AR16

CODE: 16BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, January-2019

ENGINEERING CHEMISTRY

(Common to CE, EEE & ME 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	Suggest and explain which moulding process is best suitable to covering of PVC on copper wire	5M
	b	Define functionality. Which of the factors to control the strength of the polymer?	4M
	c	Explain the process of manufacturing of cement by dry process	5M

(OR)

2.	a	Define isotactic, atactic and syndiotactic polymers. What are the differences between thermoplastic and thermosetting plastics?	7M
	b	What is the role of fillers in the compounding of plastics? Give at least any four examples of fillers	3M
	c	Define condensation polymerisation and write down the preparation of one of the condensed polymer	4M

UNIT-II

3.	a	What is temporary and permanent hardness of water? How they are removing?	7M
	b	Explain the procedure for softening of water by permutit process and what are the limitations in this process?	7M

(OR)

4.	a	How can you determine the total hardness of water by EDTA method	7M
	b	Explain the procedure for softening of water by ion exchange process.	7M

UNIT-III

5.	a	Write about galvanic corrosion.	4M
	b	Explain in which way the rate of corrosion is influenced by following factors (i) solubility of corrosion products (ii) Nature of electrolyte	6M
	c	Explain in which way the metal is protected against corrosion through modifying the environment	4M

(OR)

6.	a	List out some important proper designing techniques to protect against corrosion in metals	6M
	b	What are the differences between dry and wet corrosion?	8M

UNIT-IV

7.	a	Define lubricant. Write functions of lubricant. Write any one mechanism of lubrications.	7M
	b	Explain the procedure for getting of various by-products from crude oil. List out the by-products with their carbon content and separated boiling ranges	7M

(OR)

8.	a	Explain the synthesis of petrol by Fischer-Tropsch of method.	7M
	b	Write short notes on (i) cloud and pour point (3M) (ii) aniline point (2M) (iii) neutralisation number (2M)	7M

UNIT-V

9.	a	Derive Nernst equation. What are the applications of Nernst equation?	7M
	b	Explain the procedure for conversion of solar energy into electrical energy.	7M

(OR)

10.	a	Explain greenhouse concept	7M
	b	Explain in detail in which way the single electrode potentials are measured	4M
	c	Write about harnessing of solar energy	3M

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CODE: 16BS1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, January-2019

ENGINEERING PHYSICS

(Common to ECE, CSE & IT 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 in one place only

UNIT-I

1. a) What is the principle of superposition? obtain the expression for maxima and minima conditions for interference in thin films? **10M**

   b) In Newton's rings experiment, the diameter of the 15^{th} ring was found to be 0.59cm and that of the 5^{th} ring was 0.336cm. if the radius of the plano convex lens is 100cm, compute the wavelength of light used. **4M**

(OR)

2. a) How diffraction is different from interference? **4M**

   b) obtain the condition for primary maxima in Fraunhofer diffraction due to single slit. **10M**

UNIT-II

3. a) Explain the construction and working of He-Ne Laser? **10M**

   b) Write applications of Lasers in Industry and Medical Fields. **4M**

(OR)

4. a) Obtain expression for Numerical aperture of an optical fiber **10M**

   b) Calculate the numerical Aperture and Acceptance angle for an optical fiber with core and cladding refractive indices being 1.58 and 1.55 respectively. **4M**

UNIT-III

5. a) Derive the time independent Schrodinger's equation for a free particle. **6M**
   b) Explain the Physical significance of wave function. **4M**
   c) An electron is confined in one-dimensional potential well of width 1×10^{-10}m. Find the energy of electron when it is in the ground state. **4M**

(OR)

6. a) Show that the energy of the particle is quantized in a potential box **10M**
   b) Compare Maxwell Boltzmann, Bose Einstein and Fermi Dirac Statistics Qualitatively? **4M**

UNIT-IV

7. a) What is the origin of magnetic momentum explain? **8M**
   b) On the basis of domain theory explain the hysteresis curve? **6M**

(OR)

8. a) Classify magnetic materials into Dia, Para and Ferro magnetic materials **6M**
   b) Show that $B=\mu_0(H+M)$ **4M**
   c) Distinguish between soft and hard magnetic materials? **4M**

UNIT-V

9. a) Obtain an expression for electronic polarizability of an atom? **10M**
   b) What are the applications of dielectrics? **4M**

(OR)

10. a) What is Ferro Electricity? explain Spontaneous Polarization in Barium Titanate Crystal **8M**
    b) Explain the frequency dependence of total polarizability? **6M**

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AR13

CODE: 13BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, January-2019

ENGINEERING PHYSICS
(Common to CIVIL, MECH, CSE & IT)

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

PART-A

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

1. a) If the air film in Newton rings apparatus is replaced by an oil film the how does the diameter of the rings changes, explain
   b) Describe Huygens principle
   c) What is the wavelength of ruby laser?
   d) What is numerical aperture of optical fibre?
   e) What is the coordination number in a face - centered cubic lattice?
   f) State the limiting condition of Bragg's law
   g) What is meant by magnetisation?
   h) Write the relation between D, E & P in dielectrics.
   i) Define drift velocity
   j) What is Schrodinger's time independent equation in one dimension?

