***ELECTRODYNAMICS***

1. **Problems on Cartesian, Cylindrical and Spherical Co-ordinate System**

Formulae Used:

1. Cylindrical- Cartesian

1. Spherical- Cartesian

Where,

Solved Problems

1. Convert the point P(1,3,5) from Cartesian to Cylindrical and Spherical polar coordinates

Solution:

Data: x=1,y=3,z=5 in Cartesian coordinates

In cylindrical polar coordinates, (r,

Z=5

In Spherical polar coordinates (r,

r=5.916

Answer: Coordinates of p in cylindrical polar coordinates are (3.162, 71.57ͦ, 5) and in spherical polar coordinates are (5.916, 71.57ͦ, 32.3ͦ)

1. Given vector in Cartesian coordinate system at point P(-2,6,3). Convert the vector into cylindrical and spherical coordinates.

Solution:

Data: , x=-2, y=6, z=3

Formula: Cylindrical coordinates

Spherical coordinates

Calculations:

Cylindrical coordinates:

r=

Z=3

Spherical coordinates:

Answer: is cylindrical coordinates

is spherical coordinates.

1. **Problems on Divergence and Curl**

Formulae Used:

1. Divergence

**()=**

1. Curl

**()=**

Solved Problems

1. Find the divergence and curl of the fielf in Cartesian coordinates.

Solution:

Divergence,

**=**

**+**2y

1. In cylindrical coordinates, find the divergence and curl of the field,

Solution:

Here,

Divergence of

Curl of =0

1. Given a general field in spherical coordinates. Find curl B at (2, ).

Solution:

Here hence, and

=

Therefore, at (2, ),