AR13 **Set 02**

13BS1004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Regular Examinations, February-2015
ENGINEERING PHYSICS
(Common to CE, ME, CSE & IT)

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

PART-A

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

1. a) Which optical phenomenon is responsible for colors in thin films?
   b) What do you mean by constructive interference?
   c) Define diffraction.
   d) What is the basic principle of an optical fiber.
   e) Define Numerical aperture of an optical fiber.
   f) Define packing factor of a crystal.
   g) Define Magnetic susceptibility .
   h) What is Ferroelectricity?
   i) Define mean free path of an electron.
   j) What is a matter wave?

PART-B

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

Unit-I

2. a) Explain the formation of Newtons rings under reflected light and also explain the determination of wavelength of monochromatic source of light using Newton's rings.
   b) What do you mean by principle of superposition and destructive interference of light? [8M+4M]

(OR)

3. a) Distinguish between Fresnel and Fraunhofer diffraction.
   b) Discuss Fraunhofer diffraction at single slit. [4M+8M]

Unit-II

4. a) With neat diagram , explain the construction and working of a He-Ne laser.
   b) Explain the various applications of lasers in industry and medical fields. [6M+6M]

(OR)

5. a) What is meant by mode in optical fibers? Distinguish between single mode and multimode fibers.
   b) Explain the advantages of optical fibre in communications. [6M+6M]

Unit-III

6. a) Deduce packing factors for simple cubic and BCC structures.
   b) What are Bravais lattices? [8M+4M]

(OR)

7. a) Write the important features of Miller indices.
   b) State and explain Braggs Law of X-ray Diffraction . [4M+8M]

Unit-IV

8. a) Explain classification of magnetic materials into dia, para and ferro magnetic materials.
   b) Explain hysteresis of ferro magnetic materials. [8M+4M]

(OR)

9. a) Describe the phenomenon of electronic and ionic polarization.
   b) Explain the terms Electric dipole moment, Polarizability, Polarization vector and Dielectric constant . [8M+4M]

Unit-V

10. a) What is meant by mobility of electrons?
    b) Write a note on postulates , Success and drawbacks of classical free electron theory. [2M+10M]

(OR)

11. a) Calculate the wavelength associated with an electron raised to apotential 1600 V.
    b) Explain the physical significance of the wave function.
    c) Write a note on De-Broglie hypothesis. [4M+4M+4M]

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Code: 13BS1005

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(AUTONOMOUS)
ENGINEERING CHEMISTRY
I B.Tech. I Semester Regular Examinations, February-2015
ENGINEERING CHEMISTRY
(Common to ECE, EEE)

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

PART - A

Answer all the Questions. **[10 x 1= 10M]**

1. a) Define functionality?
   b) What are puzzolona cements?
   c) How temporary hardness can be removed?
   d) Differentiate Soft and Hardwater?
   e) Why pure metal always have tendency to lose energy?
   f) Define Pilling Bedworth Rule?
   g) Define Cracking?
   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 carbon nano tubes?

PART – B

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

Unit - I

2. a) Differentiate Thermoplastics from thermosets? [6M + 6M]
   b) Explain in brief manufacture of Portland cement by wet process?

(OR)

3. a) Write preparation, properties and uses of PVC and Bakelite? [6M + 6M]
   b) Explain the setting and hardening of cement.

Unit - II

4. What is desalination? Describe various methods available for desalination and compare them critically. [12M]

(OR)

5. a) Write the chemistry involved in estimation of water hardness by EDTA. [3M + 9M]

b) AITAM underground water analysis gave following results in mg/L: $Al_2(SO_4)_3$ = 34.2, $MgCl_2$ = 47.5, $Ca(HCO_3)_2$ = 1.62, H_2SO_4=49, $FeSO_4$ = 27.8 and SiO_2 = 12. Water is to be softened for Chemistry lab for the academic year 2013-14. Each student consumes 2L of water for performing one experiment. Total number of experiments is to be performed by 900 students are 12. Then calculate the cost of lime and soda, if cost of lime is Rs.15 per kg and soda is Rs.20 per kg. Write the chemistry of lime soda process for the above impurities?

Unit - III

6. Explain "rusting of Iron" with the help of electrochemical theory of corrosion. [12M]

(OR)

7. a) What is impressed current method? How this method is useful to protect transformers from corrosion? [7M + 5M]
   b) Discuss the role of inhibitors in corrosion control?

Unit - IV

8. a) What is cracking? Give the various types of cracking. Explain octane number and cetane number. [7M + 5M]
   b) What are the characteristic features of synthetic lubricants?

(OR)

9. a) Describe one method of catalytic cracking of petroleum fractions and point out the advantages of cat – cracking 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 fullerenes?

(OR)

11. a) Write an account on green synthesis and engineering applications. [8M + 4M]
    b) Discuss the applications of CNT in fuel cells..

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