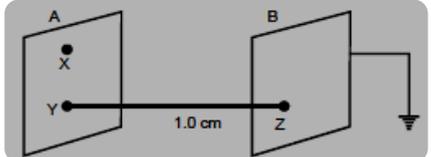


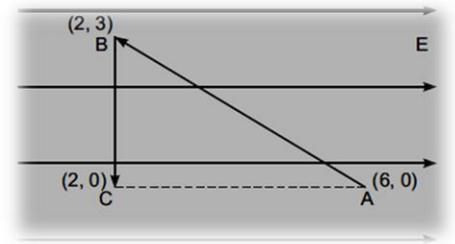
Topic-Electric potential

Assignment – 3

Subjects- Physics

1. What is the work done in moving a $2\mu C$ point charge from corner A to corner B of a square ABCD when a $10\mu C$ charge exist at the centre of the square? 1
2. Show that the potential at a point on the equatorial line of an electric dipole is Zero? 2
3. Draw one equipotential surfaces
 - (1) Due to uniform electric field
 - (2) For a point charge ($q < 0$)? 2
4. Two charges are placed at points A and B 6 cm apart.
 - I) Identify an equipotential surface of the system.
 - II) What is the direction of the electric field at every point on this surface? 2
5. Two charges $5 \times 10^{-8} C$ & $-3 \times 10^{-8} C$ are located 16 cm apart. At what point(s) on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero. 3
6. A charge of $8mC$ is located at the origin. Calculate the work done in taking a small charge of $-2 \times 10^{-9} C$ from a point P (0, 0, 3 cm) to a point Q (0, 4 cm, 0), via a point R (0, 6 cm, 9 cm) 3
7. Derive an expression for the potential energy of an electric dipole of dipole moment p in an electric field E
Derive expression P.E for system of two charges under the presence of external electric field E 3
8. Describe schematically the equipotential surfaces corresponding to
 - i) a constant electric field in the z-direction,
 - ii) a field that uniformly increases in magnitude but remains in a constant (say, z) direction,
 - iii) a single positive charge at the origin, and
 - iv) A uniform grid consisting of long equally spaced parallel charged wires in a plane. 3
9. Two identical plane metallic surfaces A and B are kept parallel to each other in air separated by a distance of 1.0 cm as shown in the figure. Surface A is given a positive potential of 10V and the outer surface of B is earthed.
 - (a) What is the magnitude and direction of uniform electric field between point Y and Z? What is the work done in moving a charge of 20 from point X to Y?
 - (b) Can we have non-zero electric potential in the space, where electric field strength is zero? 3
10. A regular hexagon of side 10 cm has a charge $5\mu C$ at each of its vertices. Calculate the potential at the centre of the hexagon. 3
11. Two point charges Q_1 & Q_2 are located at points (a, 0, 0) & (0, b, 0) respectively. Find the electric field due to both these charges at the point (0,0,0) 3

12. A test charge 'q' is moved without acceleration from A to C along the path from A to B and then from B to C in electric field E as shown in the figure. (i) Calculate the potential difference between A and C. (ii) At which point (of the two) is the electric potential more and why?



3

For detail study, numerical problems & conceptual questions click below

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