barometer because

(a) it is the best liquid
(b) the height of barometer will be less
(c) its vapour pressure is so low that it may be neglected
(d) both (b) and (c)
(e) it moves easily.
Ans: d

101. Barometer is used to measure

(a) pressure in pipes, channels etc.
(b) atmospheric pressure
(c) very low pressure
(d) difference of pressure between two points
(e) rain level.
Ans: b

102. Which of the following instrument can be used for measuring speed of a submarine moving in deep sea

(a) Venturimeter
(b) Orifice plate
(c) hot wire anemometer
(d) rotameter
(e) pitot tube.
Ans: e

103. Which of the following instrument can be used for measuring speed of an aeroplane

(a) Venturimeter
(b) Orifice plate
(c) hot wire anemometer
(d) rotameter
(e) pitot tube.
Ans: e

104. Piezometer is used to measure

(a) pressure in pipe, channels etc.
(b) atmospheric pressure
(c) very low pressures
(d) difference of pressure between two points
(e) flow.
Ans: c

105. Which of the following instruments is used to measure flow on the application of Bernoulli's theorem

(a) Venturimeter
(b) Orifice plate
(c) nozzle
(d) pitot tube
(e) all of the above.
Ans: e

106. The speed of sound in a ideal gas varies directly as its

(a) pressure
(b) temperature
(c) density
(d) modulus of elasticity
(e) absolute temperature,
Ans: e

107. Dynamic viscosity of most of the liquids with rise in temperature

(a) increases
(b) decreases
(a) remains unaffected
(d) unpredictable
(e) none of the above.
Ans: b

108. Dynamic viscosity of most of the gases with rise in temperature

(a) increases

(b) decreases

(c) remains unaffected

(d) unpredictable

(e) none of the above.

Ans: a

109. A metal with specific gravity of o floating in a fluid of same specific gravity a will

(a) sink to bottom

(b) float over fluid

(c) partly immersed

(d) be fully immersed with top surface at fluid surface

(e) none of the above.

Ans: d

110. Euler's dimensionless number relates the following

(a) inertial force and gravity

(b) viscous force and inertial force

(c) viscous force and buoyancy force

(d) pressure force and inertial force

(e) pressure force and viscous force.

Ans: d

111. Manometer is used to measure

(a) pressure in pipes, channels etc.

(b) atmospheric pressure

(c) very low pressure

(d) difference of pressure between two points

(e) velocity.

Ans: a

112. Which of the following manometer has highest sensitivity

(a) U-tube with water

(b) inclined U-tube

(c) U-tube with mercury

(d) micro-manometer with water

(e) displacement type.

Ans: d

113. In order to increase sensitivity of U-tube manometer, one leg is usually inclined by angle 9. Sensitivity of inclined tube to sensitivity of U-tube is equal to

(a) sin 9
(b) sin 9
(c) cas 9
(d) cos 9
(e) tan 9.
Ans: b

114. Working principle of dead weight pressure gauge tester is based on

(a) Pascal's law
(b) Dalton's law of partial pressure
(c) Newton's law of viscosity .
(d) Avogadro's hypothesis
(e) Second law of thermodynamic.
Ans: a

115. The resultant of all normal pressures acts

(a) at e.g. of body
(b) at center of pressure
(c) vertically upwards
(d) at metacentre
(e) vertically downwards.
Ans: c

116. Center of pressure compared to e.g. is

(a) above it
(b) below it.
(c) at same point
(d) above or below depending on area of body
(e) none of the above.
Ans: b

117. Metacentric height is the distance between the metacentre and

(a) water surface
(b) center of pressure
(c) center of gravity
(d) center of buoyancy
(e) none of the above.
Ans: c

118. The resultant upward pressure of the fluid on an immersed body due to its tendency to uplift the sub-merged body is called

(a) upthrust
(b) reaction
(c) buoyancy
(d) metacentre
(e) center of pressure.
Ans: c

119. The center of pressure of a surface subjected to fluid pressure is the point

(a) on the surface at which resultant pres-sure acts
(b) on the surface at which gravitational force acis
(c) at which all hydraulic forces meet
(d) similar to metacentre
(e) where pressure equivalent to hydraulic thrust will act.
Ans: a

120. Buoyant force is

(a) the resultant force acting on a floating body
(b) the resultant force on a body due to the fluid surrounding it
(c) equal to the volume of liquid dis-placed
(d) the force necessary to maintain equilibrium of a submerged body
(e) none of the above.
Ans: b

121. The horizontal component of buoyant force is

(a) negligible

(b) same as buoyant force

(c) zero

Ans: c

122. The line of action of the buoyant force acts through the

(a) centroid of the volume of fluid vertically above the body

(b) centre of the volume of floating body

(c) center of gravity of any submerged body

(d) centriod of the displaced volume of fluid

(e) none of the above.

