

**AR13**

**Set-02**

**Code: 13BS1004**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech I Semester Supplementary Examinations, March 2015**

**ENGINEERING PHYSICS  
(Common to CE, ME, CSE & IT)**

**Time: 3 hours**

**Max. Marks: 70**

**PART-A**

**Answer all questions**

**[10X1= 10M]**

1. a) What is the main condition to produce interference of light?  
b) Write de Broglie wave equation?  
c) What is the active element in ruby laser?  
d) Define Numerical aperture.  
e) Why the wave nature of matter is not apparent in our daily observation?  
f) Write Bragg's equation.  
g) Name a phenomenon which illustrates the particle nature of light.  
h) What is the relation between permeability and susceptibility?  
i) Write examples of paramagnetic substances.  
j) Give an example for three level laser.

**PART-B**

**Answer one question from each unit**

**[5X12= 60M]**

**UNIT-I**

2. a) What are Newton's rings? Derive the expressions for the diameters of dark and bright rings.  
b) In Newton's rings experiment the diameter of 15<sup>th</sup> ring was found to be 0.59cm and that of 5<sup>th</sup> ring 0.036cm. The radius of curvature of lens is 100cm. Find the wavelength of light.

**[8M+4M]**

**(OR)**

3. a) What is meant by diffraction? Distinguish between Fresnel and Fraunhofer classes of diffraction.  
b) Derive an expression for the intensity distribution at a point on a screen due to Fraunhofer diffraction at a single slit.

**[5M+7M]**

**UNIT-II**

4. a) Explain the characteristics of laser.  
b) Describe the construction and working of a ruby laser with neat diagrams.  
c) Mention some applications of laser in the field of medical.

**[4M+6M+2M]**

**(OR)**

5. a) Explain the structure of an optical fiber.  
b) Discuss the types of optical fibers in detail.

**[4M+8M]**

**UNIT-III**

6. a) Describe the BCC crystal structure and obtain the expression for its packing factor.  
b) Explain the terms (i) Basis (ii) Unit cell [8M+4M]

**(OR)**

7. a) What are Miller indices? How they are obtained?  
b) State and explain Bragg's law. [6M+6M]

**UNIT-IV**

8. a) Explain the Origin of magnetic moment. Find the magnetic moment due to orbital motion of an electron.  
b) Describe Hysteresis loop. [8M+4M]

**(OR)**

9. a) Define Polarization vector and Electric displacement. Give the relation between E, D and P vectors.  
b) Explain electronic polarizability. Derive an expression for electronic polarizability. [4M+8M]

**UNIT-V**

10. a) Derive the expression for (i) Drift velocity (ii) Relaxation time  
b) Write the salient features of classical free electron theory [4M+8M]

**(OR)**

11. a) Write the physical significance of wave function.  
b) Derive expressions for the energy and wave function of a particle in a one dimensional potential box. [4M+8M]

**Code: 13BS1005****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I B.Tech I Semester Supplementary Examinations, March 2015****ENGINEERING CHEMISTRY****(Common to EEE & ECE)****Time: 3 hours****Max. Marks: 70****PART - A****Answer all the Questions.****[10 x 1= 10M]**

1. a) Write the structure of monomeric unit in PE?  
b) Give composition and application of slag cement.  
c) Raw water is always passed first through cation exchange column. Why?  
d) What happens when temporary hard water is boiled? Give equations.  
e) What is the effect of humidity on rate of corrosion?  
f) If the corrosion product formed is stable, rate of corrosion decreases. Why?  
g) Give important properties of a good fuel?  
h) What is the significance of determining the pour point of a lubricant?  
i) Write one advantage and disadvantage of solar energy?  
j) What are fullerenes?

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

2. a) Write the methods for fabrication of plastic articles? [6M + 6M]  
b) How is Portland cement manufactured?

**(OR)**

3. a) Write an account on compounding of plastics? [6M + 6M]  
b) Discuss the setting of Portland cement.

**Unit - II**

4. a) Explain how demineralization of water is done using polymers? [8M + 4M]  
b) How exhausted resins are regenerated?

**(OR)**

5. Describe the principle and estimation of total hardness of water by EDTA method?

**[12M]****Unit - III**

6. Outline the electrochemical theory of corrosion and explain the mechanism of rust formation in acidic and neutral medium. [12M]

**(OR)**

7. a) What is cathodic protection? How this method is useful to protect buried pipelines from corrosion? [8M + 4M]

b) Discuss how the nature of oxide layer affects the rate of corrosion?

**Unit - IV**

8. a) Distinguish between 'cracking' and 'reforming'. What is the purpose of these operations? [7M + 5M]

b) What are the functions of lubricants?

(OR)

9. a) Describe one method of thermal cracking of petroleum fractions and point out a feasible mechanism for the process?

b) Write a brief note on extreme pressure lubrication. [6M + 6M]

**Unit – V**

10. a) What is photovoltaic cell? Explain the construction and working of PV cell? [6M+6M]

b) Write preparation and applications of carbon nanotubes?

(OR)

11. a) Give any six principles of green chemistry. [6M + 6M]

b) Write the engineering applications of nano chemistry.

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