AR13

Code: 13BS1005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Regular / Supplementary Examination, December, 2015
ENGINEERING CHEMISTRY
(Common to EEE & ECE)

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

PART – A

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

1. (a) Write the structure of monomer of PE?
   (b) What is the major component of cement?
   (c) Write any two impurities present in domestic water?
   (d) Define sedimentation.
   (e) State pilling-bed worth rule.
   (f) What is the influence of p^H on the rate of corrosion?
   (g) Define octane number.
   (h) Write the principle of lubrication.
   (i) What are the methods of green synthesis?
   (j) What is neutralization number?

PART-B

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

UNIT-I

2. a) Describe the differences between addition and condensation polymerisation?
   b) Distinguish between Thermo settings & Thermo plastics? [6M+6M]

(OR)

3. a) Discuss the preparation and uses of PVC and bakelite
   b) Explain in detail about setting and hardening of Portland cement [6M+6M]

UNIT-II

4. a) Explain the desalination of seawater by Electrodialysis
   b) Calculate temporary hardness and total hardness of a sample of water containing $Mg(HCO3)2$ = 8.1 mg/L; $Ca(HCO3)2$ = 14.2 mg/L; $MgCl2$ = 8.5 mg/L; $CaSO4$ = 11.6 mg/L. [7M+5M]

(OR)

5. Discuss briefly the following:
   (a) Break point chlorination
   (b) Zeolite process [6M+6M]

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UNIT-III

6. a) Discuss in detail the electrochemical theory of corrosion
   b) Explain about (i) sacrificial anodic protection, (ii) Impressed current cathodic protection [6M+6M]

(OR)

7. a) Explain the role of corroding environmentl in influencing the rate of corrosion
   b) Describe in detail about corrosion inhibitors. [6M+6M]

UNIT-IV

8. a) Explain Fischer –Tropsch process for the manufacture of synthetic petrol.
   b) Discuss about extreme pressure lubrication and aniline point [6M+6M]

(OR)

9. a) Explain about viscosity index of lubricant
   b) Write a sort note on Flash point and fire point and Could & Pour point. [4M+8M]

UNIT-V

10. a) Write the engineering applications of green chemistry
    b) Explain about photovoltaic cell
    c) What are green house gases and how do these gases produce green house effect? [3M+4M+5M]

(OR)

11. a) Explain briefly about top down concept of preparation of nanomaterial.
    b) Write the different properties of gold and silver nano particles [6M+6M]

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13BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B. Tech I Semester Regular / Supplementary Examinations, December, 2015

ENGINEERING PHYSICS

(Common to CIVIL, MECH, CSE, IT)

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

PART- A

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

1. a) Define interference of light.
   b) Write the condition at which you will get principal maxima.
   c) What is the significance of Einstein coefficients?
   d) Does the numerical aperture depend on size of optical fiber? Give reason.
   e) Write the relation between electric susceptibility and relative permittivity.
   f) What is Bohr magneton? Write its value.
   g) Define unit cell and primitive cell.
   h) How many Lattice Points a Unit Cell of FCC Lattice contain?
   i) Define current density. Is it scalar or vector?
   j) Write the properties of wave function.

PART-B

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

UNIT-I

2. a) What is meant by coherence and coherent sources of light? Explain.
   b) Write the conditions for interference pattern.
   c) With ray diagram discuss the theory of Young's double slit experiment and derive the equation for fringe width. **[4M+2M+6M]**

(OR)

3. a) Write any four differences between interference and diffraction of light.
   b) Obtain the condition for primary maxima in Fraunhoffer diffraction due to single slit and derive an expression for width of the central maxima. **[4M+8M]**

UNIT-II

4. a) List various applications of lasers.
   b) Describe the construction and working of Ruby laser **[4M+8M]**

(OR)

5. a) What are the advantages of optical fibers in communication?

   b) Define acceptance angle and numerical aperture of an optical fiber. Derive expression for acceptance angle and numerical aperture. **[4M+8M]**

UNIT-III

6. a) Explain the unit cell and lattice parameters. What is primitive cell and how does it differ from unit cell.

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

(OR)

7. a) Derive an expression for inter planar distance between parallel planes (h k l).

   b) State and prove Bragg's Law of X-Ray Diffraction. **[8M+4M]**

UNIT-IV

8. a) Define Magnetic field strength(H), Relative Permeability (μ_r) and Susceptibility (χ) in magnetism. Write the values of μ_r and χ for different types of magnetic materials.

   b) Explain the origin of magnetism in materials in detail. Mention various differences between soft and hard magnetic materials. **[4M+8M]**

(OR)

9.a) Obtain the relation between D, E & P.

   b) What are different types of polarization mechanisms in dielectric materials? Explain in detail about Ionic Polarizability and derive an expression for the same. **[4M+8M]**

UNIT-V

10.a) What are the successes and failures of classical free electron theory of metals.

   b) Derive the expression for electrical conductivity of a metal on the basis of classical free electron theory. **[4M+8M]**

(OR)

11.a) Discuss the particle in potential well. Using boundary conditions, explain the formation of energy levels

   b) Calculate the de-Briglie wavelength of an electron accelerated through 1000V potential difference. **[8M+4M]**

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