Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester Supplementary Examinations February-2022
APPLIED PHYSICS
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define simple harmonic motion and simple harmonic oscillator. Give examples.	4M
	b	Derive the equation of motion of simple harmonic oscillator and find its solution.	8M

OR

2	a	What are damped oscillations? Solve the differential equation of a damped harmonic oscillator.	6M
	b	Discuss the case of under damped motion.	6M

UNIT-II

3	a	Deduce Schrodinger time independent wave equation.	8M
	b	Write the physical significance of wave function ψ.	4M

OR

4	a	Outline the behavior of particle in a one dimensional potential box in terms of eigen values and eigen functions.	8M
	b	An electron is confined to a one dimensional box of width 4 A, then calculate the energies corresponding to the second and fourth quantum states.	4M

UNIT-III

5	a	Describe the quantum free electron theory of metals.	8M
	b	Explain the effect of temperature on Fermi-Dirac distribution.	4M

OR

6	a	What are intrinsic semiconductors? Deduce an expression for the carrier concentration and conductivity of intrinsic semiconductors.	8M
	b	Distinguish the direct and indirect band gap semiconductors?	4M

UNIT-IV

7	a	Write a brief note on the characteristics and applications of Lasers.	6M
	b	Obtain the relationship between various Einstein coefficients of absorption and emission of radiation.	6M

OR

8	a	Deduce expressions for acceptance angle and numerical aperture of an optical fiber.	8M
	b	An optical fiber has a core material of refractive index 1.55 and cladding with refractive index 1.50. Calculate its numerical aperture.	4M

UNIT-V

9	a	What are nanomaterials? Explain the basic principles of nanomaterials.	8M
	b	Outline the properties of nanomaterials that are affected due to increased surface area to volume ratio.	4M

OR

10	a	What is Scanning Electron Microscope? Discuss in detail the construction and working of SEM.	8M
	b	Write any two applications of SEM.	4M

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