RK TUITION CENTRE

STD-12 -Physics

UNIT :1 (ELECTROSTATICS) **TEST NO:1** **Total Marks:50**

Answer all the questions. Choose and write correct answer. $7 \times 1 = 7$

1. A glass rod rubbed with silk acquires a charge of $+8 \times 10^{-12}$C. The number of electrons it has gained or lost
   (a) 5×10^{-7}(gained) (b) 5×10^{7}(lost) (c) 2×10^{-8}(lost) (d) -8×10^{-12}(lost)
2. The electrostatic force between two point charges kept at a distance d apart, in a medium $\varepsilon_r = 6$, is 0.3 N. The force between them at the same separation in vacuum is
   (a) 20 N (b) 0.5 N (c) 1.8 N (d) 2 N
3. Electic field intensity is 400 V m^{-1} at a distance of 2 m from a point charge. It will be 100 V m^{-1} at a distance?
   (a) 50 cm (b) 4 cm (c) 4 m (d) 1.5 m
4. Two point charges +4q and +q are placed 30 cm apart. At what point on the line joining them the electric field is zero?
   (a) 15 cm from the charge q (b) 7.5 cm from the charge q
   (c) 20 cm from the charge 4q (d) 5 cm from the charge q
5. A dipole is placed in a uniform electric field with its axis parallel to the field. It experiences
   (a) only a net force (b) only a torque
   (c) both a net force and torque (d) neither a net force nor a torque
6. If a point lies at a distance x from the midpoint of the dipole, the electric potential at this point is proportional to
   a) $\frac{1}{x^2}$ b) $\frac{1}{x^3}$ c) $\frac{1}{x^4}$ d) $\frac{1}{x^{3/2}}$
7. A hollow metal ball carrying an electric charge produces no electric field at points
   (a) outside the sphere (b) on its surface (c) inside the sphere (d) at a distance more than twice

Answer any 6 questions $6 \times 3 = 18$

1. State Coulomb's law in electrostatics
2. Define: Coulomb.
3. Define: Electric potential.
4. State Gauss's law.
5. During lightning, it is safer to sit inside car than in an open ground. Why?
6. What are polar molecules? Give an example.
7. What is action of points (corona discharge)? What is its use?

Answer question number 4 compulsory. answer any two of the remaining 2 questions. $3 \times 5 = 15$

1. Write the properties of lines of forces
2. Obtain an expression for Electric potential at a point due to a point charge
3. Obtain an expression for Capacitance of a parallel plate capacitor with a dielectric medium.
4. Two capacitances 0.5 μF and 0.75 μF are connected in parallel and the combination to a 110 V battery. Calculate the charge from the source and charge on each capacitor.

Answer any one question: $1 \times 10 = 10$

1. Obtain an expression for Electric field due to an electric dipole at a point on the equatorial line.
2. Obtain an expression for Electric field due to an electric dipole at a point on its axial line.