AR20

CODE: 20BST106 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, June-2022
ENGINEERING PHYSICS
(Civil 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 forced oscillation? Derive an equation of motion for forced Oscillation. Write the expression for forced vibration.	8M
	b)	If the quality factor of un-damped tuning fork frequency256 is 10^3 calculate the time in which its energy reduced to (1/e) of its energy in the absence of damping.	2M
		(OR)	
2.	a)	Distinguish between Free and forced Oscillation.	8M
	b)	Give two examples of forced vibration.	2M
		UNIT-II	
3.	a)	What is interference? With a neat diagram explain that the diameter of bright Newton's Ring is directly proportional to the square root of the odd number.	8M
	b)	In a Newton's rings experiment the diameter of the 15^{th} ring was found to be 0.59 cm and that of the 5^{th} ring is 0.336 *cm.* If the radius of curvature of the lens is 100 *cm,* find the wave length of the light.	2M
		(OR)	
4.	a)	Discuss the phenomenon of interference in thin films. Obtain the condition for maxima and minima.	8M
	b)	If a parallel glass plate of t=4×10^{-4}mm and RI=1.5 is illuminated normally by white light, what wavelengths will be intensified in reflected beam in visible spectrum?	2M
		UNIT-III	
5.	a)	What do you understand by solid state laser? Describe the construction and working of a Solid state laser.	8M
	b)	Write characteristics of laser.	2M
		(OR)	
6.	a)	With a neat diagram discuss construction, working and uses of Four Level system laser.	8M
	b)	What is meant by population inversion and how is it achieved in practice	2M
		UNIT-IV	
7.	a)	Define Numerical Aperature and Acceptance angle. Derive an expression for them.	8M
	b)	In an optical fiber the RI of core and cladding are 1.46 and 1.45 respectively. Find the numerical aperture and the maximum acceptance angle (α_{max}) of the optical fiber system.	2M
		(OR)	
8.	a)	Discuss with necessary diagram the application of optical fiber in communication.	8
	b)	In an optical fiber the core has a refractive index equal to 1.5 and a cladding of refractive index of 1.4. Find speed of the light in core.	2
		UNIT-V	
9.	a)	Define (i) Basis (ii) Unit cell (iii) Coordination number (iv) Packing fraction	8M
	b)	Define space Lattice.	2M
		(OR)	
10.	a)	Show that the atomic packing fraction of FCC is greater than BCC.	8M
	b)	Describe the SC crystal structure.	2M
		UNIT-VI	
11.	a)	Differentiate Type-1 and type-II superconductors	6M
	b)	What is Hysteresis loop. Discuss the property of Hysteresis for a ferromagnetic material.	4M
		(OR)	
12.	a)	What is ferromagnetism? Discuss Domain theory of Ferromagnetism.	8M
	b)	The magnetic field in the interior of a certain solenoid has the value of 6.5×10^{-4}T when the solenoid is empty. When it is filled with iron the field becomes 1.4T. Find the relative permeability of iron.	2M

***

AR20

CODE: 20BST105 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, June-2022

APPLIED PHYSICS

(Common to EEE, ECE)

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

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

UNIT-I

1.	a)	Discuss the principle of the superposition theorem.	6M
	b)	In the newtons rings experiment, the diameter of the 4^{th} and 12^{th} dark rings are 0.4cm and 0.7 cm respectively. Find the diameter of the 20^{th} dark ring.	4M
		(OR)	
2.	a)	Identify the diffraction phenomenon in our daily life.	3M
	b)	Discuss the distribution of intensity in Fraunhofer diffraction.	7M

UNIT-II

3.	a)	Give the applications of LASER.	3M
	b)	Explain the construction and working procedure of the He-Ne Laser with a neat diagram.	7M
		(OR)	
4.	a)	Differentiate between spontaneous emission and stimulated emission.	3M
	b)	Demonstrate the construction and working of a three-level LASER system with the help of the energy level diagram.	7M

UNIT-III

5.	a)	Recognize the total internal reflection.	3M
	b)	Compare the Single-Mode Fibers and the Multimode Optical Fibers,	7M
		(OR)	
6.	a)	Memorize the conditions of light propagation in optical fibre.	3M
	b)	Derive the outcomes from Numerical Aperture and Acceptance Angle	7M

