



School of Electronics Engineering
FS_2024-25 (CAT-1)

Course Code: BEVD202L

Course Name: Electromagnetic Field Theory

Faculty Name: Dr. Rajan Kumar Pandey

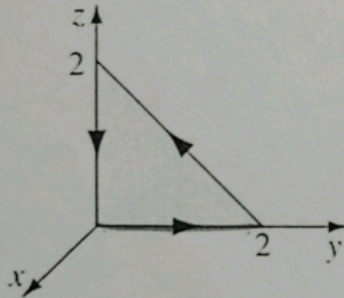
Duration: 90 Minutes.

Class ID: VL2024250104063

Slot: D1+TD1

Maximum Marks: 50

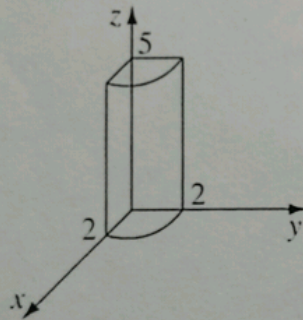
- Q1. Test Stokes' theorem for the function $\mathbf{v} = (xy)\hat{x} + (2yz)\hat{y} + (3zx)\hat{z}$, using the triangular shaded area shown in the figure below: [4+4]



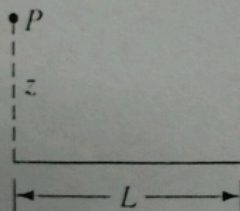
- Q2. (a) Find the divergence of the function [4+4+4]

$$\mathbf{v} = s(2 + \sin^2 \phi)\hat{s} + s \sin \phi \cos \phi \hat{\phi} + 3z \hat{z}$$

- (b) Test the divergence theorem for this function using the quarter-cylinder of radius 2, and height 5 units.
(c) Find the curl of $\mathbf{v}$.



- Q3. Find the electric field a distance z above one end of a straight line segment of length L (as shown in the figure below) that carries a uniform line charge λ . [10]
Check that your formula is consistent with what you would expect for the case $z \gg L$.



- Q4. A long cylinder carries a charge density that is proportional to the distance from the axis: $\rho = ks$, for some constant k . Find the electric field inside this cylinder. [8]
- Q5. A non-conducting disk of radius a has a uniform surface charge density σ C/m². What is the potential at a point on the axis of the disk at a distance x from its center. Calculate the electric field from the potential. Discuss the special cases of potential, when $x \gg a$, and when $x = 0$. [8+4]
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