Ans: d

123. Center of buoyancy is the

(a) centroid of the displaced volume of fluid

(b) center of pressure of displaced volume

(c) e.g. of floating 'body

(d) does not exist

(e) none of the above.

Ans: a

124. A body floats in stable equilibrium

(a) when its meatcentric height is zero

(b) when the metancentre is above e.g.

(c) when its e.g. is below it's center of buoyancy

(d) metacentre has nothing to do with position of e.g. for determining stability

(e) none of the above.

Ans: b

125. A piece weighing 3 kg in air was found to weigh 2.5 kg when submerged in water. Its specific gravity is

(a) 1

(b) 5

(c) 7

(d) 6

Ans: d

126. The total pressure force on a plane area is equal to the area multiplied by the intensity of pressure at the centriod, if

(a) the area is horizontal
(b) the area is vertical
(c) the area is inclined
(d) all of the above
(e) none of the above.
Ans: d

127. A square surface 3 m x 3 m lies in a vertical line in water pipe its upper edge at water surface. The hydrostatic force on square surface is

(a) 9,000 kg
(b) 13,500 kg
(c) 18,000 kg
(d) 27,000 kg
(e) 30,000 kg.
Ans: b

128. The depth of the center of pressure on a vertical rectangular gate 8 m wide and 6 m high, when the water surface coincides with the top of the gate, is

(a) 2.4 m
(b) 3.0 m
(c) 4.0 m
(d) 2.5 m
(e) 5.0 m.
Ans: b

129. If the atmospheric pressure on the surface of an oil tank (sp. gr. 0.8) is 0.2 kg/cm", the pressure at a depth of 50 m below the oil surface will be

(a) 2 meters of water column
(b) 3 meters of water column
(c) 5 meters of water column
(d) 6 meters of water Column
(e) 7 meters of water column.
Ans: d

130. Metacentre is the point of intersection of

(a) vertical upward force through e.g. of body and center line of body
(b) buoyant force and the center line of body
(c) mid point between e.g. and center of buoyancy
(d) all of the above
(e) none of the above.
Ans: b

131. Choose the wrong statement

(a) The horizontal component of the hydro-static force on any surface is equal to the normal force on the vertical projection
of the surface
(b) The horizontal component acts through the center of pressure for the vertical projection
(c) The vertical component of the hydrostatic force on any surface is equal to the weight of the volume of the liquid above the area
(d) The vertical component passes through the center of pressure of the volume
(e) Center of pressure acts at a greater depth than center of gravity.
Ans: d

132. For a body floating in a liquid the normal pressure exerted by the liquid acts at

(a) bottom surface of the body
(b) e.g. of the body
(c) metacentre
(d) all points on the surface of the body
(e) all of the above.
Ans: d

133. Choose the wrong statement

(a) any weight, floating or immersed in a liquid, is acted upon by a buoyant force
(b) Buoyant force is equal to the weight of the liquid displaced
(c) The point through which buoyant force acts, is called the center of buoyancy
(d) Center of buoyancy is located above the center of gravity of the displaced liquid v
(e) Relative density of liquids can be determined by means of the depth of flotation of hydrometer.
Ans: d

134. According to the principle of buoyancy a body totally or partially immersed in a fluid will be lifted up by a force equal to

(a) the weight of the body
(b) more than the weight of the body
(c) less than the weight of the body
(d) weight of the fluid displaced by the body
(e) weight of body plus the weight of the fluid displaced hy the body.
Ans: d

135. When a body floating in a liquid, is displaced slightly, it oscillates about

(a) e.g. of body
(b) center of pressure
(c) center of buoyancy
(d) metacentre
(e) liquid surface.
Ans: d

136. Buoyant force is

(a) resultant force acting on a floating body
(b) equal to the volume of liquid displaced
(c) force necessary to keep a body in equilibrium
(d) the resultant force on a body due to the fluid surrounding it
(e) none of the above.
Ans: d

137. Ratio of inertia force to surface Tension is known as

(a) Mach number
(b) Froude number
(c) Reynold's number
(d) Weber's number
(e) none of the above.
Ans: d

138. A ship whose hull length is 100 m is to travel at 10 m/sec. For dynamic similarity, at what velocity should a 1:25 model be towed through water ?

