Total No. of Printed Pages: 2

SUBJECT CODE NO: - YY-2340
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y (Sem. II)
Examination March / April - 2023
Physics Paper-V Electricity and Magnetism

[Time: 1:30 Hours] **[Max. Marks: 40]**

Please check whether you have got the right question paper.

N. B
1. All questions are compulsory.
2. All questions carry equal marks.
3. Draw neat diagrams and give labelled wherever necessary.
4. Figures to the right indicate full marks.

Q1 a) Define scalar triple product and show that it remains unchanged under cyclic change of vector $(\vec{A}\,\vec{B}\,\vec{C}) = (\vec{B}\,\vec{C}\,\vec{A}) = (\vec{C}\,\vec{A}\,\vec{B})$ 10

OR

Explain in brief.

a) Potential due to a point charge 10

b) Calculate the electric potential due to the dipole of the dipole moment $4.5*10^{-10}$ C/m at a distance 1m from its center and on its axis

Q2 a) Derive an expression for Gauss law dielectric. 10

OR

Explain in brief.

a) Magnetic induction due to straight current carrying conductor. 10

b) Calculate magnetic induction at a distance of 1.75 m from the axis of a long straight wire carrying a current of 140 A.

Q3 **Write a short note on (any two)** 10

a) Geometrical interpretation of $\nabla\phi$
b) Electric field
c) Dielectric
d) Ampere's circuital law.

Q4 **Multiple Choice Questions.** 10

1. Divergence of a vector field is the net outward flux of a vector per unit --------
   a) Surface area b) volume c) length d) none of these

2. $\nabla.(AB)$ is equal to ----------
   a) $(\nabla.A)(\nabla.B)$ b) $\nabla.A + \nabla.B$ c) $\nabla^2.AB$ d) $B\,\nabla.A + A\nabla.B$

3. Electric intensity is a ----------
   a) Scalar b) Vector c) Tensor d) Number

4. The potential at a point due to a charge is 9 V. if the distance is increased three times the potential at that point will be ----------
   a) 27 V b) 3V c) 12 V d) 18V

5. Dipoles are created when the dielectric is placed in ----------
   a) Magnetic Field b) Electric field c) Vacuum d) Inert environment

6. Dielectric constant for metal is ----------
   a) Zero b) Infinite c) One d) Ten

7. The unit of magnetic induction is ----------
   a) Wb.m b) Tesla c) A/m^2 d) Wb/m^2

8. The magnetic induction due to a long straight conductor carrying a current at a distance X is B. if distance X is double then magnetic induction becomes ------.
   a) Double b) Half c) Zero d) Constant

9. If proton moves with velocity 3.1×10^7 m/s, perpendicular to magnetic induction 1.5 Wb/m^2, force of proton is --------
   a) $74 \times 10^{-12}\ N$ b) $37 \times 10^{-12}\ N$ c) $7.4 \times 10^{-12}\ N$ d) 3.7×10^{-12} N

10. The Gaussian surface for a point charge will be, ---------
    a) Cube b) Cylinder c) Sphere d) Cuboid