AR16

CODE: 16BS1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, August-2018

ENGINEERING PHYSICS

(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) Obtained the conditions for the interference of light reflected by a thin parallel film. 8M
   b) Why the central spot in Newton's ring seen in reflected light is dark? 3M
   c) Magnesium fluoride has a refractive index of 1.38 and is frequently used to coat lenses. Estimate the thickness of the coating for the maximum transmittance at a wavelength of 530 nm. 3M

(OR)

2. a) Describe the Fraunhofer diffraction due to a single slit and deduce the positions of maxima and minima. 8M
   b) Distinguish between interference and diffraction. 3M
   c) Calculate the angular separation between the first order minima on either side of central maximum when the slit is $6x10^{-4}$cm width and light illuminating it has a wavelength 6000Å. 3M

UNIT-II

3. a) Explain how population inversion is achieved. 3M
   b) Describe the construction and working of a Ruby laser with an energy level diagram. 8M
   c) Mention any two applications of laser in the field of scientific research and medical fields. 3M

(OR)

4. a) Distinguish between step index and graded index optical fibers. 4M
   b) Draw the block diagram of an optical fiber communication system and explain function of each block. 10M

UNIT-III

5. a) What are matter waves? Write its properties. 3M
   b) State and explain the Heisenberg's uncertainty principle with its applications. 8M
   c) Calculate the wavelength associated with a neutron of energy 0.025 eV (mass of neutron = 1.67×10^{-27} kg). 3M

(OR)

6. a) Solve the Schrödinger wave equation for a free particle. Obtain an expression for the energy of a particle in one dimensional potential box. 10M
   b) Distinguish between Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics. 4M

UNIT-IV

7. a) Explain the hysteresis curve on the basis of domains. 6M
   b) Distinguish between soft and hard magnetic materials. 4M
   c) Write a short note on magnetostriction. 4M

(OR)

8. a) What is Bohr magneton? Explain how it is related to magnetic moment of an electron. 6M
   b) Explain about the classification of magnetic materials. 8M

UNIT-V

9. a) Explain Ionic polarization. 6M
   b) Explain about different types of breakdowns in dielectric materials. 8M

(OR)

10 a) Define piezoelectric effect. Discuss some the applications of the piezoelectrics. 6M
   b) What is a ferroelectric material? Describe the spontaneous polarization in barium titanate. 8M

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AR16

CODE: 16BS1004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, August-2018

ENGINEERING CHEMISTRY

(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)	Define degree of polymerisation. Explain the free radical polymerisation mechanism of a vinyl compound	8M
	(b)	Explain the functions of different ingredients used in compounding of plastics	6M
		(OR)	
2.	(a)	Discuss the merits and demerits of dry & wet process for the manufacture of Portland cement	6M
	(b)	Write the chemical constituents of Portland cement. Discuss the mechanism of setting and hardening of cement with necessary chemical reactions involved	8M

UNIT-II

3.	(a)	Describe the demineralisation process of water softening. Explain the reactions involved.	8M
	(b)	Define carbonate & non-carbonate hardness of water. Explain with necessary equations what happens when temporary hard water is boiled.	6M
		(OR)	
4.	(a)	What is the principle of EDTA method ? Describe the estimation of hardness of water by EDTA method	8M
	(b)	With the help of a neat diagram, explain the use of electrodialysis of desalination of water	6M

UNIT-III

5. (a) Give reasons of the following
   (i) Corrosion of water filled steel tanks occurs below the waterline — 3M
   (ii) Small anodic area results in intense corrosion — 3M
   (b) Discuss the various factors influencing the rate of corrosion — 8M

(OR)

6. (a) What is cathodic protection ? Explain sacrificial anodic method to prevent corrosion of a metal — 6M
   (b) What is meant by passivity ? How material selection and design can prevent corrosion ? — 8M

UNIT-IV

7. (a) What is the significance of octane number and cetane number and for which these are used ? How these can be improved ? — 6M
   (b) What is synthetic petrol ? Describe any one method for manufacture of gasoline with good octane number — 8M

(OR)

8. (a) Give the classification of lubricants with suitable examples. Write a short note on extreme pressure lubrication — 6M
   (b) Write short notes on the following
   (i) Flash and fire point — 4M
   (ii) Aniline point — 4M

UNIT-V

9. (a) What is an electrochemical series ? Explain the various applications of the electrochemical series — 6M
   (b) Derive Nernst equation with proper steps — 8M

(OR)

10. (a) Explain the concentrated solar power plant by using solar power tower with neat diagram. — 7M
    (b) How do solar cells work ? Write its advantages and disadvantages. — 7M