(a) 10 m/sec
(b) 25 m/sec
(c) 2 m/sec
(d) 50 m/sec
(e) 250 m/sec.
Ans: c

139. A model of a reservior is drained in 4 mts by opening the sluice gate. The model scale is 1: 225. How long should it take to empty the prototype ?

(a) 900 minutes
(b) 4 minutes
(c) 4 x (225)3/2 minutes
(d) 4 (225)1/3 minutes
(e) 4 x V225 minutes.
Ans: e

140. A model of torpedo is tested in a towing tank at a velocity of 25 m/sec. The prototype is expected to attain a velocity of 5 m/sec. What model scale has been used ?

(a) 1 : 5
(b) 1 : 2.5
(c) 1 :25
(d) 1:55
(e) 1 : 53/2
Ans: a

141. Ratio of inertia force to elastic force is known as

(a) Mach number
(b) Froude number
(c) Reynold's number
(d) Weber's number
(e) none of the above.
Ans: a

142. For a floating body to be in stable equilibrium, its metacentre should be

(a) below the center of gravity
(b) below the center of buoyancy

(c) above the center of buoyancy

(d) between e.g. and center of pressure

(e) above the center of gravity.

Ans: e

143. For a floating body to be in equilibrium

(a) meta centre should be above e.g.

(b) centre of buoyancy and e.g. must lie on same vertical plane

(c) a righting couple should be formed

(d) all of the above

(e) none of the above.

Ans: d

144. The two important forces for a floating body are

(a) buoyancy, gravity

(b) buoyancy, pressure

(c) buoyancy, inertial

(d) inertial, gravity

(e) gravity, pressure.

Ans: a

145. Choose the wrong statement

(a) The center of buoyancy is located at the center of gravity of the displaced liquid

(b) For stability of a submerged body, the center of gravity of body must lie directly below the center of buoyancy

(c) If e.g. and center of buoyancy coincide, the submerged body must lie at neutral equilibrium for all positions

(d) For stability of floating cylinders or spheres, the e.g. of body must lie below the center of buoyancy

(e) All floating bodies are stable.

Ans: e

146. Center of pressure on an inclined plane is

(a) at the centroid

(b) above the centroid

(c) below the centroid

(d) at metacentre

(e) at center of pressure.

Ans: c

147. An open vessel of water is accelerated up an inclined plane. The free water surface will

(a) be horizontal

(b) make an angle in direction of inclination of inclined plane

(c) make an angle in opposite direction to inclination of inclined plane

(d) any one of above is possible

(e) none of the above.

Ans: c

148. The line of action of the buoyant force acts through the centroid of the

(a) submerged body

(b) volume of the floating body

(c) volume of the fluid vertically above the body

(d) displaced volume of the fluid

(e) none of the above.

Ans: d

149. Resultant pressure of the liquid in the case of an immersed body acts through

(a) centre of gravity

(b) centre of pressure

(c) metacentre

(d) centre of buoyancy

(e) in between e.g. and centre of pressure.

Ans: b

150. The centre of gravity of the volume of the liquid displaced by an immersed body is called

(a) centre of gravity

(b) centre of pressure

(c) metacentre

(d) centre of buoyancy

(e) centroid.