UNIT-IV

7.	a)	Discuss the dual nature of the light.	3M
	b)	Explain the de Broglie hypothesis and list out the physical Significance of Wave Function.	7M
		(OR)	
8.	a)	Recall the matter Waves.	3M
	b)	Derive the time-independent Schrodinger wave equation	7M

UNIT-V

9.	a)	State Gauss law in magnetostatics.	3M
	b)	State and prove Gauss law in electro statics.	7M
		(OR)	
10.	a)	Explain Maxwell's Equations and their applications.	7M
	b)	State and explain Faraday's Law of Induction.	3M

UNIT-VI

11.	a)	What is a semiconductor? What are the most important uses of semiconductors?	3M
	b)	Give the difference between drift and diffusion current.	7M
		(OR)	
12.	a)	Discuss the hall effect and how can we find out the conductivity and resistivity of the charge carriers by using the hall effect.	7M
	b)	Write any four applications of the Hall Effect.	3M

AR20

CODE: 20BST107 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, June-2022

CHEMISTRY

(Common to MECH, CSE, IT & AIML)

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)	How to determine the amount of hardness present in given hard water by titrating with the complexing agent EDTA. Discuss in detail	8M
	b)	The water sample has the following impurities CaSO4 = 136ppm, MgCO3= 84ppm, NaCl= 58.5ppm. Calculate the Total hardness in the water sample.	2M
		(OR)	
2.	a)	Illustrate How the water can be softened to reduce its hardness below 2ppm by Ion exchange process.	8M
	b)	Discuss the significance of breakpoint chlorination.	2M

UNIT-II

3.	a)	Explain the principle of IR spectroscopy. What region of spectra is called Finger print region and discuss in detail why it is called Finger print region?	8M
	b)	Distinguish chromophore with auxochrome.	2M
		(OR)	
4.	a)	What is a chemical shift? Explain the factors effecting chemical shift.	6M
	b)	Discuss the equivalent and non-equivalent protons with minimum two examples.	4M

UNIT-III

5.	a)	Differentiate thermoplastics from thermosettings.	4M
	b)	Discuss the role of various constituents of plastics with examples.	6M
		(OR)	
6.	a)	Illustrate with neat sketch the moulding of Thermoplastics by Injection moulding.	4M
	b)	Explain the preparation, properties and applications of Bakelite.	6M

UNIT-IV

7.	a)	Explain Markonikoff's rule with examples.	4M
	b)	Discuss methyl bromide and tertiary butyl bromide which will undergo SN^1 reaction?	6M
		(OR)	
8.	a)	Illustrate Free radical mechanism of chlorine reaction with methane in sun light.	6M
	b)	Explain the reaction and mechanism Claisen rearrangement.	4M

UNIT-V

9.	a)	What is Galvanic series? Give its significance.	4M
	b)	Explain the factors effecting corrosion by nature of environment.	6M
		(OR)	
10.	a)	Compare galvanization and tinning. Which process is suitable for engineering applications?	6M
	b)	How Current Impressed cathodic protection reduce corrosion of underground pipelines.	4M

UNIT-VI

11.		Elaborate the 12 principles of green chemistry in detail.	10M
		(OR)	
12.	a)	What is battery? Explain the construction and working of alkaline battery.	6M
	b)	Discuss how batteries differ from super capacitors?	4M

AR18

CODE: 18BST107 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, June-2022

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? Derive and solve differential equation of damped harmonic oscillator?	8M
	b)	What are the characteristics of Simple Harmonic Oscillator?	4M
		(OR)	
2.	a)	What are forced oscillations? Obtain an expression for the amplitude of forced oscillations.	8M
	b)	Distinguish between damped and forced oscillations?	4M

UNIT-II

3.	a)	Explain the young's double slit experiment.	4M
	b)	Explain the formation of Newton's rings. Determine the wavelength of sodium light using Newton's rings experiment.	8M
		(OR)	
4.	a)	What are the differences between interference and diffraction?	4M
	b)	Discuss in detail Fraunhofer diffraction due to double slit.	8M

UNIT-III

5.	a)	Obtain the relation between Einstein's coefficients.	8M
	b)	Describe how Population inversion is very important in lasers.	4M
		(OR)	
6.	a)	Explain the characteristics of lasers.	4M
	b)	Describe the construction and working of a semiconductor laser.	8M

UNIT-IV

7.	a)	Explain the principle of an optical fiber.	4M
	b)	Obtain the mathematical expression for acceptance angle and numerical aperture.	8M
		(OR)	
8.	a)	Calculate the acceptance angle and numerical aperture of an optical fiber, if the refractive indices of the core and cladding are 1.56 and 1.49 respectively.	4M
	b)	Describe different types of fibers by their refractive index profile and propagation.	8M