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AR13

CODE: 13BS1004 **SET-2**

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

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

PART-A

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

1. a) State the principle of superposition principle in light
   b) What is the condition for first minima in diffraction due to single slit?
   c) Mention any two types pumping schemes in lasers
   d) State the conditions for propagation of light in optical fibres
   e) Define lattice in crystal structures
   f) What is meant by the direction in crystal structures?
   g) Define the magnetic moment of an atom
   h) What is dielectric constant of a dielectric material?
   i) What is wave particle duality?
   j) What is the de Broglie wavelength associated with an electron accelerated through a potential of 60V

PART-B

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

UNIT-I

2. a) Explain the formation of Newton's rings and obtain the expression for radius of curvature of convex lens — 8M
   b) Two slits are separated by 0.2mm are illuminated by a monochromatic light of wavelength 550nm. Calculate the fringe width on the screen at a distance of 1m from the slits — 4M

(OR)

3. a) Differentiate between the interference and diffraction — 4M
   b) Explain the phenomena of Fraunhoffer diffraction through a single slit — 8M

UNIT-II

4. (a) Explain the construction, principle and working of Ruby Laser — 8M
   (b) Mention applications of lasers in medical and industrial fields — 4M

(OR)

5. (a) Define the terms total internal reflection, acceptance angle and Numerical aperture of optical fibres — 6M
   (b) Describe different types of optical fibres based on their applications and explain their structures — 6M

UNIT-III

6.	(a)	Obtain the packing fractions in simple cubic and FCC crystal systems and compare their packing fractions	8M
	(b)	Calculate the interplanar distance for (321) planes in simple cubic crystal lattice with interatomic spacing equal to 4.12 A.U	4M

(OR)

7.	(a)	Define Coordination number, packing fraction in crystal structures	4M
	(b)	Explain Bragg's law of X-ray diffraction in crystals	8M

UNIT-IV

8.	(a)	Based on Ferro magnetic hysteresis curve classify soft and hard magnetic materials	6M
	(b)	Explain electronic polarization and derive an expression for electronic polarizability.	6M

(OR)

9.	(a)	State magnetic parameters Magnetic induction (B), Field strength (H) , Intensity (I) and relation among B,H and I,	6M
	(b)	Define electric displacement (D), dielectric Polarization (P) and relation between D,E&P	6M

UNIT-V

10.	(a)	Define relaxation time and drift velocity of electron in metals	4 M
	(b)	Derive time independent Schrodinger wave equation to a particle exhibiting wave nature	8M

(OR)

11.	(a)	What are the postulates of classical free electron theory	4M
	(b)	Describe G.P Thomson experiment and verify that electrons are diffracted from thin gold foil in the experiment	8M

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

PART-A

ANSWER ALL QUESTIONS **[10X1M = 10 M]**

1. (a) Define condensation polymerisation.
   (b) What is homo chain polymer?
   (c) Method used for the removal of temporary hardness of hard water?
   (d) Define ppm.
   (e) Define corrosion of metals.
   (f) Write about oxidation corrosion.
   (g) Define fuel and classify.
   (h) Mention the characteristics of good fuel.
   (i) Mention two methods involved in the preparation of nano-materials.
   (j) What is the fullerene?

PART-B

Answer one question from each unit [5X12M=60M]

UNIT-I

2. a) What are the differences between thermo plastics and thermo setting plastics.
   b) Write about manufacturing of Portland cement. [6M+6M=12M]

(OR)

3. a) What are the different methods involved molding of plastics.? [6M+6M=12M]
   b) Write the various chemical reactions involved in setting and hardening of cement.

UNIT-II

4. a) Describe the estimation of hardness of water using EDTA method.
   b) Explain Lime Soda method for softening of water. [6M+6M=12M]

(OR)

5. a) Describe desalination of brakish water by Reverse osmosis method.
   b) What are the major disadvantages with hard water? [6M+6M=12M]

UNIT-III

6. a) Explain sacrificial anodic method employed against metal corrosion.
   b) Explain factors influencing the metal corrosion. [6M+6M=12M]

(OR)

7. a) Write electrochemical corrosion through mechanisms. [6M+6M=12M]
   b) What is meant by corrosion inhibitors? Name Anodic and cathodic inhibitors.

UNIT-IV

8. a) Explain manufacture of synthetic petrol by Fisher-Thopsch's method.
   b) What is meant by lubricant? What are the functions of lubricants? [6M+6M=12M]

(OR)

9. a) Describe the fractional distillation of petroleum.
   b) Explain any three properties of lubricants. [6M+6M=12M]

UNIT-V

10. a) What is nano particle? How are they prepared?
    b) What is green chemistry? What are its applications?
    c) Write a brief note on Solar energy. [4M+4M+4M=12M]

(OR)

11. a) Write short notes on Gold nano particle. [4M+4M+4M=12M]
    b) Explain green house effect and its results.
    c) Write a brief note on Photovoltaic cell.