Ans: d

151. Differential monometer is used to measure

(a) pressure in pipes, channels etc.
(b) atmospheric pressure
(c) very low pressure
(d) difference of pressure between two points
(e) velocity in pipes
Ans: d

152. The pressure in the air space above an oil (sp. gr. 0.8) surface in a tank is 0.1 kg/cm".The pressure at 2.5 m below the oil surface will be

(a) 2 metres of water column
(b) 3 metres of water column
(c) 3.5 metres of water column
(d) 4 m of water column
(e) none of the above.
Ans: b

153. The time oscillation of a floating body with increase in metacentric height will be

(a) same
(b) higher
(c) lower
(d) lower/higher depending on weight of body
(e) unpredictable.
Ans: c

154. In an immersed body, centre of pressure is

(a) at the centre of gravity
(b) above the centre of gravity
(c) below be centre of gravity
(d) could be above or below e.g. depend¬ing on density of body and liquid
(e) unpredictable.
Ans: c

155. The normal stress is same in all directions at a point in a fluid

(a) only when the fluid is frictionless

(b) only when the fluid is incompressible and has zero viscosity

(c) when there is no motion of one fluid layer relative to an adjacent layer

(d) irrespective of the motion of one fluid layer relative to an adjacent layer

(e) in case of an ideal fluid.

Ans: c

156. Select the correct statement

(a) Local atmospheric pressure depends upon elevation of locality only

(b) Standard atmospheric pressure is the mean local atmospheric pressure a* sea level

(c) Local atmospheric pressure is always below standard atmospheric pressure

(d) A barometer reads the difference be-tween local and standard atmospheric pressure

(e) Gauge piessure is equal to atmospheric pressure plus instrument reading.

Ans: b

157. For measuring flow by a venturimeter, if should be installed in

(a) vertical line

(b) horizontal line

(c) inclined line with flow downward

(d) inclined line with upward flow\

(e) in any direction and in any location.

Ans: e

158. Total pressure on a lmxlm gate immersed vertically at a depth of 2 m below the free water surface will be

(a) 1000 kg

(b) 4000 kg

(c) 2000 kg

(d) 8000 kg

(e) 16000 kg.

Ans: a

159. Hot wire anemometer is used to measure

(a) pressure in gases

(b) liquid discharge

(c) pressure in liquids

(d) gas velocities

(e) temperature.

Ans: d

160. Rotameter is a device used to measure

(a) absolute pressure
(b) velocity of fluid
(c) flow
(d) rotation
(e) velocity of air.
Ans: c

161 Flow of water in a pipe about 3 metres in diameter can be measured by

(a) orifice plate
(b) venturi
(c) rotameter
(d) pitot tube
(e) nozzle
Ans: d

162. True one-dimensional flow occurs when

(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid par-ticles, at any point, is the same at suc-cessive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline pat-terns are identical in each plane
(e) velocity, depth, pressure etc. change from point to point in the fluid flow.
Ans: a

163. An ideal flow of any fluid must satisfy

(a) Pascal law
(b) Newton's law of viscosity
(c) boundary layer theory
(d) continuity equation
(e) Bernoulli's theorem.
Ans: d

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164. In the case of steady flow of a fluid, the acceleration of any fluid particle is

(a) constant
(b) variable
(c) zero
(d) zero under limiting conditions
(e) never zero.
Ans: c

165. Non uniform flow occurs when

(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid particles, at any point, is the same at successive periods of time
(c) the magnitude aricf direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline pat-terns are identical in each plane
(e) velocity, depth, pressure, etc. change from point to point in the fluid flow.
Ans: e

166. During the opening of a valve in a pipe line, the flow is

(a) steady
(b) unsteady
(c) uniform
(d) laminar
(e) free vortex type.
Ans: b

167. Uniform flow occurs when

(a) the flow is steady
(b) the flow is streamline
(c) size and shape of the cross section in a particular length remain constant
(d) size and cross section change uniformly along length
(e) flow occurs at constant fate.
Ans: c

168. Gradually varied flow is

(a) steady uniform
(b) non-steady non-uniform
(c) non-steady uniform
(d) steady non-uniform
(e) true one-dimensional.
Ans: d

169. Steady flow occurs when

(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid particles, at any point, is the same at successive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline pat-terns are identical in each plane
(e) velocity, depth, pressure, etc. change from point to point in the fluid flow.
Ans: b

170. The flow which neglects changes in a transverse direction is known as

(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: a

171. The flow in which each liquid particle has a definite path and their paths do not cross each other is called

(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: e

172. The flow in which conditions do not change with time at any point, is known as

(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: c

173. The flow in which the velocity vector is identical in magnitude and direction at every point, for any given instant, is known as

(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: b

174. The flow in which the particles of a fluid attain such velocities that vary from point to point in magnitude and direction as well as from instant to instant, is known as

