Q.P. Code: 19HS0849 **R19**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July-2021

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. Give three examples.	4M
	b	Derive the equation of motion of simple harmonic oscillator and find its solution.	8M
		OR	
2	a	Explain different types of damped oscillations with suitable examples.	6M
	b	A point performs damped oscillations according to the law $x=aoe^{-bt}\ sin\ \omega t$.	6M

UNIT-II

3	a	Explain de Broglie hypothesis and Derive the expression for de Broglie wavelength.	8M
	b	Obtain an expression for wavelength of electron accelerated in a potential V.	4M
		OR	
4	a	Deduce the solution of Schrodinger wave equation for particle confined in a box.	8M
	b	An electron is confined in a one dimensional potential box having width of $3x10^{-10}$ m. Estimate the kinetic energy of electron when it is in the ground state.	4M

UNIT-III

5	a	Write the salient features and demerits of classical free electron theory. Derive an expression for electrical conductivity in a metal.	6M
	b	Find relaxation time of conduction electron in metal, if its resistivity is $1.54x10^{-8}$ Ω-m and it has $5.8x10^{28}$ conduction electron/m^3. Given m= 9.1×10^{-31} kg, e= 1.6×10^{-19} C.	6M
		OR	
6	a	Derive the Einstein's relations.	4M
	b	What is Hall Effect? Obtain an expression for Hall coefficient. Write the applications of Hall Effect.	8M

UNIT-IV

7	a	Explain the construction and working of He-Ne laser with a neat diagram.	8M
	b	Explain the pumping mechanisms to achieve population inversion.	4M
		OR	
8	a	Classify the optical fibers based on their refractive index profile.	6M
	b	Explain the propagation of electromagnetic wave through optical fibers.	6M

UNIT-V

9	a	Describe the classification of nanomaterials with suitable examples.	6M
	b	Nanomaterials behave differently in their properties than the bulk materials. Justify.	6M
		OR	
10	a	Describe any one method of fabrication of nanomaterials.	8M
	b	Explain how nanomaterials are used in the field of medicine and sensor technology.	4M

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