AR20

CODE: 20BST105 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

APPLIED PHYSICS

(Common to 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 the formation of Newton's rings? Derive the expression for diameter of n^{th} dark ring.	7
	b)	In Newton's rings experiment using a sodium vapor lamp light source of wavelength $\lambda=5890A^{0,}$ the diameter of 16^{th} dark ring is found to be 0.28cm. What is the diameter of 20^{th} dark ring?	3

(OR)

2.	a)	Explain the theory of Fraunhofer diffraction due to single slit and give the detailed analysis of intensity distribution.	7
	b)	Comment how the diffraction pattern will be affected by increasing the slit width in Fraunhofer single slit diffraction.	3

UNIT-II

3.	a)	Explain the significance of Einstein's coefficients in Lasers	6
	b)	State the following terms stimulated absorption, spontaneous emission and stimulated emission.	4

(OR)

4.	a)	Illustrate the construction and working of ruby laser with neat energy level diagrams	7
	b)	List out any three applications of lasers in medical field	3

UNIT-III

5.	a)	Explain the application of Optical Fibers in Communication with block diagram	6
	b)	What is the principle of optical fiber and explain with neat diagram	4

(OR)

6.	a)	Define acceptance angle and derive the expression for acceptance angle and numerical aperture	7
	b)	List the applications of optical fibers in medical field	3

UNIT-IV

7.	a)	Solve the Schrodinger wave equation for a particle confined in a one-dimensional potential of width 'L' and infinite height and show that energy of particle is quantized	7
	b)	An electron moving under a potential field of 15kV. Compute the wavelength of matter waves produced by electron	3

(OR)

8.	a)	State and explain Heisenberg's Uncertainty Principle	6
	b)	Briefly explain the wave particle duality	4

UNIT-V

9.	a)	State and explain Faraday's law	3
	b)	Explain the any two applications of gauss law	7

(OR)

10.	a)	State and explain the Lenz law	3
	b)	Derive the expression for magnetic force on current carrying coil	7

UNIT-VI

11.	a)	State and explain drift and diffusion currents	6
	b)	Derive the expression for drift current in terms of mobility	4

(OR)

12.	a)	Explain the variation of Fermi Level on Carrier Concentration and Temperature	6
	b)	Derive expression for conductivity of semi conductors.	4

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

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)	Define the terms Over-Damped, Critically Damped and Under-Damped Oscillations.	6
	b)	Distinguish between free oscillation and forced oscillation.	4
		(OR)	
2.	a)	Derive the expression for damped harmonic oscillator.	6
	b)	Write a short note on resonance.	4

UNIT-II

3.	a)	Explain the interference of light due to thin films.	8
	b)	Why do soap bubbles appear multicoloured when viewed under sun light?	2
		(OR)	
4.	a)	What is diffraction and how are fringes obtained in diffraction?	6
	b)	Explain the principle of superposition of waves.	4

UNIT-III

5.	a)	What are Einstein's coefficients A and B in Laser?	4
	b)	Describe the construction and working of He-Ne Laser.	6
		(OR)	
6.	a)	What is meant by population inversion? What are the different methods of achieving population inversion?	6
	b)	State any four applications of Lasers in the field of medicine.	4

UNIT-IV

7.	a)	What is an optical fibre? Describe its structure.	4
	b)	Distinguish between step index and graded index fibres?	6
		(OR)	
8.	a)	Calculate the refractive index of core and cladding materials of an optical fibre if its numerical aperture is 0.22 and relative refractive index difference is 0.012.	4
	b)	Define acceptance angle of an optical fibre and derive the expression for it.	6

UNIT-V

9.	a)	Define the terms atomic radius and coordination number.	4
	b)	Illustrate Bravais lattices.	6
		(OR)	
10.	a)	Show that FCC crystals are closed packed than BCC crystals.	8
	b)	Calculate the radius of atoms in α-iron belonging to BCC structure. Take the density of α-iron as 7860 kg/m^3 and atomic weight of iron as 55.85.	2

UNIT-VI

11.	a)	Explain hysteresis of a ferro-magnetic materials.	6
	b)	Give the Weiss theory of ferromagnetism.	4
		(OR)	
12.	a)	What are the critical parameters of a superconductors? Explain	4
	b)	Distinguish between Type-I and Type-II superconductors.	6

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

CHEMISTRY

(Common to MECH, 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)	What is meant by carbonate and non carbonate hardness of water? How to determine this hardness in water by complexometry method?	6M
	b)	One litre hand pump water sample having the following compositions in mg/L. $Mg(HCO_3)_2$ = 21.9, $MgCl_2$ =14.2 , $CaSO_4$ = 20.4 and KCl = 7.4. Calculate temporary and permanent hardness of water	4M
		(OR)	
2.	a)	Explain the procedure for getting of softening water by Zeolite process. List out the limitations in this process	6M
	b)	Write short notes on chlorination and Ozoniation disinfection processes	4M

UNIT-II

3.	a)	Discuss the various types of electronic transitions.	6M
	b)	Define Chromophore and auxochrome	4M
		(OR)	
4.	a)	Write briefly on Chemical Shift and Coupling Constant.	6M
	b)	Write a note on stretching vibrations in IR spectroscopy.	4M

UNIT-III

5.	a)	Suggest and explain best moulding method in the fabrication of electrical switches	4M
	b)	Explain addition polymerisation process by taking with one example.	6M
		(OR)	
6.	a)	Write about the preparation, properties and engineering applications of Phenol formaldehyde polymer	6M
	b)	Compare the merits and demerits of all moulding methods	4M

UNIT-IV

7.	a)	Write some important points on electrophilic addition reactions	6M
	b)	Explain SN^1 mechanism with example.	4M
		(OR)	
8.	a)	Explain the reaction and mechanism of Pinacol Pinacolone rearrangement	6M
	b)	Write a short notes Free radical – addition reaction	4M

UNIT-V

9.	a)	Suggest and explain suitable corrosion mechanism, if an Iron rod is continuously exposed to atmospheric oxygen in a room in dry condition	6M
	b)	How the factors like nature of electrolyte and humidity to influence the rate of corrosion in metals?	4M

(OR)

10.	a)	List out the proper designing principles to follow in the protection of corrosion in metals	5M
	b)	Explain the procedure for developing of Zinc coating on iron metal surface through hot dipping process	5M

UNIT-VI

11.	a)	Write a brief note on renewable and non renewable energy sources with examples	5M
	b)	Write any five principles followed in green chemistry	5M

(OR)

12.	a)	Write about the construction and working of PV cell	5M
	b)	Explain the construction and working of alkaline battery with necessary reactions	5M