

Assignment

PHYSICS(regular)

Paper: PHY-RC/HG-2016

Full Marks=50

Submission date: 09/08/2020

1. Answer the following questions. 1x5=5

- a. What is vector quantity ?
- b. Find the divergence of the vector field $3x^2 \mathbf{i} + 5xy \mathbf{j} + xyz^3$.
- c. What is electric field?
- d. What do you mean by ferro-magnetic material ?
- e. State the Gauss's law in electrostatics.

2. Answer the following questions .2x5=10

- a. State the Faraday's two laws of electromagnetic induction.
- b. State the Gauss-divergence theorem.
- c. Write the Maxwell's equations of EM in integral form.
- d. What is the physical significance of Curl of a vector field.
- e. Define displacement vector in electrostatics.

3. Answer the following questions. 5x3=15

- a. Evaluate $\int (2x+y) dv$ over the volume bounded by the cylinder and the planes $x=0$, $y=0$, $y=2$ and $z=0$.
- b. Write the expression of mutual inductance M of two coils.
- c. State some practical application of eddy current.

4. State and prove the Biot-Savart law. Applying this law to derive an expression for the magnetic field produced at a point due to the current flowing through a straight wire of infinite length.

5+5=10

5. State and prove Poynting's theorem. 10