

# Assignment 1

EC and Electronics Dept.

5<sup>th</sup> Sem

**Subject: Engineering Electromagnetic (2151002)**

1. Explain Vector field and its component
2. For the following write down the formula
  - (a) For vector A & Vector B write down the formula for cross product & Dot product.
  - (b) Conversion from rectangular(Cartesian) to cylindrical & spherical
  - (c) Conversion from cylindrical to rectangular
  - (d) Spherical to rectangular
3. With the help of neat sketches, briefly explain the cylindrical coordinate system. Also give the dot table relating to the vectors in cylindrical coordinate & rectangular coordinate systems & justify.
4. Explain cross product and dot product in details.

# Assignment 2

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Subject: Engineering Electromagnetic (2151002)

1. Define electric field intensity. Derive the expression for the intensity of electric field due to a line charge along the Z direction with uniform charge density  $\rho_L$  C/m using Coulomb's law.
2. (a) Describe the experimental law of Coulomb. (b) Derive the expression for the electric field E due to infinite sheet of charge having a uniform density of  $\rho_S$  C/m<sup>2</sup>.
3. "Two charges exert on each other equal and opposite force" Justify and support your answer mathematically.
4. What is principle of superposition? Explain in context with electric field intensity with necessary equations.

# Assignment 3

## EC and Electronics Dept.

### 5<sup>th</sup> Sem

#### Subject: Engineering Electromagnetic (215102)

1. Using Gauss's laws explain the concept of divergence. Prove divergence theorem and obtain Maxwell's first equation
2. State the conditions to be satisfied by the special Gaussian surfaces.
3. What is an electric dipole? Derive the expression for electric field intensity  $E$  at distant point due to a  $+Q$  &  $-Q$  charge located the point apart from origin.
4. Using Gauss's law for differential volume element proves that  $\text{div } D = \rho_V$ .
5. What do you mean by equipotential surface? Derive the expressions of potential gradient.
6. Derive the electric field intensity due to infinite and uniform line charge density using Gauss's law.
7. Define (i) electric potential (ii) potential difference (iii) Dipole moment.
8. Define work done and obtain the line integral to calculate the work done in moving a point charge  $Q$  in an electric field  $E$ .
9. Derive the equation of energy stored in terms of  $D$  and  $E$ .
10. Define potential gradient and derive the relationship between  $E$  and  $V$ .