PART-B

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

UNIT-I

2. a) Explain why the centre of Newton's rings is dark in the reflected system. 2M
   b) Derive an expression for condition of maxima and minima for reflected light in case of transparent thin film of uniform thickness 10M

(OR)

3. a) Explain clearly the differences between interference and diffraction. 6M
   b) Give the differences between Fresnel and Fraunhofer diffractions. 6M

UNIT-II

4. a) What are the characteristics of Lasser? 4M
   b) Explain the construction and working of He-Ne laser. 8M

(OR)

5. a) What are the types of optical fibres? Classify fibres based on modes of propagation and index profile. 8M
   b) What are the advantages of optical fibre? 4M

UNIT-III

6. a) Explain the terms i) Unit cell ii) lattice parameters 4M
   b) Describe crystal systems with diagrams. 8M

(OR)

7. a) Sketch the planes i) (1 0 0) ii) (1 1 1) 4M
   b) Deduce the expression for the interplanar distance in terms of Miller indices for a cubic structure. 8M

UNIT-IV

8. a) Give the classification and properties of Dia, Para and Ferro magnetic materials. 8M
   b) Explain Hysteresis of a Ferromagnetic material. 4M

(OR)

9. a) What are polar and non-polar dielectrics? Give examples for each. 4M
   b) What is ionic polarisation? Derive the expression for ionic polarisability. 8M

UNIT-V

10. a) Discuss the various drawbacks of classical free electron theory of metals 4M
    b) Define the terms i) Mean free path ii) Relaxation time iii) Mobility 8M

(OR)

11. a) What are the physical significances of wave function. 4M
    b) Obtain the Eigen values for a particle in one dimensional infinite potential box. 8M

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I B.Tech I Semester Supplementary Examinations, January-2019

ENGINEERING CHEMISTRY

(Common to ECE, EEE)

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

PART-A

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

1. a) Define degree of polymerisation
   b) What are the salts responsible for temporary hardness of water?
   c) Define pilling Bedworth rule.
   d) Define octane number
   e) Define nanomaterial
   f) What is Puzzolana cement?
   g) What is the working principle involved in the Lime Soda softening method?
   h) Why pure metal always tendency to loss energy?
   i) Define neutralization number.
   j) Is it necessary to boil and filter the water in estimation of permanent hardness? Give a valid explanation about this?

PART-B

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

UNIT-I

2. a Write the Differentiate between thermoplastics and thermosettings. 6M

   b i)Express the important functions of raw materials which are used in the cement manufacture 3M

   ii) List out the chemical constituents in the Portland cement with approximate compositions. 3M

(OR)

3. a Write about the preparation, properties and engineering applications of PVC. 6M

   b Explain the setting and hardening of Portland cement. 6M

UNIT-II

4. a How can you determine the total hardness of water by EDTA method 6M

   b Explain reverse osmosis method with neat diagram 6M

(OR)

5.	a	Write down the chemical reactions takes place in lime soda softening process when water containing the following constituents? i) NaCl and KCl (ii) $Mg(HCO_3)_2$ (iii) HCO_3^- (iv) $MgCl_2$ (v) $CaSO_4$ (vi) $CaCl_2$	6M
	b	A water sample containing the following constituents per mg/L. $NaHCO_3$ = 8.4, $Mg(HCO_3)_2$ = 14.6, $Ca(HCO_3)_2$ = 16.2, $MgCl_2$ = 9.5, $CaSO_4$ = 13.6, Na_2SO_4 = 14.2, $FeSO_4$ = 1.52 and NaCl = 5.85. Find out temporary, permanent and total hardness in the given water sample	6M

UNIT-III

6.	a	Write a brief note on i) Galvanic corrosion ii) Concentration cell corrosion	6M
	b	Explain the following factors towards influence the rate of corrosion on metals? (i) Nature of oxide film (ii) Position in galvanic series (iii) Nature of electrolyte	6M

(OR)

7.	a	Write in detail about proper designing techniques towards corrosion control?	6M
	b	Explain sacrificial anodic protection method with neat diagram.	6M

UNIT-IV

8.	a	Explain the process about preparation of synthetic petrol by Bergius process?	6M
	b	Explain the mechanism of lubrication.	6M

(OR)

9.	a	Why catalytic cracking is better than thermal Cracking? Descri a method to get gasoline from Heavy oil when it is subjected moving bed Catalytic Cracking	6M
	b	Write about semi solid lubricants?	6M

UNIT-V

10.	a	Explain the construction and working of photovoltaic cell.	6M
	b	Write about the preparation of carbon nano tubes by CVD method.	6M

(OR)

11.	a	Write any six principles of green chemistry.	6M
	b	Write applications nanomaterials.	6M

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