(a) one dimensional flow
(b) uniform flow
(c) steady flow
(d) turbulent flow
(e) streamline flow.
Ans: d

175. Flow occurring in a pipeline when a valve is being opened is

(a) steady
(b) unsteady
(c) laminar
(d) vortex
(e) rotational.
Ans: b

176. General energy equation holds for

(a) steady flow
(b) turbulent flow
(c) laminar flow
(d) non-uniform flow
(e) all of the above.
Ans: d

177. A streamline is defined as the line

(a) parallel to central axis flow
(b) parallel to outer surface of pipe
(c) of equal yelocity in a flow
(d) along which the pressure drop is uniform
(e) which occurs in all flows.
Ans: c

178. Two dimensional flow occurs when

(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid particles, at any point, is the same at successive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid
(d) the fluid particles move in plane or parallel planes and the streamline pat-terns are identical in each plane
(e) velocity, depth, pressure, etc. change from point to point in the fluid flow.
Ans: d

179. A piece of metal of specific gravity 7 floats in mercury of specific gravity 13.6. What fraction of its volume is under mercury ?

(a) 0.5
(b) 0.4
(c) 0.515
(d) 0.5
(e) none of the above.
Ans: c

180. A piece of wood having weight 5 kg floats in water with 60% of its volume under the liquid. The specific gravity of wood is

(a) 0.83
(b) 0.6
(c) 0.4
(d) 0.3
(e) none of the above.
Ans: b

181. The velocity of jet of water travelling out of opening in a tank filled with water is proportional to

(a) head of water (h)
(b) h2
(c) V/T
(d) h2
(e) h3/1.
Ans: c

182. In a free vortex motion, the radial component of velocity everywhere is

(a) maximum
(b) minimum
(c) zero
(d) non-zero and finite
(e) unpredictable.
Ans: c

183. In a forced vortex, the velocity of flow everywhere within the fluid is

(a) maximum
(b) minimum
(c) zero
(d) non-zero finite
(e) unpredictable.
Ans: d

184. The region between the separation streamline and the boundary surface of the solid body is known as

(a) wake
(b) drag

(c) lift
(d) boundary layer
(e) aerofoil section.
Ans: a

185. For hypersonic flow, the Mach number is

(a) unity
(b) greater than unity
(c) greater than 2
(d) greater than 4
(e) greater than 10.
Ans: d

186. The upper surface of a weir over which water flows is known is

(a) crest
 (b) nappe
(c) sill
(d) weir top
(e) contracta.
Ans: c

187. Normal depth in open channel flow is the depth of flow corresponding to

(a) steady flow
(b) unsteady flow
(c) laminar flow
(d) uniform flow
(e) critical flow.
Ans: d

188. Uniform flow occurs when

(a) the direction and magnitude of the velocity at all points are identical
(b) the velocity of successive fluid paiticles, at any point, is the same at successive periods of time
(c) the magnitude and direction of the velocity do not change from point to point in the fluid

(d) the fluid particles move in plane or parallel planes and the streamline pat-terns are identical in each pleasure

(e) velocity, depth, pressure, etc. change from point to point in the fluid flow.

Ans: c

189. Pitot tube is used for measurement of

(a) pressure
(b) flow
(c) velocity
(d) dsscharge
(e) viscosity.

Ans: c

190. Hydrometer is used to determine

(a) specific gravity of liquids
(b) specific gravity of solids
(c) specific gravity of gases
(d) relative humidity
(e) density.

Ans: a

191. The total energy of each particle at various places in the case of perfect incompres sible fluid flowing in continuous sream

(a) keeps on increasing
(b) keeps on decreasing
(c) remains constant
(d) may increase/decrease
(e) unpredictable.

Ans: c

192. According to Bernoulli's equation for steady ideal fluid flow

(a) principle of conservation of mass holds
(b) velocity and pressure are inversely proportional
(c) total energy is constant throughout
(d) the energy is constant along a stream-line but may vary across streamlines
(e) none of the above.

Ans: d

193. The equation of continuity holds good when the flow

(a) is steady

(b) is one dimensional

(c) velocity is uniform at all the cross sections

(d) all of the above

(e) none of the above.

Ans: d

194. Mach number is significant in

(a) supersonics, as with projectiles and jet propulsion

(b) full immersion or completely enclosed flow, as with pipes, aircraft wings, nozzles etc.

