AR20

CODE: 20BST105 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, October-2021

APPLIED PHYSICS

(Common to CSE & IT)

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)	State and explain the superposition principle	3
	b)	Explain the interference in thin films and derive the expression for dark band in reflection of light rays	7
		(OR)	
2.	a)	Differentiate diffraction and interference	3
	b)	Describe the theory of Fraunhofer diffraction due to single slit and give the detailed analysis of intensity distribution	7

UNIT-II

3.	a)	What are the characteristics of lasers	4
	b)	Explain the term population inversion and explain the role of optical resonator in LASER	6
		(OR)	
4.	a)	Describe construction and working of He-Ne laser with neat energy level diagram	7
	b)	List out any three applications of lasers in industry.	3

UNIT-III

5.	a)	Explain the construction of an optical fiber and derive the expression for numerical aperture	7
	b)	A beam of laser light entered from air to optical fiber of core refractive index 1.55 and cladding refractive index 1.52. Compute the numerical aperture of an optical fiber	3
		(OR)	
6.	a)	Sketch and explain the refractive index profiles of single and multi-mode step index and graded index fibers .	7
	b)	Define intermodal dispersion in multimode step index optical fiber	3

UNIT-IV

7.	a)	Derive the expression for de-Broglie's wavelength	6
	b)	Explain the physical significance of wave function	4
		(OR)	
8.	a)	Derive the expression for Schrödinger time independent wave equation	7
	b)	What is meant by normalized condition	3

UNIT-V

9.	a)	State and explain Gauss's law in electrostatics	3
	b)	Explain the any one application of Biot-Savart law	7
		(OR)	
10.	a)	Explain the ampere's law	3
	b)	List out the differential and integral form of Maxwell's equations and write a short note of significance of maxwell equations	7

UNIT-VI

11.	a)	State Hall Effect	2
	b)	Derive the expression for Hall Coefficient and write its significance	8
		(OR)	
12.	a)	Describe the extrinsic semiconductors and write the significance of doping of impurities in semiconductors	7
	b)	List any three differences between intrinsic and extrinsic semiconductors	3

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CODE: 20BST106 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, October-2021

ENGINEERING PHYSICS

(Mechanical 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)	Write the differential equation of a damped harmonic oscillator whose damping force is proportional to its velocity and obtain the solution of the same.	8M
	b)	A mass of 0.5kg hangs from a spring. If the mass is pulled downward and let go to execute S.H.M. Calculate the time period if the same spring is stretched 16 cm by 0.4 kg mass.	2M

(OR)

2.	a)	Show that the energy of a simple harmonic oscillator is proportional to square of its amplitude. What is the effect of damping on total energy of the oscillator?	8M
	b)	What do you understand by quality factor? On what factors does it depend?	2M

UNIT-II

3.	a)	Prove that the diameter of the n^{th} dark ring in a Newton's ring set up is directly proportional to the square root of the ring number.	6M
	b)	In a Newton's rings experiment the diameter of 15^{th} ring was found to be 0.59 cm and that of 5^{th} ring is 0.336 cm. If the radius of curvature of lens is 100 cm find the wavelength of the light.	4M

(OR)

4.	a)	Distinguish between interference and diffraction.	4M
	b)	Explain with necessary theory the Fraunhofer diffraction due to single slit.	6M

UNIT-III

5.	a)	With a neat sketch, describe the construction and working of a Ruby laser.	6M
	b)	Write any four applications of LASERs.	4M

(OR)

6.	a)	Define Spontaneous emission, Stimulated emission and Population inversion.	6M
	b)	What are the characteristics of a LASER? Explain.	4M

UNIT-IV

7.	a)	Define Numerical aperture of an optical fibre and derive the expression for it.	6M
	b)	What is an optical fibre? Define the principle involved in it.	4M
		(OR)	
8.	a)	Distinguish between single mode and multi mode fibres.	8M
	b)	Calculate NA of an optical fibre whose core and cladding are made up of material of refractive index 1.6 and 1.5 respectively.	2M

UNIT-V

9.	a)	Illustrate the SC, BCC and FCC crystal structures.	6M
	b)	With the help of an example distinguish between crystal lattice and crystal structure.	4M
		(OR)	
10.	a)	Describe the seven crystal systems with diagrams.	8M
	b)	What is meant by primitive and non-primitive cell?	2M

UNIT-VI

11.	a)	Distinguish between dia, para and ferro magnetic materials.	6M
	b)	What are coercivity and retentivity?	4M
		(OR)	
12.	a)	State and explain Meissner effect.	6M
	b)	What are superconductors? Write its properties.	4M

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CODE: 20BST107 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular Examinations, October-2021

CHEMISTRY

(Common to CE, EEE & ECE)

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 with a neat sketch zeolite process for softening of hard water	6M
	b)	What are the types of Hardness? Differentiate them.	4M
		(OR)	
2.	a)	Explain ion-exchange process for softening of hard water.	6M
	b)	Describe the terms i) Disinfection of water ii) Coagulation	4M

UNIT-II

3.	a)	Discuss about various types of electronic transitions involved in the UV - visible region.	6M
	b)	Explain the terms Finger print region and coupling constant	4M
		(OR)	
4.	a)	Discuss about the principle and different types of stretching and bending vibrations in IR spectroscopy.	6M
	b)	Explain the terms i) Chromophore ii) Auxochrome	4M

UNIT-III

5.	a)	Differentiate between Thermosetting and Thermoplastics.	6M
	b)	Discuss the preparation, properties and uses of Bakelite polymer.	4M
		(OR)	
6.	a)	Describe compounding of plastics? Discuss different constituents of compounding and their uses.	6M
	b)	With a neat Sketch explain Injection moulding technique for fabrication of plastic	4M

UNIT-IV

7.	a)	Describe Mechanism of SN^1 and SN^2 reactions with examples.	6M
	b)	Explain the reaction and mechanism of Claisen rearrangement	4M
		(OR)	
8.	a)	Write a note on Uni molecular and Bi molecular Elimination reactions with mechanisms	6M
	b)	Explain the reaction and mechanism of Pinacol-Pinacolone rearrangement	4M

UNIT-V

9.	a)	Discuss the Electrochemical theory of corrosion.	6M
	b)	Explain Tinning method for the protection of iron from corrosion	4M
		(OR)	
10.	a)	What is corrosion? Discuss the factors that affect the rate of corrosion.	6M
	b)	Write about sacrificial anodic protection method for controlling corrosion	4M

UNIT-VI

11.	a)	What is a solar cell? Explain the working principle of PV cell.	6M
	b)	Compare batteries and super capacitors	4M
		(OR)	
12.	a)	Explain the construction and working of Lead acid battery	6M
	b)	Differentiate between Renewable and Non-renewable Energy sources	4M