AR18

CODE: 18BST107 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, April,2021

ENGINEERING PHYSICS

(Common to CE & ME Branches)

Time: 3 Hours **Max Marks: 60**

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)	What are damped oscillations ? deduce the equation of motion of a damped harmonic oscillator and obtain its solution	10M
	b)	Define resonance	2M
		(OR)	
2.	a)	Derive an expression for the total energy of a particle executing simple harmonic motion.	8M
	b)	Distinguish between free and forced vibrations.	4M

UNIT-II

3.	a)	Describe the phenomenon of interference of light in thin films by reflection and derive the condition for constructive and destructive interference.	8M
	b)	What is diffraction grating? Explain with necessary theory.	4M
		(OR)	
4.	a)	Explain Fraunhofer Diffraction due to Single slit obtain the conditions for central maxima secondary minima and maxima.	8M
	b)	What are necessary conditions for obtaining interference of light?	4M

UNIT-III

5.	a)	Explain the construction and working of Nd-YAG Laser	8M
	b)	What is pumping? Describe various pumping systems used in lasers.	4M
		(OR)	
6.	a)	Elucidate the role of optical mirrors, active medium in lasers and how can they be satisfied in He-Ne laser ?	8M
	b)	Discuss the essential requirements for producing laser.	4M

UNIT-IV

7.	a)	Explain the light wave communication by using optical fibers with a neat block diagram.	8M
	b)	List out the advantages of optical fibers in communications.	4M
		(OR)	
8.	a)	Discuss the types of optical fibers based on refractive index profile.	8M
	b)	Explain the principle of optical fiber.	4M

UNIT-V

9.	a)	Classify magnetic materials into Dia, Para, Ferro, Ferri and anti Ferro	8M
	b)	Distinguish between type-I and type-II superconductors	4M
		(OR)	
10.	a)	Describe Weiss theorem of ferromagnetism	8M
	b)	List out applications of superconductors	4M

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AR18

CODE: 18BST108 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, APRIL,2021

CHEMISTRY

(Common to EEE, CSE, IT Branches)

Time: 3 Hours **Max Marks: 60**

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)	Explain hybridizations and shapes of following molecules i) $CH_2=CH_2$ ii) XeF_2	6M
	b)	Write the salient features of Molecular orbital theory. Draw and explain Molecular orbital diagram of O_2	6M
		(OR)	
2.	a)	Explain shapes of following molecules with the help of VSEPR theory. i) SO_3 ii) NCl_3 (iii) PCl_5	6M
	b)	Define electro negativity and arrange the following elements in the order of increasing electronegativity.(i) Sodium (ii) Aluminium (iii) Chlorine	6M

UNIT-II

3.	a)	What are the types of electronic transitions that occurs when UV- Visible light interacts with molecule? Discuss with example.	6M
	b)	Explain principle involved in IR spectroscopy? Describe various molecular vibrations in a molecule.	6M
		(OR)	
4.	a)	Explain fluorescence and phospherescence by using Jablonski's Diagram	6M
	b)	Explain the terms (i) Shielding and deshielding of protons (ii) Chemical shift with examples.	6M

UNIT-III

5.	a)	Describe electrochemical series. Explain the important of the series.	4M
	b)	Describe the construction and working of i) NHE ii) calomel electrode	8M
		(OR)	
6.	a)	What is corrosion? Explain electrochemical theory of corrosion.	6M
	b)	Explain any six factors affecting corrosion.	6M

UNIT-IV

7.	a)	What are types of organic reactions? Explain with examples.	6M
	b)	Explain Diels-Alder reaction with three examples.	6M
		(OR)	
8.	a)	Explain addition and condensation polymerizations with suitable examples	6M
	b)	Write about (i) Functionality (ii) Degree of polymerisation	6M

UNIT-V

9.	a)	Explain any six principles of green chemistry.	6M
	b)	Write the principle and applications of photovoltaic cells.	6M
		(OR)	
10.	a)	Write the differences between super capacitors and battaries	6M
	b)	Explain construction , working and cell reactions of Lead acid Battery	6M

