13BS1005

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B. Tech II Semester Supplementary Examinations, April-2017

ENGINEERING CHEMISTRY

(Common to CIVIL, ME, CSE & IT)

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

PART- A

Answer all questions [10 x 1=10M]

1. a) Define the terms degree of polymerization and functionality
   b) What is the function of iron oxide in cement
   c) What are the units of hardness of water
   d) Why is water softened before using in boilers
   e) Define galvanic corrosion
   f) Define passivity of metal and what are the causes for it
   g) Define octane number and cetane number of liquid fuels
   h) Define the terms flash point and fire points
   i) Define the term green chemistry
   j) What are the important properties of nanomaterials

PART -B

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

UNIT-I

2 a) What is polymerization? Explain the addition polymerization by free radical mechanim
   b) Write a detailed note on hardening and setting of cement [6M + 6M]

(OR)

3 a) Describe the method of preparation properties and industrial used of Bakellite and PVC
   b) Describe the method of manufacture of cement [6M + 6M]

UNIT-II

4 a) Explain the desalination of water by reverse osmosis
   b) Describe ion-exchange process for demineralization of water [5M + 7M]

(OR)

5 a) Describe the methods for removing temporary hardness
   b) Explain break point chlorination and sterilization of water
   c) Why pure water is not fir for drinking purses [4M + 5M +3M]

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UNIT-III

6 a) What is electrochemical corrosion Explain the mechanism in detail

b) Explain briefly the factors that are influence the rate of corrosion of metal [7M+5M]

(**OR)**

7 a) Define pilling bedwoth rule and explain its significance

b) Write a detailed note on cathodic protection methods

c) Write a note on concentration cell corrosion [2M +6M +4M]

UNIT-IV

8 a) Describe the refining process of petroleum

b) Explain the lubrication mechanism [6M + 6M]

(**OR)**

9 a) What is meant by criacking of petroleum? Explain Thermal catalytic cracking method to obtain gasoline

b) Define the term viscosity coefficient? How it can be determined for liquid lubricants [6M+6M]

UNIT-V

10 a) What is green houseeffect and what are the advantages and disadvantages of the effect

b) Explain super critical extraction method of green synthesis

c) What are the engineering and biomedical applications of nano material [4M+4M+4M]

(**OR)**

11 a) Explain in detail the concepts of green house

b) How the carbon nanotubes are syhnthesised

c) What are the engineering applications of green chemistry [4M+4M+4M]

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CODE: 13BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B. Tech II Semester Supplementary Examinations, April-2017
ENGINEERING PHYSICS
(Common to EEE & ECE)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Write any one condition for obtaining interference of light.
   b) What is the nature of Wave Front in case of Fraunhofer Diffraction?
   c) What is the active medium in He-Ne laser?
   d) Define Numerical Aperture.
   e) Give the relation between atomic radius and lattice constant in Simple Cubic structure.
   f) What are Miller Indices?
   g) Define Magnetic Susceptibility.
   h) What is Piezoelectricity?
   i) Write the expression for electrical conductivity based on Classical Free Electron Theory.
   j) What is a de-Broglie wave?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a. Explain the Formation and theory of Newton's Rings. **8M**
   b. Newton's Rings are observed in reflected light of wavelength $5900A^0$.The diameter of 10^{th} dark ring is 0.5 cm. Find the radius of curvature of lens used. **4M**

(OR)

3. a. What is Diffraction? **2M**
   b. Give the theory of Fraunhofer diffraction due to single slit and hence obtain the condition for principal maximum, Secondary maxima and minimum intensities and also obtain intensity distribution graph. **10M**

UNIT-II

4. a. With the help of suitable diagrams describe the construction and working of Ruby Laser. **8M**
   b. Mention any four applications of lasers in various fields **4M**

(OR)

5. a. Differentiate Step Index fiber and Graded Index fiber **6M**
   b. What are the various applications of Optical fibers? **6M**

UNIT-III

6. a. Show that FCC is the most closely packed of the three cubic structures by working out the packing fractions. **8M**
   b. Explain the terms (i)Basis (ii) Unit Cell **4M**

(OR)

7. a. Sketch the following planes of a cubic unit cell (1 0 0), (1 0 1) and (1 1 1). **6M**
   b. State and explain Bragg's law of X-ray diffraction. **6M**

UNIT-IV

8. a. Explain the origin of magnetic moment. Find the magnetic dipole moment due to orbital and spin motions of an electron. **8M**
   b. Distinguish soft and hard magnetic materials **4M**

(OR)

9. a. Show that $D=\varepsilon_0 E+P$ **2M**
   b. Describe the phenomenon of electronic polarization and obtain an expression for electronic polarizability. **6M**
   c. The dielectric constant of He gas at NTP is 1.0000684. Calculate the electronic polarizability of He atoms, if the gas contains 2.7×10^{23} atoms/m^3 **4M**

UNIT-V

10. a. Explain the terms (i) mean free path (ii) drift velocity (iii) mobility (iv) relaxation time of electrons in metals **8M**
    b. Find the relaxation time of conduction electrons in a metal of resistivity 1.54×10^{-8} ohm-m, if the metal has 5.8×10^{28} conduction electrons/m^3.(mass of electron $=9.1\times10^{-31}$kg & Charge of electron $=1.6\times10^{-19}$C) **4M**

(OR)

11. a. Explain the physical significance of wave function **6M**
    b. Derive the time independent Schrodinger wave equation for a free particle **6M**

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