AR16

CODE: 16BS1004   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, November-2018

ENGINEERING CHEMISTRY
(Common to CE, EEE & ME Branches)

Time: 3 Hours   Max Marks: 70M

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered at one place only

UNIT-I

1.	a)	Explain about condensation polymerization	6M
	b)	Distinguish between thermoplastic and thermosetting resins	8M

(OR)

2.	a)	How do you manufacture Portland cement	6M
	b)	Write setting and hardening of cement	8M

UNIT-II

3.	a)	Define temporary and permanent hardness of water and Explain breakpoint of chlorination	8M
	b)	Explain the following methods used in treatment of drinking water i) sedimentation ii) filtration	6M

(OR)

4.	a)	Describe electro dialysis method for desalination of water with neat diagram	6M
	b)	Describe Zeolite process for softening of hardness of water with neat diagram.	8M

UNIT-III

5.	a)	Explain about electrochemical theory of corrosion	6M
	b)	Write brief notes on i) Pitting corrosion ii) waterline corrosion	8M

(OR)

6.	a)	Write the various factors influence corrosion based on nature of metal	6M
	b)	Explain about galvanic series and corrosion inhibitors	8M

UNIT-IV

7.	a)	Explain fractional distillation of refining of petroleum	6M
	b)	Explain Fischer-Tropschs method for synthesis of petrol with neat diagram	8M

(OR)

8.	a)	Explain the following: i) aniline point ii) pour and cloud point	6M
	b)	Explain about thick film and extreme pressure lubrication mechanism	8M

UNIT-V

9.	a)	Describe the construction and working of calomel electrode	6M
	b)	Explain faraday's laws of electrolysis.	8M

(OR)

10.	a)	How do you convert solar energy into electrical energy using photovoltaic cells? Explain principle and method.	6M
	b)	Explain the concentrated solar power plant by using solar power tower with neat diagram	8M

***

AR16

CODE: 16BS1003   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, November-2018

ENGINEERING PHYSICS
(Common to ECE, CSE & IT Branches)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place.

UNIT-I

1. a) Outline how Newton rings are formed between Plano 3+6+2
   convex lens and glass plate. Derive expression for diameter
   of Newton's rings. Show that diameters of dark rings are
   proportional to square root of natural numbers and bright
   rings diameters are proportional to square root of odd
   natural numbers.

   b) A soap film of refractive index 1.33 and the thickness 5000   3
   A^o is exposed to white light. What wavelength in the visible
   region is observed?

   (OR)

2. a) Explain Fraunhofer diffraction at single slit and find   10
   conditions for dark fringes and secondary maxima.

   b) Write any four differences between interference and   4
   diffraction phenomenon.

UNIT-II

3. a) Explain the Acceptance angle of an optical fiber, and derive 2+8
   acceptance angle in terms of core and cladding refractive
   indices with neat sketch.

   b) Write any four major applications of laser.   4

   (OR)

4. a) What is pumping mechanism in lasers? Illustrate the   3+8
   construction and working of Ruby laser.

   b) Write any three applications of optical fibers.   3

UNIT-III

5. a) Explain wave particle duality of matter. Derive de Broglies wavelength of matter waves.   3+3

   b) Derive time independent Schroedinger wave equation.   8

(OR)

6. a) Derive Eigen values and Eigen functions of a particle in one dimensional box.   10

   b) Explain physical significance of wave function.   4

UNIT-IV

7. a) Explain the phenomenon Magnetostriction.   4

   b) Classify magnetic materials into Dia, Para and Ferro magnetic materials.   10

(OR)

8. a) Explain hysteresis behaviour of ferromagnetic material based on domains.   8

   b) Compare soft and hard magnetic materials.   6

UNIT-V

9. a) Explain in detail Electronic, Ionic and Orientational polarizations in dielectrics.   12

   b) Write relation between D, E and P. Explain terms D E and P.   2

(OR)

10. a) What is ferro electricity and explain it.   10

    b) What is Piezo electric effect and explain it?   4

AR13

PART-A

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

1. a) What are the conditions for two sources to be coherent?
    b) Compare the intensity distribution of light during interference and diffraction phenomena
    c) What is population inversion in lasers
    d) Mention the necessary relation for refractive indices of air, core and cladding in an optical fibre.
    e) What is total internal reflection of light
    f) What the coordination number for unit cell in crystalline structures?
    g) Relate magnetic induction vector with magnetic field intensity
    h) Define Ferro electricity in dielectric materials
    i) What is the drift velocity electron in metals
    j) What is matter wave function?