UNIT-V

9.	a)	Explain the classification of magnetic materials on the basis of electron spin.	8M
	b)	Distinguish between soft and hard magnetic materials.	4M
		(OR)	
10.	a)	Explain the critical parameters and their significance in superconductor.	6M
	b)	What is meissner effect? Explain	6M

***

AR18

CODE: 18BST108 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, June-2022

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)	What are the main postulates of VSEPR Theory?	6M
	b)	Write basic features of molecular orbital theory. Explain MO diagram of CO.	6M
		(OR)	
2.	a)	What is hybridisation? Explain about SP and SP^2 hybridization with examples	6M
	b)	Write a note on following. i) Atomic size ii) Electron affinity	6M

UNIT-II

3.	a)	Write a note on following. i) Finger print region ii) Fluorescence	6M
	b)	Discuss the electronic transitions involved in the UV - visible region.	6M
		(OR)	
4.	a)	Explain the terms i) Chemical shift ii) Coupling constant.	6M
	b)	Discuss about NMR spectroscopy	6M

UNIT-III

5.	a)	What is electro chemical series? Discuss its significance.	6M
	b)	Describe the construction and working of Hydrogen electrode	6M
		(OR)	
6.	a)	Explain theory of dry corrosion and nature of oxide film formed on the metal surface.	6M
	b)	Explain about i) Sacrificial anodic protection. ii) Impressed current cathodic protection	6M

UNIT-IV

7.	a)	Explain SN^1 mechanisms with examples.	6M
	b)	Explain Diels-Alder reaction with example.	6M
		(OR)	
8.	a)	Differentiate between addition and condensation polymerization.	6M
	b)	Discuss about the classification of polymers.	6M

UNIT-V

9.	a)	Discuss the working and construction of a lead acid battery.	6M
	b)	What is Green chemistry? Discuss about the need of green chemistry.	6M
		(OR)	
10.	a)	Explain differences between renewable and non -renewable energy sources.	6M
	b)	What is photo voltaic cell? Explain the principle and working.	6M

***

AR16

CODE: 16BS1003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech I Semester Supplementary Examinations, June-2022

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)	Describe the principle and formation of Newton's rings and give a method to determine wavelength of monochromatic light.	10M
	b)	Discuss various applications of Interference of light.	4M
		(OR)	
2.	a)	What do you understand the difference between Interference and diffraction.	4M
	b)	Obtain the condition for primary and secondary maxima in Fraunhofer diffraction due to a single slit and derive an expression for width of the central maxima.	10M

UNIT-II

3.	a)	Obtain the relation between various Einstein's coefficients in laser system.	4M
	b)	With the help of suitable energy level diagrams discuss the working principle, construction and lasing action in a Ruby laser.	10M
		(OR)	
4.	a)	Discuss in detail the construction and working of an Optical fibre with neat sketch. Obtain an expression for Numerical aperture.	10M
	b)	Calculate the acceptance angle and numerical aperture of a given optical fibre, if the refractive indices of core and cladding are 1.563 and 1.498 respectively.	4M

UNIT-III

5.	a)	Explain the significance of Heisenberg's Uncertainty Principle with the support of few applications.	8M
	b)	Describe the Physical significance of wave function for finding a particle.	6M
		(OR)	
6.	a)	Discuss the motion of an electron in a One Dimensional Potential Box.	8 M
	b)	What do you understand by the concepts of Maxwell Boltzmann and Bose Einstein Statistics for the moment of an electron.	6M

UNIT-IV

7.	a)	Describe the concept of Domain Theory of Ferromagnetism	6M
	b)	Discuss in detail the classification of magnetic materials based on their alignment of magnetic moments.	8M
		(OR)	
8.	a)	Mention the differences between Soft and Hard Magnetic Materials	8M
	b)	Explain the terms Ferrites and Eddy Current Losses - Transformer Cores	6M

UNIT-V

9.	a)	Deduce the relation between D, E & P for a dielectric material.	6M
	b)	Obtain an expression for an electronic polarization.	8M
		(OR)	
10.	a)	Elaborate the concept of Piezoelectricity.	6M
	b)	What do you understand from the concepts of Frequency Dependence of Polarizability, Dielectric Loss and Dielectric Breakdown.	8M

***