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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2026

B.Tech-II Semester (CSE/IT/BT/ECE/CE)

COURSE CODE (CREDITS): 25B11PH211 (4) MAX MARKS: 25

COURSE NAME: Physics II/Engg. Physics-II

COURSE INSTRUCTOR: PBB, SKK, SKT, HAZ, SBA MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed

Q.No	Question	CO	Marks
Q1	Find the expression for the electric field at P(x,y,z) due to a point charge Q at (x_1, y_1, z_1). What will be electric field if charge is at origin?	1	2+1
Q2	Find the gradient of the following scalar functions: 1. $T = \frac{3}{(x^2+y^2)}$ 2. $V = xy^2z^4$	2	2
Q3	An infinitely long straight wire is carrying a steady current I. Determine the ratio of the magnitude of the magnetic energy density at distance 'r_1' to that at 'r_2 (=2r_1)' from the wire.	3	2
Q4	A semi-infinite straight wire carrying a current I = 15.0 A along x-direction with one end at the origin. Find the magnetic induction at a point lying on y-axis at a distance L = 100 cm from the origin.	4	3
Q5	For a plane wave in vacuum prove that $\frac{E}{B} = c$. Prove that time average of Poynting vector is $\frac{1}{2}c\varepsilon_0 E_0^2$.	1	3+2
Q6	Explain the difference between the micro and macro-bending losses in optical fiber, Derive the numerical aperture in terms of differential refractive index Δ.	5	1+2
Q7	Consider a fiber with a 100μm core diameter and a 140μm cladding diameter. If n_1 = 1.48 and n_2 = 1.465, calculate (a) Numeric Aperture of fiber. (b) V parameter if the operating wavelength is 850nm.	3	2
Q8	If E = 250 V/m, u = 5.53 × 10^{-7} J/m^3, A = 0.2 m^2, find the power crossing a surface area. Prove the laws of reflection and refraction using EM theory.	2	2+3