(c) simultaneous motion through two fluids where there is a surface of dis-continuity, gravity force, and wave making effects,

as with ship's hulls

(d) all of fhe above

(e) none of the above.

Ans: a

195. Froude number is significant in

(a) supersonics, as with projectile and jet propulsion

(b) full immersion or completely enclosed flow, as with pipes, aircraft wings, nozzles etc.

(c) simultaneous motion through two fluids where there is a surface of dis-continuity, gravity forces, and wave making effect,

as with ship's hulls

(d) all of the above

(e) none of the above

Ans: c

196. All the terms of energy in Bernoulli's equation have dimension of

(a) energy

(b) work

(c) mass

(d) length

(e) time.

Ans: d

197. Reynolds number is significant in

(a) supersonics, as with projectile and jet propulsion

(b) full immersion or completely enclosed flow, as with pipes, aircraft wings, nozzles etc.

(c) simultaneous motion through two fluids where there is a surface of dis-continuity, gravity forces, and wave making effect, as with ship's hulls

(d) all of the above

(e) none of the above.

Ans: b

198. The fluid forces considered in the Navier Stokes equation are

(a) gravity, pressure and viscous

(b) gravity, pressure and turbulent

(c) pressure, viscous and turbulent

(d) gravity, viscous and turbulent

(e) none of the above.

Ans: a

199. A large Roynold number is indication of

(a) smooth and streamline flow

(b) laminar flow

(c) steady flow

(d) turbulent flow

(e) highly turbulent flow.

Ans: e

200. For pipes, laminar flow occurs when Roynolds number is

(a) less than 2000

(b) between 2000 and 4000

(c) more than 4000

(d) less than 4000

(e) none of the above.

Ans: a

201. In order that flow takes place between two points in a pipeline, the differential pressure between these points must be more than

(a) frictional force

(b) viscosity

(c) surface friction

(d) all of the above

(e) none of the above.

Ans: d

202. At the center line of a pipe flowing under pressure where the velocity gradient is zero, the shear stress will be

(a) minimum

(b) maximum

(c) zero

(d) negative value

(e) could be any value.

Ans: e

203. The pressure in Pascals at a depth of 1 m below the free surface of a body of water will be equal to

(a) 1 Pa

(b) 91 Pa

(c) 981 Pa

(d) 9810 Pa

(e) 98,100 Pa.

Ans: d

204. Two pipe systems can be said to be equivalent, when the following quantites are same

(a) friction loss and flow

(b) length and diameter

(c) flow and length

(d) friction factor and diameter

(e) velocity and diameter.

Ans: a

205. For pipes, turbulent flow occurs when Reynolds number is

(a) less than 2000

(b) between 2000 and 4000

(c). more than 4000

(d) less than 4000

(e) none of the above.

Ans: c

206. Bernoulli equation deals with the law of conservation of

(a) mass

(b) momentum

(c) energy

(d) work

(e) force.

Ans: c

207. A hydraulic press has a ram of 15 cm diameter and plunger of 1.5 cm. It is required to lift a weight of 1 tonne. The force required on plunger is equal to
(a) 10 kg
(b) 100 kg
(c) 1000 kg
(d) 1 kg
(e) 10,000 kg.
Ans: a

208. Cavitation is caused by
(a) high velocity
(b) high pressure
(c) weak material
(d) low pressure
(e) low viscosity.
Ans: d

209. Cavitation will begin when
(a) the pressure at any location reaches an absolute pressure equal to the saturated vapour pressure of the liquid
(b) pressure becomes more than critical pressure
(c) flow is increased
(d) pressure is increased
(e) none of the above.
Ans: a

210. Principle of similitude forms the basis of
(a) comparing two identical equipments
(b) designing models so that the result can be converted to prototypes
(c) comparing similarity between design and actual equipment
(d) hydraulic designs
(e) performing acceptance tests.
Ans: b

211. For similarity, in addition to models being geometrically similar to prototype, the following in both cases should also be equal
(a) ratio of inertial force to force due to viscosity
(b) ratio of inertial force to force due to gravitation

(c) ratio of inertial force to force due to surface tension

(d) all the four ratios of inertial force to force due to viscosity, gravitation, sur-face tension, and elasticity

Ans: d