PART-B
Answer one question from each unit   **[5x12=60M]**
UNIT-I

2. a) Explain the Young's double slit experiment and obtain the fringe width of maxima of light   8 M
    b) In a Newton's ring experiment, the diameter of the 5th ring is 0.336 cm and the diameter of the 15th ring is 0.59 cm. Find the radius of curvature of the convex lens, if the wavelength of the light is 5890 A.U   4 M

(OR)

3. a) Explain how intensity of light is distributed after diffraction due to single slit.   8 M
    b) Differentiate between Fraunhoffer and Fresnel type diffraction of light   4 M

UNIT-II
4. a) Describe the principle, construction and working of He-Ne gas laser   8 M
    b) Explain any four characteristics of laser radiation.   4 M

5.	a)	What are different types of optical fibres based on their fabrication?	8 M
	b)	Mention the advantages of optical fibres in communication over conventional systems	4 M

UNIT-III

6.	a)	Obtain and compare the packing fractions in B.C.C and F.C.C crystal systems	8 M
	b)	What are the important features of Miller Indices?	4 M

(OR)

7.	a)	Explain the seven crystal systems by mentioning relation between primitives angles and possible Bravais lattices they exhibit.	8 M
	b)	Write the procedure to find the Miller Indices of direction	4 M

UNIT-IV

8.	a)	Define Ferro magnetism? Explain the B-H hysteresis curve on the basis of domain structures	6 M
	b)	Explain the polarization vector, dielectric constant and susceptibility of the dielectric materials	6 M

(OR)

9.	a)	Classify magnetic materials into three main groups based on their magnetic properties.	6M
	b)	What is orientational polarizabity in dielectrics and explain how it is related to dipole moment of the atom and temperature of the dielectric	6 M

UNIT-V

10.	a)	Based on Free electron theory of metals obtain an expression for electrical conductivity for metals	8 M
	b)	Explain the terms relaxation time and mean free path of electron in free electron theory of metals	4 M

(OR)

11.	a)	Explicitly mention the significance of particle wave function	4 M
	b)	Explain the behaviour of wave nature particle in one dimensional potential box	8 M

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, November-2018
ENGINEERING CHEMISTRY
(Common to ECE, EEE)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) Mention the two types of polymerization.
   b) What are the raw materials of cement?
   c) What is the cause for permanent hardness?
   d) What is meant by disinfection of water?
   e) Give any two applications of sacrificial anodic protection method.
   f) What is liquid metal corrosion?
   g) How catalytic cracking is advantageous over thermal cracking?
   h) Give any two functions of a lubricant.
   i) Give any two principles of green chemistry?
   j) What are fullerenes?

PART-B

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

UNIT-I

2. a) What is Compounding of plastics? Explain the functions of different compounding materials added to plastic resins with suitable examples. 8M
   b) Explain briefly the injection moulding technique with a neat sketch. 4M

(OR)

3. a) Give the preparation, properties and engineering applications of the following polymers 8M
          i)Bakelite   ii) Nylon
   b) Give any four differences between thermoplastic resins and thermosetting resins. 4M

UNIT-II

4. a) Give an account on Ion-Exchange method for the external treatment of boiler feed water with a neat sketch. 8M
   b) A sample of hard water contains the following dissolved salts per litre. 4M
      $CaCl_2$ =111mgs; $CaSO_4$ =1.36mgs; $Ca(HCO_3)_2$=16.2mgs; $Mg(HCO_3)_2$=14.6mgs. Calculate temporary hardness and permanent hardness of water.

5. a) How the hardness of water is estimated by EDTA method.   8M
   b) Discuss the disinfection of water by chlorine.   4M

UNIT-III

6. a) Write a note on Impressed Current cathodic protection method.   4M
   b) How does the nature of environment influence the rate of corrosion?   4M
   c) Explain Galvanic corrosion and give suitable examples.   4M

(OR)

7. a) Write a note on passivity of metals.   4M
   b) Explain the role of inhibitors in controlling the corrosion.   4M
   c) Give a brief note on the prevention of corrosion by modifying the environment.   4M

UNIT-IV

8. a) Explain Bergius process for synthesis of petrol with a neat sketch.   5M
   b) Explain the refining of petroleum by giving the composition, boiling range and uses of various fractions obtained during refining.   7M

(OR)

9. a) Write a note on thin film lubrication.   5M
   b) Define viscosity. What is viscosity index of lubricating oil? How it does change with temperature?   4M
   c) Write a short note on aniline point and neutralization number.   3M

UNIT-V

10. a) Give any one preparation of Carbon Nano Tubes.   4M
    b) Write a note on green synthesis.   4M
    c) What are fullerenes? Give any three applications of fullerenes.   4M

(OR)

11. a) Explain how solar energy is converted into electrical energy by Photovoltaic cell.   7M
    b) Give any five principles of green chemistry.   5M