

**Class Test-1, Electromagnetics (EC4501), ECE NITP**

Q.1. Let  $\vec{A} = 3\hat{y} + 4\hat{z}$  and  $\vec{B} = 4\hat{x} - 10\hat{y} + 5\hat{z}$

1. Find the component of  $\vec{A}$  along  $\vec{B}$ .

2. Determine the unit vector perpendicular to both  $\vec{A}$  and  $\vec{B}$ .

Q.2. Calculate the circulation of vector  $\vec{A} = \rho \cos \phi \hat{\rho} + z \sin \phi \hat{z}$  along defined by the dimensions as  $0 \leq \rho \leq 2$ ,  $0 \leq \phi \leq 60^\circ$ ,  $z = 0$ . Also, validate the result using Stokes' theorem.

Q.3. Find whether the vector field defined by  $\vec{A} = 2\hat{x} + 3\hat{y} - \hat{z}$  is solenoidal or rotational. Also, comment on its conservation property.

Q.4. Resolve all the vectors of cylindrical coordinate system into the spherical coordinate system to find the transformation matrix from cylindrical to spherical and vice-versa.

Q.5. How much is the divergence of magnetic flux around the magnetic bar. Why?

Q.6. Draw the electric field distribution of static electric dipole and find the divergence and curl of this field.