End Sem—II
PHY- G.E.-2

2021

Time : 3 Hours
Full Marks : 75
*Candidates are required to give their answers in
their own words as far as practicable.*
परीक्षार्थी यथासंभव अपने शब्दों में ही उत्तर दें।
Answer from both the groups as directed.
निर्देशानुसार दोनों खण्डों से उत्तर दें।

Group-A
(Compulsory)

1. **Answer, in very short, the following questions:** (1x10=10)

a) Vector product of two vector quantity is scalar or vector quantity and why?

b) Define electric dipole moment and its unit.

c) Write the formula for the Capacitance of an isolated spherical conductor.

d) State Biot - Savart's law.

e) Define ferromagnetic materials with examples.

f) Give the statement of Fraday's law of electromagnetic induction.

g) What is a dielectric ? Define dielectric constants.

h) What is the statement of Ampere's circuital law ?

i) What is the unit of Mutual inductance?

j) Define relative permeability and its unit.

2. Derive an expression for the electric potential at a point due to a point charge. **(5)**

GROUP-B

Attend any four of the following : (15x4=60)

3. Define electric field and electric line of force. Give properties of electric lines of force.

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4. Solve any two of the following :

i) A sphere of radius 3cm has a point charge q=7.6MC located at its centre . Find the electric flux through it.

ii) If 100 Joule of work must be done to move electric charge of 4C from a place where potential is -10 Volt to another place, where potential is V Volt. Find the value of V.

iii) The self inductance of a coil having 200 turns is 100 milli henry, calculate the magnetic flux through the cross- section of coil in which current of 2 mA is passing. Also calculate the total magnetic flux linked with the coil.

5. Define electric dipole. Derive an expression for the electric potential due to an electric dipole.

6. Derive an expression for the capacitance of a parallel plate capacitor with a dielectric completely filled between the plates?

7. Using Biot- Savart's law find the magnetic field at a point due to a straight conductor.

8. Define self induction. Obtain an expression for the self inductance of a long solenoid. Also derive an expression for the energy stored in a inductance coil.

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