

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- MARCH-2023

COURSE CODE (CREDITS): 18B11PH211 (3)

MAX. MARKS: 15

COURSE NAME: Engineering Physics II

COURSE INSTRUCTORS: PBB, SKK, VSA, SKT, HAZ, SBD

MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. Consider a vector field $\vec{A} = yz\hat{i} + xz\hat{j} + xy\hat{k}$: (i) Is the field solenoidal? (ii) Is the field irrotational? [2-marks] [CO-1]

Q2. Prove that "divergence of the curl" of a vector is zero? If $\vec{F} = 2x\hat{i} + 3y^2\hat{j} + 4z^3\hat{k}$ what is its divergence? [3-marks] [CO-1]

Q3. Derive an expression for the electric field due to an infinitely long uniformly charge straight wire using Gauss law. [2-marks] [CO-1]

Q4. Electric potential at a point is given by $V(x,y,z) = \frac{10}{\sqrt{x^2 + y^2 + z^2}}$. Find electric field intensity at a point (2,4,4). [3-marks] [CO-1]

Q5. Using spherical polar coordinates, sketch the vector function $\vec{v} = \frac{\hat{r}}{r^2}$ and compute the divergence. [2-marks] [CO-1]

Q6. What is the charge density in a region of space where electrostatic potential is given by $V = a - b(x^2 + y^2) - c \log(x^2 + y^2)$ [3-marks] [CO-1]