

Raghunathpur College

Department of Physics

Internal Examination 2nd & 4th semester (GE), 2020

Topic: Electricity & Magnetism (BPHSGEHC)

Full mark: 10

Time: 20 minutes

NOTE:

- Write your name (in capital letter) on starting of your answer script.
- Send your answer sheets in PDF format to the mail-id (phys.rnpur@gmail.com).

Answer the following questions (each questions contain 2 marks)

1. Find the constant λ such that the vectors $2\hat{i} - \hat{j} + \hat{k}$, $\hat{i} + 2\hat{j} - 3\hat{k}$ and $3\hat{i} + \lambda\hat{j} + 5\hat{k}$ are coplanar.

or,

Prove, $\vec{\nabla} \cdot \left(\frac{\vec{r}}{r^3} \right) = 0$

2. Find out the expression for motional EMF.

or,

Show that, an inductor L has a current I then the energy stored in it is $\frac{1}{2}LI^2$.

3. What is Biot-Savart law. Write down its mathematical form.

Or,

A circular coil of radius 10 cm has the 500 number of turns. The current flowing through the coil is 5 amp. Find the magnetic field intensity at its centre.

4. Define electrostatic flux. Establish Coulomb's law from Gauss's theorem.

Or

Write down the mathematical forms of Gauss's theorem. Using Gauss's theorem find the electric field intensity at a distance d from the axis ($d > r$) of a uniformly charged infinitely long cylinder of radius r.

5. In a region, the electric potential is expressed by $\Phi(x, y, z) = \frac{29}{\sqrt{x^2 + y^2 + z^2}}$. Find the electric field at (3,4,2).

Or

State Gauss's theorem. What is the relation between electric field and electrostatic flux.