



### **UNIT-1 POLYMER CHEMISTRY**

1. Differentiate thermoplastics and thermosetting plastics
2. Write the preparation, properties and uses i) Nylon-6, 6, ii) Epoxy resin
3. Distinguish between addition and condensation polymerization
4. Explain the following properties of polymers i) Glass transition temperature, ii) Tacticity, iii) PDI iv) i) Molecular weight of a polymer
5. Mention the various techniques of polymerization
  - i) Emulsion polymerization
  - ii) Suspension polymerization.
  - iii) Solution polymerization
  - iv) Bulk polymerization
6. Explain the mechanism of free radical polymerization of polyvinyl chloride
7. Explain the mechanism of cationic polymerization
8. Explain the mechanism of anionic polymerization
9. Explain various functionality of a polymer with example and state its significance.
10. How are polymers classified? Explain
11. What are plastics? Explain its advantages and disadvantages.

### **UNIT-2 CHEMICAL THERMODYNAMICS**

1. Derive Gibb's Helmholtz equation. Mention its applications
2. Derive Clausius Clayperon equation. Mention its significance
3. Derive the entropy change for an isothermal reversible expansion of an ideal gas.
4. Derive the following Maxwell's relations
5. VantHoff's isotherm



6. VantHoff's isochore equation (or) VantHoff's equation

**UNIT-3 PHOTOCHEMISTRY AND SPECTROSCOPY**

1. (i) With the help of Jablonski diagram, explain radiative and non-radiative pathways for an electronic transition

(ii) How quantum efficiency is determined experimentally? Explain.

2. (i) Distinguish between (a) fluorescence and phosphorescence (or) Types of photo physical process

3. (i) What is the statement, expressions and the limitations of Beer-Lambert law?

(ii) Explain about Stark-Einstein law of photochemistry

4. Explain about chemiluminescence with suitable examples

5. Explain about photosensitization with suitable examples

6. (i) Explain the principle of IR spectroscopy and discuss the functions of various Components in IR spectrophotometer

(ii) Discuss the applications of IR spectroscopy.

8. (i) Discuss the principle, instrumentation and working mechanism of UV-Visible spectroscopy

(ii) Discuss the applications of UV-Visible spectroscopy.

9. State the following

(a) Hypsochromic shift, (b) Hyper chromic shift,

(c) Hypochromic shift, (d) Bathochromic shift

10. Explain in detail about the rotational, vibrational and electronic transitions.

11. Explain in detail about types of electronic transition that occur in UV-Visible spectrum

12. Explain about Stark-Einstein law of photochemistry



### **UNIT-4 PHASE RULE AND ALLOYS**

1. What is a phase diagram? With the help of phase diagram discuss one component WATER system.
2. i) Discuss Lead-Silver (Pb-Ag )  
ii) Describe pattinsons process of desilverisation of lead.
3. Write the composition, properties and uses of any two (BRASS & BRONZE) nonferrous alloys.
4. Discuss the composition, characteristics and uses of German silver and Gun metal.
5. Write the composition, properties and uses of i) Nichrome ii) Stainless steel
6. Explain the Heat treatment process i) Annealing ii) Tempering iii) Hardening .iv) Nitriding
7. What are the types of alloys? Discuss the purpose of making alloys.

### **UNIT-5 NANOCHEMISTRY**

1. Applications of Nanoparticles (OR) Nanoparticles
2. Give an account of carbon nanotubes ( CNT ) and their Applications of carbon nanotubes
3. Explain Laser Ablation method of preparing nanoparticles
4. Explain CVD (chemical vapour deposition) method for the synthesis of CNTs
5. Bring out the differences between molecules, nanomaterials and bulk materials.
6. (i) Explain in detail about the Eletrodeposition method  
(ii) Describe the hydrothermal synthesis of nanoparticles
7. Explain solvo thermal process of nanoparticles.
8. (i) What are Nanorods and Nanowires? Explain their properties with examples.
9. Describe the size dependant properties of nanoparticles with example.
10. Explain top – down and bottom – up nanomaterial preparation with examples.



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