Class :- F.Y.B.Sc.   **Subject :- Physics (II)**

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1.Electrostatics

Q. 1A) Short Answer Questions.
1) State Coulombs low, in electrostatics.
2) State Coulombs low, express in vector from.
3) State principal of super position in electro statics.
4) Define electric intensity at a point in electric field. Give its SI unit.
5) What do you mean by electric field or electrostatics field?
6) Define electric flux.
7) State Gauss's theorm in electrostatics.

B] Long Answer Questions.

1) State Coulomb's law in electrostatics. Discuss it's vector from.
2) State Principle of superposition theorem in electrostatics and obtain an expression for force on any one charge due to all other charges.
3) Define electric intensity at a point in an electrostatics and obtain an expression for electric intensity due to a point charge at any point.
4) State Gauss's law ,what is the advantage of Gauss's law over Coulomb's law?
5) Using Gauss's theorem, obtain expression for electric intensity at any point due to uniformly charged non Conducting sphere.
6) Using Gauss's theorm obtain an expression for the electric intensity at any point due to a line charge.

C] Problem.

1) Calculate the force between two balls each having a charge of 12 micro Culomb and are 8cm apart.
2) Three point charge +1 micro Culomb , +2, micro Culomb & +3 micro Culomb are at the vertices of an equilaternal triangle.Calculate of the resultant force acting on the +3 micro Culomb chage.
3) A charge of 12 nano- coulomb is situated inside a cube. Calculate the electric flux through one of the force of the cabe.
(Give :   = 8.85 x 10^{-12} C^2 /Nm^2)

Chapter – 2 Dielectrics

A] Short Answer Question.

1) Define the terms electric dipole and electric dipole moment.
2) Define electric dipole moment Give it SI Unit.
3) Define polar molecule . Give its examples.
4) Define non-polar molecule. Give its examples.
5) What do you mean by dielectric material?
6) Datine electric polarization vector p. Give its SI Unit.
7) Define electric displacement Vector P. Give its SI Unit.
8) Write the relation between three electric vectors D, E, amd P.
9) State Gauss's law in dielectrics.
10)   Define dielectric constant of the material.

B] Long Answer Questions.

1) Explain polar and non- polar molecule with example and effect of electric field on them.

2) What is electric dipole and dipolemoment? Obtain an expression for electic potential at any point due to an electric dipole.
3) Derive an expression for electric intensity at any point due to electric dipole.
4) Obtain an expression for torque on a dipole placed in an uniform electric field.
5) State and Prove Gauss's law in dielectrics.
6) Show that in the substance of dielectric, the induced charge q' due to polarization is always less than the free charge q and given by q' = q(1-1/k)

C] Problem.

1) An electric dipole consisting of two opposite chanrges each of magnaitude 2.0 microcoulomb is separated by a distance of 2.0 cm. The dipole is placed in an external field of intensity 1.0×10^5N/C. Calculate the maximum torque on the dipole.
2) Calculate the potential and electric field due to a dipole of dipole moment 2×10^{-10} C-m at a distance of 1 metre from it (a) on its perpendicular bisector. (b) on perpendicular bisector.
3) A dielectric slab of thickness 0.6cm and dielectric constant k= 5 is placed between the parallel plates of plate area 0.01 m^2 and separation 0.015 m. A potential difference of 150 volt is applied with no dielectric present. If the battery is connected and dielectric is inserted, find the three vactors E, D And P in the dilectric.

4) Two parallel plates have aqual and opposite charges. When the space between the two places is vacuum, the electric intensity is 3×10^6 V/m. Find the induced charge density on the surface of the dielectric.

5) A parallel-plate capacitor of plate area A = 100 cm^2 and separation d = 1.5 cm is charged by a potential of 60 V. Then the battery is disconnected and dielectric slab of thickness b = 0.8 cm and k = 5 inserted. Calculate three vectors E, D and P in the Dielectric.

Chapter III Magnetostatics

Q. 1A) Short Answer Questions.
1.What is magnetic flux ?
2.State Ampere circuital law ?
3.What is solenoid ?Where it is used ?
4. State Gauss Law for magnetostatics
5. What is magnetic field ?

B] Long Answer Questions.
1.State and prove Ampere circuital law.
2. Explain Gauss law in Magnetism.
3. Using Biot Savarts law, derive expression for magnetic field for long conductor.
4. Derive expression for magnetic field for current caring circular coil.
5. Derive expression for magnetic intensity on axis of solenoid.

C] Problem.

1.A coil of 20cm radius has 15 turns, and carring current of 3 A. find the magnetic field at the centre of the coil.
2.A solenoid of length 100cm, is wound uniformly, with 10000turns of wire . It carries a current of 4A. What would be value of magnetic field on the axis.at the cenre.
3. A solenoid of length 0.5cm, is wound uniformly, with 10000turns of wire . radius of 1cm.It carries a current of 4A. What would be value of magnetic field on the axis.at the cenre.
4 Aluminium wire of diameter 0.4 cm carries current of 23A . Find magnetic field on surface of the wire

Chapter IV Magnetic properties of material.

Q. 1A) Short Answer Questions.

1.What is Bohr Magneton ?
2. Define Magnetic Induction, Magnetic intensity, Magnetisation,
3.Write relation between Magnetic Induction, Magnetic intensity, Magnetsation.
4.Define coerocivity.
5.Define dimagnetism, paramagnetism and ferromagnetism.
6. What is Currie Temperature ?
7. What is magnetic susceptibility ?

B] Long Answer Questions.

1.Explain in detail Magnetic Induction, Magnetic intensity, Magnetsation
2. Explian the term magnetic susceptibility and magnetic permeability.
3. What is Currie Temperature ? Explain relation between Currie Temperature and magnetic   permeability.
4. Distinguish between dimagnetism, paramagnetism and ferromagnetism.
5.What is hysteresis curve ? Explain the term coercivity. And retentivity by usings hysteresis curve.

C] Problem.

1.The magnetic susceptibility of tungsten at $27\ ^0$ c is 6.8 X10 $^{-5}$.find the percentage increases   magnetic field ?
2. A solenoid of length 100cm, is wound uniformly, with 5000 turns of wire . It carries aCurrent of 4.5 A Calculate Magnetisation in the core And magnetic field at the centre.
3. The maximum value of permability.of some material is 0.150 T- m/A Find the value of relative max. permability and susceptibility.
4. A solenoid of with 5000 turns /cm. . It carries aCurrent of 4.5 A. its core is made up of iron
Which has a relative permability of 5000 . Determine the Magnetic Induction, Magnetic intensity, Magnetsation inside the core.
5. The Magnetic Induction, Magnetic intensity, in a material are found 1.6 T and 1000A/m Calculate relative permability and susceptibility of the material.