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Code: 13BS1005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, July- 2016

ENGINEERING CHEMISTRY
(Common to CE, ME, CSE & IT)

Time: 3 hours **Max Marks: 70**

PART – A
Answer all questions **[10 x 1=10M]**

1. (a) Write the monomers of Nylon 6,6.
   (b) Mention the role of gypsum in setting and hardening of Portland cement?
   (c) Write any two limitations of zeolite process?
   (d) What is the principle of reverse osmosis?
   (e) What is meant by term passivity?
   (f) Which of the following metals could provide cathodic protection to iron: Al, Zn, Cu, Ni?
   (g) How does reforming increase octane number?
   (h) Give the classification of lubricants with examples.
   (i) What is the alternative solvent?
   (j) Write any two biomedical applications of Fullerenes.

PART-B
Answer one question from each unit **[5 x 12=60M]**

UNIT-I

2. a) What are the techniques of plastic moulding ? Discuss compression and injection moulding of plastics.
   b) Discuss the various reactions of water with cement constituents which take place during its setting and hardening.
   c) Explain addition and condensation polymerization with suitable examples. [5M+4M+3M]

(OR)

3. a) Describe the method of preparation, properties and applications of (i) Bakelite (ii) Teflon
   b) Mention the raw materials necessary for the manufacture of Portland cement. What are the different steps involved in the manufacture of cement by" wet process" and discuss various reactions taking place in rotary kiln along with temperature? [6M+6M]

UNIT-II

4. a) What is meant by hardnessof water? How do you estimate the hardness of water by EDTA method?
   b) Calculate temporary, permanent and total hardness of a water sample, having the following analysis: $Mg(HCO_3)_2$ =73 mg/L; $Ca(HCO_3)_2$ = 162 mg/L; $MgCl_2$ = 95 mg/L; $CaSO_4$ = 68 mg/L; NaCl = 100 mg/L. [8M+4M]

(OR)

5. Write a short note on:
   (a) Sedimentation with coagulation
   (b) Ion exchange process of water softening with neat sketch. [4M+8M]

UNIT-III

6. a) Define corrosion of metals. Explain electrochemical theory of wet corrosion.
   b) Discuss various factors which influence the rate of corrosion. [6M+6M]

(OR)

7. a) Write an informative note on corrosion inhibitors.
   b) Discuss different types of corrosion that we commonly come across. [4M+8M]

UNIT-IV

8. a) What is synthetic petrol? Describe the manufacture of gasoline by Fischer – Tropsch method
   b) Define Lubricant &lubrication. Explain mechanism of Hydrodynamic lubrication. [6M+6M]

(OR)

9. a) Describe the fractional distillation of petroleum.
   b) Explain the following properties of lubricants and give their significance
   (i) Aniline point (ii) viscosity index [7M+5M]

UNIT-V

10. a) Give differences between top and bottom up approach in nano synthesis.
    b) Discuss the engineering applications of green chemistry.
    c) What is meant by Green house effect? Explain its causes and adverse effects. [3M+4M+5M]

(OR)

11. Write a short note on:
    a) Solar cell
    b) Any four principles of green chemistry.
    c) Applications of CNT in fuel cells. [5M+4M+3M]

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(AUTONOMOUS)
I B. Tech II Semester Supplementary Examinations, July-2016

ENGINEERING PHYSICS

(Common to EEE & ECE)

Time: 3 hours **Max Marks: 70**

PART- A

Answer all questions **[10 x 1=10M]**

1. a) Why the centre ring is dark in a Newton's rings system?
   b) What is meant by diffraction of light?
   c) What are the important characteristics of a laser beam?
   d) Give any two applications of optical fibers?
   e) Define the terms Crystal Lattice and Unit Cell?
   f) Explain the significance of Miller indices?
   g) Define Intensity of Magnetization (I)?
   h) What is Electric Susceptibility?
   i) Give any two assumptions of classical free electron theory.
   j) Define Wave and Particle duality?

PART-B

Answer one question from each unit **[5 x 12=60M]**

UNIT-I

2. a) What are thin films? Explain the concept of interference in thin films and derive the condition for constructive and destructive interference in the case of reflected light.
   b) In young's double slit experiment, it is found that the separation of slits is 0.19cm and the fringe width is 0.031cm at a distance of 100cm from the slits. Find the wave length of monochromatic light used. **[8M+4M]**

(OR)

3. a) Distinguish between Fresnel and Fraunhoffer diffraction.
   b) Discuss the diffraction of light by a narrow slit. Explain how it can be used to determine the slit width. **[4M+8M]**

UNIT-II

4. a) Explain the principle of spontaneous and stimulated emission.
   b) Describe the construction and working of Helium- Neon Laser. **[4M+8M]**

(OR)

5. a) Derive the expressions for acceptance angle and numerical aperture of an optical fiber.
   b) Distinguish between step index and graded index optical fibers? **[7M+5M]**

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UNIT-III

6. a) Explain the terms Lattice and Basis.
   b) Enumerate the Seven Crystal Systems and Bravais Lattice in detail. **[4M+8M]**

(OR)

7. a) State and prove Bragg's Law of X-Ray Diffraction.
   b) The Bragg's angle for refection from the (111) plane in a FCC crystal is 19.2˚ for an X ray wave length of 1.54 A.U. Compute the cube edge of the unit all. **[8M+4M]**

UNIT-IV

8. a) What are the different types of magnetic materials ? Mention their properties with examples.
   b) Distinguish between Hard and Soft magnetic materials. **[8M+4M]**

(OR)

9. a) What are dielectric materials? Explain their importance.
   b) Explain the different types of polarizations. **[4M+8M]**

UNIT-V

10. a) Explain the free electron theory of metals.
    b) Discuss the various drawbacks of classical free electron theory of metals.
    c) Explain Drift velocity of an electron in a metal. **[3M+6M+3M]**

(OR)

11. a) Derive an expression for Time independent Schrodinger wave equation and also explain its significance.
    b) Calculate the de Broglie wavelength of an electron which has been accelerated from rest on application of potential of 400 volts. **[8M+4M]**

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