AR13 SET-01

CODE: 13BS1004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semister Regular Examinations, February-2014
ENGINEERING PHYSICS
(Common to CIVIL, MECH, CSE, IT)

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

PART-A

Answer all Questions **10X1=10**

1. a) What is meant by interference. Give its significance.

   b) Write condition for diffraction due to a single slit.

   c) Define population inversion.

   d) What are Einstein coefficients.

   e) What is the Principle of an Optical fibre?

   f) What is the Packing fraction for Body centered cubic system.

   g) Define Bragg's law.

   h) Give two examples of Soft magnetic material.

   i) Define the electrical resistivity of a metal.

   j) Write the schroedinger time independent wave equation in one dimension.

PART-B

Answer one Question from each Unit

Unit-I

2. (a) Explain how Newton's rings are formed in the reflected light? And why rings are circular? 8M
   (b) In a Newton's rings experiment the diameter of 15^{th} ring was found to be 0.59 cm and that of 5^{th} ring is 0.336 cm. If the radius of curvature of lens is 100 cm. Find the wave length of light. 4M

(OR)

3. (a) Distinguish between Interference and Diffraction. 4M
   (b) What is Fraunhofer diffraction? Derive conditions for Primary maxima in fraunhoffer diffraction due to a single slit and obtain the the condition for width of the central maxima. 8M

Unit-II

4. (a) Distinguish between Spontaneous and Stimulated emission of radiation. 4M
   (b) Explain the construction and working of Ruby Laser with energy diagram. Mention the applications of Lasers in engineering and medicine. 8M

(OR)

5. (a) What is an Optical fibre? What is the Principle involved in its working? 6M

(b) Define Acceptance angle and Numerical Aperture? The numerical aperture of an Optical fibre is 0.39. if the difference in the refractive indices of the material of its core and the cladding is 0.05.then calculate the refractive index of material of the core? 6M

Unit-III

6. (a) Define Space lattice, basis and unit cell and crystal structure. 4M

(b) Calculate Packing fraction for SCC, BCC and FCC structures. 8M

(OR)

7. (a) What are Miller indices? How are they obtained? Explain the significance of Miller indices. 8M

(b) Calculate the inter planner spacing for a) (321) plane in a simple cubic crystal whose lattice constant is 4.2×10^{-10} m. 4M

Unit-IV

8. (a) The magnetic field intensity in a piece of ferric oxide is 10^6 amp /meter. If the susceptibility of the material is 1.5×10^{-3}, calculate the magnetization of the material and the flux density 4M

(b) What is meant by Hysteriss? Explain the hysteresis curve for ferromagnetic materials? 8M

(OR)

9. (a) What are dielectrics? Explain 4M

(b) Explain the different types of polarizations and derive an expression for electronic polarization in terms of radius of an atom 8M

Unit-V

10. (a) Explain Free electron theory of metals and give its significance. 6M

(b) Obtain an expression for electrical resistivity of a metal on the basis of classical free electron theory of metals. 6M

(OR)

11. (a) Explain De-Broglie Hypothesis of a matter. 4M

(b) Derive Schroedinger time independent wave equation in one dimension and give its significance. 8M

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AR13 SET-02

Code: 13BS1005

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech. I Semester Regular Examinations, February-2014
ENGINEERING CHEMISTRY
(Common to ECE, EEE)

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

PART – A

Answer all questions **[10X1 = 10M]**

1. (a) Write the chemical structure of PVC.
   (b) What is Puzzolana cement?
   (c) Write the mathematical relation beween Clark's degree and degree French.
   (d) Distinguish disinfection and sterilization.
   (e) Iron undergoes severe corrosion in dilute nitric acid while aluminium gets protected even in concentrated nitric acid. Why?
   (f) Proper design of metallic structures minimizes corrosion. Justify with an example.
   (g) Define Cetane number.
   (h) What is neutralization number of a lubricating oil?
   (i) Define green chemistry.
   (j) Write an application of nanomaterials in biomedical field.

PART – B

Answer one question from each unit **[5X12 = 60M]**

Unit – I

2. a) Explain in brief (a) Injection moulding (b) Extrusion moulding of polymers.
   b) Define cement and explain types of cement. Distinguish setting and hardening of cement. [6M + 6M]

(OR)

3. a) Explain the role of all the constituents involved in compounding of a plastic with examples.
   b) Explain manufacture of cement by Rotary kiln method. [4M + 8M]

Unit – II

4. a) How do you determine hardness of a given water sample using EDTA method?
   b) Mention any four disadvantages of hardness of water. [8M + 4M]

(OR)

5. a) Explain Lime-Soda process of softening of water using relevant chemical equations.
   b) Write short note on coagulation of drinking water treatment. [7M + 5M]

Unit – III

6. a) What is galvanic corrosion? Explain the mechanism of galvanic corrosion. How is galvanic series useful in assessment and control of galvanic corrosion?
   b) Explain the mechanism of dry corrosion. [6M + 6M]

(OR)

7. a) Explain any three factors affecting corrosion with examples.
   b) Describe about Sacrificial Anodic Protection and Impressed current cathodic protection [6M + 6M]

Unit – IV

8. a) Explain fractional distillation of refining of petroleum.
   b) Explain the function of graphite and molebdenum disulphide as solid lubricants. [6M + 6M]

(OR)

9. a) Define and explain knocking. How can knocking be minimized by using antiknocking agents? How octane number is relevant to antiknocking?
   b) Explain various functions of lubricants. [6M + 6M]

Unit – V

10. a) Write and explain any eight principles of green chemistry.
    b) Explain any two properties of nanomaterials. [8M + 4M]

(OR)

11. a) Explain green house effect and its disadvantages.
    b) Explain any two preparatory methods of nanomaterials. [6M + 6M]

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