



ACHARYA INSTITUTE OF TECHNOLOGY BENGALURU 560107

INTERNAL ASSESMENT - III [Academic Year: 2018-19]

Sub with Code: Engineering Physics [18PHY12]
Semester/Section: I / All Sections
Max Marks: 50

Time: 90 Min.
Date: 28/12/2018

Note: Answer ALL the questions.

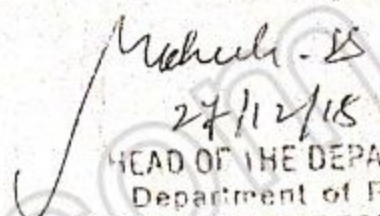
Q.N		CO'S
1	a) Explain the failures of classical free electron theory (06 M) b) Calculate the probability of an electron occupying an energy level 0.02 eV above the Fermi level at 200K, in a material. (04 M) OR a) Compute Clausius-Mossotti equation. (06 M) b) The angle of acceptance of an optical fiber is 30° when kept in air. Find the angle of acceptance when it is in a medium of RI 1.33. (04 M)	CO2 CO3 CO2 CO3
2	a) Compute the expression for electrical conductivity of an intrinsic of semiconductor. (06 M) b) Define Fermi velocity and Fermi temperature. (04 M) OR a) Discuss the different types optical fibers with neat diagram (06 M) b) Define angle of acceptance and fractional index change. (04 M)	CO2 CO1 CO2 CO1
3	a) Discuss the relation between Fermi energy and energy gap using carrier concentration of electrons and holes. (06 M) b) Discuss the point to point communication using an optical fiber with the help of a block diagram (04 M) OR a) Discuss the dependence of Fermi factor on temperature and effect on occupancy of energy levels. (06 M) b) Explain the electronic and orientational polarization with their expression in dielectric materials. $\epsilon_0(\epsilon_r - 1)$ $\frac{m}{h^2}$ (04 M)	CO2 CO2 CO2 CO2
4	a) Explain Hall effect by considering rectangular slab and obtain the hall coefficient. (06 M) b) Define polarization and dipole moment. (04 M) OR a) Compute the expression for Fermi energy at zero Kelvin. (06 M) b) Define density of states and Fermi factor with their expression. (04 M)	CO2 CO1 CO2 CO1

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9	a) Discuss the success of quantum free electron theory based on Conductivity expression (06 M)	CO2
	b) Calculate the Fermi velocity for the conduction electrons in silver, given that its Fermi energy is 5.5 eV. (04 M)	CO3
	OR	
10	a) Explain the applications of dielectrics in transformer. Mention the types of Dielectric materials with examples. (06 M)	CO1
	b) The electron concentration in an n-type semiconductor is $4.6 \times 10^{17} / \text{m}^3$. Neglecting the hole current, calculate the conductivity of the material if the drift velocity of electron is 350 m/s in an electric field of 1050 V/m. (04 M)	CO3


 27/12/18
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