AR13

13BS1004 **SET-1**

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

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) State the principle of superposition.

   b) What is the condition at which the diffraction is produced by the obstacle?

   c) Write any two differences between spontaneous and stimulated emission.

   d) What is the significance of Numerical Aperture of optical fiber?

   e) What is electronic polarization?

   f) Define the terms Coordination number and packing fraction.

   g) Sketch the direction of (110).

   h) What is meant by magnetic domain?

   i) Define drift velocity and mean free path.

   j) Write the physical significance of wave function.

PART-B

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

UNIT-I

2. a) With a neat diagram explain the theory of Newton's rings and derive the conditions for diameters of dark and bright rings in case of reflected system.
   b) Find the thickness of a soap film of $\mu = 1.33$ which gives destructive second order interference of reflected red light of $\lambda = 7000A^{o}$ for normal incidence. [8M+4M]

(OR)

3. a) Describe the diffraction pattern due to single slit. Obtain the condition for different types of maxima and minima observed in diffraction pattern.
   b) What is meant by diffraction? Write the differences between types of diffraction. [8M+4M]

UNIT-II

4. a) Explain the Einstein theory of lasers.
   b) Explain the construction and working of four level laser (He-Ne) in detail. [6M+6M]

(OR)

5. a) Explain the principle of optical fiber. Classify the optical fibers based on refractive index profile and list the differences between them.
   b) Calculate the acceptance angle of a given optical fiber if the refractive indices of the core and cladding are 1.563 and 1.498 respectively. [8M+4M]

UNIT-III

6.a) Explain the seven crystal systems and Bravais lattice in detail.
   b) Explain Unit cell, Primitive cell and lattice parameters. [8M+4M]

(OR)

7. a) Discuss the diffraction of X-rays by Crystal planes and derive Bragg's law
   b) What are miller indices? Calculate the Miller indices for a given plane having intercepts of 3a, 2b and 2c along X, Y and Z directions. [8M+4M]

UNIT-IV

8.a) Define the terms B, H and I and derive the relation between them.
   b) List various properties of Dia, Para and Ferro magnetic materials. Write about soft and hard magnetic materials. [4M+8M]

(OR)

9.a) What is meant by dielectric material?. Explain electronic polarizability and derive an expression for it.
   b) What are ferroelectric and piezoelectric materials? List their applications. [8M+4M]

UNIT-V

10.a) Write the postulates(assumptions) of Free electron theory of metals.
   b) Explain and derive the equation for electrical conductivity of metals based on free electron theory of metals. [4M+8M]

(OR)

11.a) Explain the de-Broglie concept of matter waves. List the properties of matter waves. Calculate the de-Broglie wavelength of a particle of mass $8X10^{-25}$kg moving with velocity $6X10^{7}$m/s.
   b) Derive Schrodinger time independent wave equation of matter wave. [6M+6M]

***

AR13

Code: 13BS1005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B. Tech I Semester Supplementary Examinations, Jan / Feb-2016
ENGINEERING CHEMISTRY
(Common to ECE, EEE)

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

PART – A

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

1. (a) What is meant by condensation polymerisation?
   (b) What is the role of alkali oxides in cement?
   (c) Write any two disadvantages of hard water?
   (d) Define coagulation.
   (e) What is galvanic corrosion?
   (f) What is meant by passivity?
   (g) Write any two examples of anti-knocking agent
   (h) What is aniline point of lubricating oil?
   (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) Explain additional polymerization with an example?
   b) Describe compounding of plastics
   c) Discuss transfer moulding technique? [4M+4M+4M]

(OR)

3. a) Discuss the preparation and uses of Teflon and Bakelite
   b) Explain in detail about manufacture of Portland cement [6M+6M]

UNIT-II

4. a) Explain the desalination of seawater by Reverse osmosis
   b) Calculate temporary hardness and total hardness of a sample of water containing $Mg(HCO_3)_2$ = 9.1 mg/L; $Ca(HCO_3)_2$ = 11.2 mg/L; $MgCl_2$ = 6.5 mg/L; $CaSO_4$ = 10.6 mg/L. [7M+5M]

(OR)

AR13

Code: 13BS1005 **SET-2**

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

UNIT-III

6. a) Discuss in detail about dry corrosion
   b) Explain in detail about cathode protection [6M+6M]

(OR)

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

UNIT-IV

8. a) Explain Bergius process for the manufacture of synthetic petrol.
   b) Discuss about Thick film and extreme pressure lubrication [6M+6M]

(OR)

9. a) Explain about mechanical strength 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 concentrated solar cell
    c) What are green house gases and how do these gases produce green house effect? [3M+4M+5M]

(OR)

11. a) Write the different engineering and biomedical applications of nano-material.
    b) Write the different properties of gold and silver nano particles [6M+6M]

***