

### *Chapter 1*

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|---|--|---|
| 1 | What do you mean by coulomb's law ?  | 2 |
| 2 | Write the Maxwell 1st equation in electrostatics ?   | 2 |
| 3 | Find the expression of electric field intensity due to infinite line charge distribution ?   | 7 |
| 4 | Given point A (x=2, y= 3, z= -1 ) and B ( $\rho =4, \phi= -50^0, z= 2$ ) find a unity vector in cylindrical coordinates :<br>(i) At point B directed toward point A<br>(ii) At point A directed toward point B | 7 |
| 5 | A uniform line charge $\rho_2 = 25 \text{ nC/m}$ lies on the line x= -3 m and y = 4 m in free space find the electric field intensity at a point (2,3,15) m  | 7 |

### *Chapter 2*

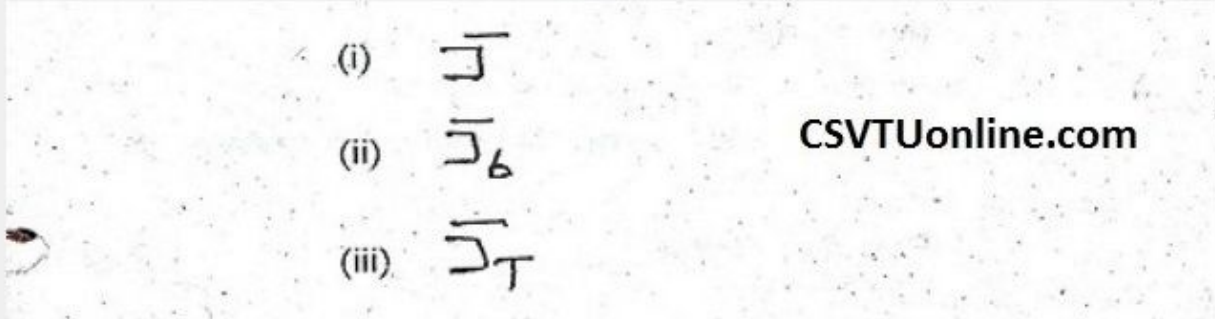
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|---|--|---|
| 1 | Explain Gauss law with its application.  | 7 |
| 2 | The spherical surface r = 1,2,&3 carry surface charge densities of 20, -9 ,and 2 nC/m <sup>2</sup> , respectively find :<br>(i) How much electric flux leaves the surface r =5<br>(ii) Find $\vec{D}$ at P(1, -1, 2) | 7 |
| 3 | Explain any two :<br>(i) Conservative property<br>(ii) potential gradient<br>(iii) Energy density in the electrostatic field   | 7 |

### *Chapter 3*

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|---|---|---|
| 1 | What do you mean by current & current density ?   | 2 |
| 2 | Explain the continuity equation for current ?   | 7 |
| 3 | Explain the uniqueness theorem?   | 7 |
| 4 | Give the potential field $V = \frac{50 \sin \theta}{r^2}$ Volt in free space :<br>(i) Determine whether V satisfy Laplace equation.<br>(ii) Find the total charge stored inside the spherical shell $1 < r < 2$ | 7 |

## Chapter 4

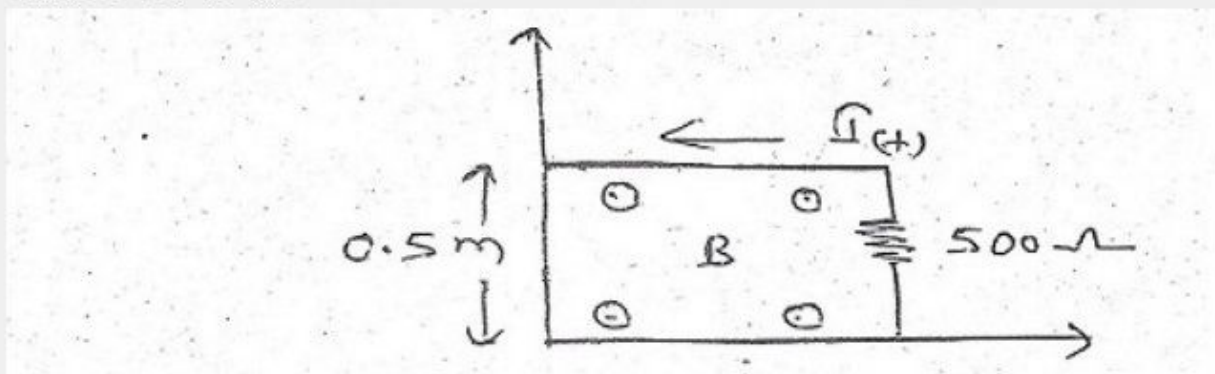
- 1 What do you mean by Bio Savart law? 2
- 2 Explain magnetic boundary condition, find the normal & tangential component for magnetic flux density & magnetic field intensity ? 7
- 3 The magnetic flux density in a magnetic material with  $X_m = 6$  is given in a certain region as  $\vec{B} = 0.005 y^2 \vec{a}_x$  T. At  $y = 0.4$  m, find the magnitude of : 7



- 4 Given that the general vector  $\vec{A}$  is  $\vec{H} = 2.5\vec{a}_\theta + 5\vec{a}_\phi$  find the curl of  $\vec{H}$  at  $(2, \pi/6, \phi=0^\circ)$  7

## Chapter 5

- 1 Write maxwell equation for time varying field in point form : 7
  - (i)  $\nabla \times \vec{E}$
  - (ii)  $\nabla \times \vec{H}$
  - (iii)  $\nabla \cdot \vec{D}$
  - (iv)  $\nabla \cdot \vec{B}$
- 2 Explain the term Poynting theorem & Poynting vector ? 7
- 3 A perfectly conducting filament containing a small  $500 \Omega$  resistor is formed into a square as shown in fig find  $I_{(t)}$  if  $\vec{B} =$ 
  - (i)  $0.2 \cos 120 \pi t \vec{a}_2$  T
  - (ii)  $2 \cos [3\pi \cdot 10^8 (t - x/c)] \vec{a}_2 \mu$  T
 where  $c = 3 \times 10^8$  m/s 7



- 4 Explain the following (any two) : 7
  - (i) Faraday's law of electromagnetic induction
  - (ii) Displacement current & displacement current density
  - (iii) Statically & dynamically induced emf