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AR18

CODE: 18BST106 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, April,2021

APPLIED PHYSICS

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

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)	What is Huygen's Principle? and define Interference of light.	4M
	b)	Explain Young's Double Slit Experiment.	8M
		(OR)	
2.	a)	Distinguish between Fresnel and Fraunhoffer diffractions.	4M
	b)	Explain Fraunhofer Diffraction due to Grating.	8M

UNIT-II

3.	a)	What is total Internal Reflection and Conditions for Light to Propagate in an optical fiber?	4M
	b)	Derive an expression for Acceptance Angle of an optical fiber.	8M
		(OR)	
4.	a)	What is meant by mode? Distinguish between single mode and multimode fibers.	6M
	b)	Write various applications of optical fibers.	6M

UNIT-III

5.	a)	What are matter waves? Derive an expression for wave length of electrons.	6M
	b)	Explain the physical significane of wave function.	6M
		(OR)	
6.	a)	Write a note on particle in a one dimensional potential box and calculate the energies of first 4 energy levels.	12M

UNIT-IV

7.	a)	Explain the concept of magnetic field and electric field.	4M
	b)	Define and derive Gauss law of Electrostics.	8M
		(OR)	
8.	a)	Explain Faraday's laws of induction with suitable diagrams.	6M
	b)	Explain Lenz's law and Ampere's law.	6M

UNIT-V

9.	a)	Explain Drift & Diffusion currents.	6M
	b)	Write a note on Direct and indirect Band Gap Semiconductors.	6M
		(OR)	
10.	a)	Explain Hall effect and Derive expression for Hall coefficient.	8M
	b)	Write down applications of Hall effect.	4M

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AR16

CODE: 16BS1004 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, APRIL,2021

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)	What is polymerization? Discuss various types of polymerization with suitable examples	8M
	b)	With neat diagram explain compression and injection moulding methods	6M
		(OR)	
2.	a)	List out the raw materials for cement. Write the chemical composition of OPC	6M
	b)	Discuss in detail about manufacturing of cement with a neat sketch	8M

UNIT-II

3.	a)	Define soft water, hard water and hardness of water.	6M
	b)	Explain the determination of total hardness of water by EDTA method.	8M
		(OR)	
4.	a)	Brief out (i) electro-dialysis (ii) reverse osmosis.	8M
	b)	Give a detailed account on disinfectioning methods.	6M

UNIT-III

5.	a)	Summarize the mechanism of electrochemical corrosion	6M
	b)	Describe the following (i) galvanic corrosion (ii) Differential aeration corrosion	8M
		(OR)	
6.	a)	What is galvanic series? Write its significance.	6M
	b)	Write note on the two methods of cathodic protection.	8M

UNIT-IV

7.	a)	Define knocking, anti-knocking, octane number and cetane number.	8M
	b)	Explain the fractional distillation of crude oil.	6M
		(OR)	
8.	a)	Discuss about any three properties of lubricants.	6M
	b)	Describe boundary lubrication and extreme pressure lubrication.	8M

UNIT-V

9.	a)	Derive an expression for Nernst equation. Calculate emf of the cell $Zn/Zn^{+2}(0.01M)// Cu^{+2}(0.1M)/ Cu$.	8M
	b)	Explain the construction, working applications of Calomel electrode.	6M
		(OR)	
10.	a)	Discuss the construction and working photovoltaic cell.	6M
	b)	What is greenhouse effect? Explain its causes and consequences.	8M

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AR16

CODE: 16BS1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, APRIL,2021

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) Define Interference of light? What are the necessary conditions to get clear and distinct interference fringes? 4 M
   b) Explain how Newton rings are formed in the reflected light. Derive an expression for diameters for bright and dark rings. 10 M

(OR)

2. a) What is meant by Diffraction of light? How diffraction is different from Interference? 6M
   b) Distinguish between Fresnel and Fraunhofer class of diffraction. 4M
   c) Calculate the angular separation between the first order minima on either side of central maximum when the width of the slit is 1×10^{-4} cm and the light illuminating has wavelength 6000 Å 4 M

UNIT-II

3. a) Explain the characteristics of laser. 4M
   b) Describe the construction and working of a ruby laser. 10 M

