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Internal Assessment Test 2 – January 2025

Sub:	Physics for CSE stream					Sub Code:	BPHYS102	Branch:	ISE/AIDS/AIML/CSE-AIML
Date:	17/01/2025	Duration:	90 mins	Max Marks:	50	Sem/Sec:	I Sem / A, B, C, D, E, F, G, H		OBE

Answer any FIVE FULL Questions

Given: $c = 3 \times 10^8$ m/s; $h = 6.625 \times 10^{-34}$Js; $k = 1.38 \times 10^{-23}$ J/K; $m_e = 9.1 \times 10^{-31}$kg; $e = 1.6 \times 10^{-19}$C

		MARKS	CO	RBT
1 (a)	What is superconductivity? Outline, qualitatively the BCS theory of superconductivity.	[06]	CO2	L2
(b)	Mention any two the failures of classical free electron theory.	[04]	CO2	L2
2 (a)	Differentiate between Type I and Type II superconductors.	[06]	CO2	L2
(b)	The Fermi energy of silver is 5.5eV. What is the value of energy for which the probability of occupation will be 2% at a temperature of 27°C.	[04]	CO2	L3
3 (a)	Define Fermi factor. Explain the variation of Fermi factor with temperature and energy.	[06]	CO2	L2
(b)	The critical field for Niobium is 1×10^5A/m at 8 K and 2×10^5 A/m at 4K. Find the transition E temperature and the critical field at 0K.	[04]	CO2	L3

PTO

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PTO

4 (a)	State Pauli's X, Y and Z matrices and apply them on $\|0\rangle$ and $\|1\rangle$ states.	[6]	CO1	L2
(b)	Mention any four differences between inferential and descriptive statistics.	[4]	CO3	L2
5 (a)	What is the matrix representation and the truth table for an S gate and a T gate? Show that $T^2=S$.	[6]	CO1	L2
(b)	On a particular place, flash floods occur twice every 50 years on average. Calculate the probability of k = 1 and k =2 flash floods in a 50 year interval, assuming the Poisson model is appropriate.	[4]	CO3	L3
6 (a)	Discuss the modelling of the probability of proton decay using Poisson distribution.	[6]	CO3	L2
(b)	Mention the differences between classical and quantum computing.	[4]	CO1	L2
7 (a)	Illustrate odd rule and the four odd rule scenarios with suitable examples.	[6]	CO3	L2
(b)	While animating slow out of a car the base distance is 0.25m. Calculate the distance between the first and the fifth frame.	[4]	CO3	L3
8 (a)	Mention the general pattern of Monte Carlo method and hence determine the value of π.	[6]	CO3	L2
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