R20

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year I Semester Regular & Supplementary Examinations March-2023
APPLIED PHYSICS
(Common to CSE, CAD,CCC, CSM, CIC,CIT & CAI)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 60

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

UNIT-I

1	a	Describe the formation of Newton's ring with necessary theory with relevant diagram and derive the expressions for dark and bright fringes.	CO 1	L2	9M
	b	In a Newton's rings experiment, the diameter of the 5th ring is 0.30 cm and the diameter of the 15th ring is 0.62 cm. Calculate the diameter of the 25th ring.	CO 1	L3	3M

OR

2	a	Explain the theory of Fraunhofer diffraction due to single slit.	CO 1	L2	8M
	b	Obtain conditions for bright and dark fringes in single slit diffraction pattern and draw intensity distribution.	CO 1	L4	4M

UNIT-II

3	a	What are the salient features of classical free electron theory? Derive an expression for electrical conductivity in a metal?	CO 2	L3	8M
	b	Find relaxation time of conduction electron in metal if its resistivity is $1.54 \times 10^{-8} \Omega$-m and it has 5.8×10^{28} conduction electron/m^3. Given m= 9.1×10^{-31} kg, e= 1.6×10^{-19} C.	CO 2	L3	4M

OR

4	a	Write a significance of divergence and curl of a vector.	CO 2	L1	8M
	b	Find the temperature at which there is 1 1% probability that a state with energy 0.5eV is above Fermi energy.	CO 2	L3	4M

UNIT-III

5	a	Describe the construction and working principle of NdYAG Laser with the help of a neat diagram.	CO 3	L2	9M
	b	Calculate the wavelength of emitted radiation from GaAs which has a band gap of 1.44eV.	CO 3	L3	3M

OR

6	a	What is the acceptance angle of an optical fiber and derive an expression for it.	CO 3	L3	8M
	b	An optical fibre has a core refractive index of 1.44 and cladding refractive index of 1.40. Find its numerical aperture, Acceptance angle, critical angle and fractional refractive index change.	CO 3	L3	4M

UNIT-IV

7	a	What is Fermi level? Prove that the Fermi level $E_F = \frac{E_C + E_V}{2}$ for an intrinsic semiconductor.	CO 4	L5	8M
	b	Draw the energy band structure of intrinsic semiconductor.	CO 4	L1	4M

OR

8	a	Describe the construction and working mechanism of LED.	CO 4	L2	8M
	b	Determine the wavelength of LED fabricated by the CdS material with band gap of 2.42 eV	CO 4	L3	4M

UNIT-V

9	a	Explain the Type-I and Type-II superconductors.	CO 5	L2	8M
	b	What is Meissner effect?	CO 5	L1	4M

OR

10	a	What are the techniques available for synthesizing nanomaterials?	CO 5	L1	6M
	b	Explain ball milling technique for synthesis of nanomaterial.	CO 5	L2	6M

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