(OR)

4. a) Explain the principle behind the functioning of an optical fiber 4 M
   b) What is meant by acceptance angle for an optical fiber? Obtain mathematical expression for acceptance angle and numerical aperture. 10 M

UNIT-III

5. a) State and explain the Heisenberg uncertainty principle 4M
   b) Derive the time independent Schrodinger wave equation. 10 M

(OR)

6. a) What are matter waves? Obtain an expression for wavelength of matter waves 6 M
   b) Explain the properties of wave function (Ψ). 4 M
   c) Calculate the wavelength associated with an electron having energy 2000 eV 4 M

UNIT-IV

7. a) Define Magnetic moment. Explain the origin of magnetic moment at the atomic level. 10 M
   b) A circular loop of copper having a diameter of 10cm carries a current of 500 mA. Calculate the magnetic moment associated with the loop. 4 M

(OR)

8. a) Distinguish between Dia, Para and Ferromagnetism 10 M
   b) What are hard magnetic materials? Explain their properties 4 M

UNIT-V

9. a) Explain electronic polarization in atoms and obtain an expression for electronic polarizability in terms of radius of the atom. 10 M
   b) The hydrogen gas contains 9.7×10^{26} atoms/m3 and the radius of the atom is 0.52 Å. Calculate the electronic polarizability. 4 M

(OR)

10. a) Explain the frequency dependence of polarizability. 4M
    b) Explain the phenomenon of ferroelectricity with particular reference to $BaTiO_3$ 6 M
    c) Explain the various applications of dielectric materials 4 M

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AR13

Code: 13BS1004 **SET-I**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, April,2021
ENGINEERING PHYSICS
(Common to CIVIL, MECH, CSE, IT)

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

PART-A

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

1. a) What is meant by interference of light?
   b) What is meant by diffraction of light?
   c) What is the principle of laser?
   d) Define numerical aperture of optical fiber.
   e) What is unit cell?
   f) Write the condition for Bragg's law.
   g) Define magnetic flux density.
   h) What is displacement vector.
   i) Define drift velocity of electrons.
   j) Write one dimensional time dependent Schrodinger's wave equation.

PART-B

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

UNIT-I

2. a) With ray diagram discuss the theory of thin parallel film and derive the conditions for constructive and destructive interference of light by reflection. 8M
   b) A parallel beam of light of wavelength $5890A^0$ is incident on a glass plate having refractive index is 1.5 such that the angle of refraction in the plate is 60^0 calculate the smallest thickness of the plate which will appear dark by reflected light. 4M

(OR)

3. a) Obtain the conditions for principle maxima and minima in Fraunhofer diffraction of light due to a single slit. 8M
   b) Mention any four differences between interference and diffraction of light. 4M

UNIT-II

4. a) Explain the characteristics of laser. 4M
   b) Derive the relation between the probabilities of spontaneous emission and stimulated emission in terms of Einstein coefficients. 8M

(OR)

5. a) Explain the principle behind the functioning of an optical fiber. 4M
   b) Distinguish between single mode and multimode fibers 8M

UNIT-III

6. a) Explain Structure and packing factor of Body centered cubic crystal 8M
   b) Define the following. i) Atomic radius ii) Coordination number iii) Packing fraction and iv) Primitive cell. 4M

(OR)

7. a) What are the Miller indices? How they are obtained and mention their physical significance. 8M
   b) State and explain Bragg's law for X-ray diffraction. 4M

UNIT-IV

8. a) What is Bohr magneton. Find the magnetic moments due to orbital and spin motion of electrons. 8M
   b) Derive relation between Magnetic susceptibility and relative permeability 4M

(OR)

9. a) Derive relation between electric susceptibility and dielectric constant. 4M
   b) What is electronic polarization and derive the expression for its polarizability**.** 8M

UNIT-V

10. a) Derive an expression for electrical conductivity of metal based on classical free electron theory. 8M
    b) Discuss various drawbacks of classical free electron theory. 4M

(OR)

11. a) Derive Schrodinger's time independent wave equation for a particle in one diamension. 8M
    b) Write the physical significances of wave function (Ψ). 4M

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