APPENDICES

APPENDIX - 1

INSTRUCTIONAL OBJECTIVES SPELT OUT FOR THE SIX SYLLABUS BASED COMPUTER SOFTWARE PACKAGES IN PHYSICS

Electrostatics - Module 1

At the end of the instruction, the learner,

- recalls the behaviour of stationary electric charges.
- Recognises that like charges repel and unlike charges attract.
- Understands that the electric charge in nature comes in units.
- States the law of conservation of electric charge.
- defines conductor and finds example for conductor.
- defines insulator and finds example for insulator.
- defines coulomb's inverse square law.
- finds the value of permitivity of free space.
- finds the value of K in coulomb's inverse square law.
- finds the formula for force when two charges are kept in medium other than vacuum.
- writes the equation relating ε_r, ε and ε_o
- recalls the value of ε_r for air.
- find out the value of repulsive force between two charges.
- defines electric field.
- defines strength of electric field.
- computer the value of electric field.
- understands about point charge.
- writes the equation of election field (E)
- identifies the direction of electricfield.
- defines an electric dipole.
- apply the dipole moment formula to calculate the value of dipole moment

Electrostatics - Module - 2

At the end of the instruction, the learner.

- defines electric lines of force.
- learns the first property of electric lines of force.
- understands the second property of electric lines of force.
- recalls the third property of electric lines of force.
- learns the fifth property of electric lines of force.
- calculates the number of electric lines of force given by certain units of positive charge.
- defines Electric potential at a point in an electric field region.
- understands that the electric potential at a point near an isolated positive charge is positive.
- understands that the electric potential at a point near an isolated negative charge is negative
- defines electric potential difference.
- writes the equation to find out the electrical potential difference between two points.
- defines 1 volt and calculate potential difference between two points.
- explains electric potential at a point due to a point charge.
- calculates the force experied by a unit positive charge.
- derive the formula to find electric potential at a point due to a point charge +q coulomb kept in vacuum or free space.
- derive an expression for electric field intensity at a point at a distance from a point charge +q.

Electrostatics - Module - 3

At the end of the instruction the learner.

- is able to derive general expression for electric potential at any point P due to an electric dipole.
- understands to derive an expression for potential at P with orientation formula.
- derives an expression for electric potential at any point due to an electric dipole moment P.
- obtains the formula to find electric potential at a point P lies on the axial line of electric dipole on the side of the positive charge q.

- obtains the formula to find electric potential at a point P lies on the axial line of electric dipole on the side of negative charge.
- applies the formula to find electric potential at a point lies on the equatorial line of dipole.
- derives an expression for torque acting on an electric dipole P placed in an uniform electric field E.
- derives an expression for torque acting on an electric dipole P placed in an uniform electric field E.
- derives an expression to represent the electric potential energy (U) of the system of charges q_1 and q_2 kept in vacuum of permittivity ε_o and separated by a distance d.
- is able to derive the formula for electric flux through the closed surface considered in an electric field E.

Electrostatics - Module - 4

At the end of the instruction, the learner.

- states the Gauss law or Gauss theorm.
- understands from the Gauss law that the flux through a closed

  surce depends only on the value of the net charge inside the surface and not on the location of the charge.
- is able to derive an expression for electric field due to an infinite plane sheet of charge by applying Gauss theorm.
- derives, by applying Gauss theorm, the formula for electric field at a point inside the parallel sheets of charges.
- recalls that electric field at a point out side the parallel sheets of charges as zero.
- explains what is electrostatic induction.
- describes the method of charging a body temporarily.
- explains the method of charging a body permanently.
- explains another method of charging body permanently also.
- defines Electrophorus.
- understands the construction of Electrophorus.
- understands that the negative charges on the disc foes to earth when it is earthed and positive charges remains there itself.

- identifies that the negative charges remains undiminished.
- identifies that the charges carried by the disc, in the electrophorus, each time will be the same.

Electrostatics - Module - 5

At the end of the instruction, the learner

- recalls about the distribution of charges on a conductor.
- understands that the charge accumulates to a maximum at the pointed end where the curvature is greater.
- understands that the charge accumulation at the edges will be more around the edges of a metal circular disc when it is charged.
- concludes that greater the currature at any point, greater is the surface charge density.
- understands that distribution of charge on a conductor depends not only upon the shape of the conductor but also on the proximity of other conductors near the charged conductor.
- reasons for action of points.
- understands about the concentration of charge at sharp points.
- concludes that a charged conductor with sharp points on its surface rapidly loses its charge.
- defines action of points.
- finds the application of action of points.
- knows the construction of Van de Graaff generator that (i) it consists of a hollow metallic sphere mounted on insulating pillars.
- (ii) knows that belt of generator made up of rubber.
- understands that where the comb of the machine connected.
- understands about the working of Van de Graaff generator.
- knows about how much of voltage can be generated from Van de Graaff generator.
- learns the application of the generator.

Electrostatics - Module - 6

At the end of the Instruction, the learner

- recalls the relation connecting charge Q, potential V and capacitance C.
- concludes that the charge given to the conductor depends only on the size and shape of the conductor.
- calculates capacitance of a conductor.
- recalls the practical units of capacitance.
- identifies the relation between microfarad and farad.
- identifies the relation between picofarad and farad.
- defines capacitor.
- explains the principle of making capacitor.
- describes the construction of parallel plate capacitor.
- understands the application of Gauss's law in parallel plate capacitor.
- derives the relation to calculate potential difference developed in the parrallel plate capacitor.
- derives the relation to calculate the capacitance of parallel plate capacitor.
- explains the effect of dielectric introduced in parallel plate capacitor.
- recognises that the capacitance of a parallel plate capacitor increases when the dielectric is introduced in between the plates of capacitor.
- derives the relation to find electric field at any point in air space between the plates of capacitor.
- derives the relation for the capacitance of the capacitor with a dielectric slab is introduced in the between the plates of capacitor.
- derives the formula to find the effective capacitance when two or three capacitors conned in series.
- calculates the effective capacitance when capacitors are connected series.
- derives the formula to find the effective capacitance when many capacitors connected in parallel.
- is able to do sums on capacitors connected in parallel.