Physicsaholics

DPP – 4 (Electrostatics)

Video Solution on Website:- https://physicsaholics.com/home/courseDetails/51

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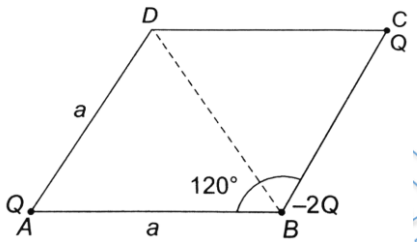
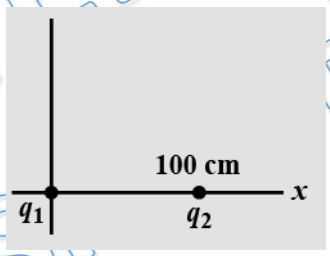
Q 1. A charge +Q at A produces electric field E and electric potential V at D. If we now put charges -2Q and +Q at B and C vertices of a parallelogram ABCD, then the magnitude of electric field and potential at D will be:



(a) E and zero (b) zero and V (c) $\sqrt{2}E$ and $\frac{V}{\sqrt{2}}$ (d) $\frac{E}{\sqrt{2}}$ and $\frac{V}{\sqrt{2}}$

Q 2. A point charge $q_1 = +2\mu C$ is placed at the origin of co-ordinates. A second charge, $q_2 = -3\mu C$, is placed on the x-axis at x = 100cm. At what point (or points) on the x-axis will the absolute potential be zero?



(a) $x = 40cm$ and $x = -200cm$
(b) $x = 40cm$ only
(c) $x = -200cm$ only
(d) $x = 80cm$ only

Q 3. Two charges $q_1 = 5 \times 10^{-8}C$ and $q_2 = -3 \times 10^{-8}C$ 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:
(a) 10cm from charge q_1 (b) 10cm from charge q_2
(c) 6cm from charge q_1 (d) None of these

Q 4. In a regular polygon of n sides each corner is at a distance r from the centre. Identical charges are placed at (n-1) corners. At the centre, the intensity is E and the potential is V. The ratio V/E has magnitude:
(a) nr (b) $r(n-1)$ (c) r (d) $-\frac{r}{n}$

Q 5. Electric potential is given by $V = 6x - 8xy^2$. Then electric force acting on 2C point charge placed at the origin will be:
(a) 2N (b) 6N (c) 8N (d) 12N

Q 6. Electric potential 'v' in space as a function of co-ordinates is given by, $v = \frac{1}{x} + \frac{1}{y} + \frac{1}{z}$. Then the electric field intensity at (1,1,1) is given by:

(a) $-(\hat{\imath} + \hat{\jmath} + \hat{k})$ (b) $\hat{\imath} + \hat{\jmath} + \hat{k}$

(c) Zero (d) $\frac{1}{\sqrt{3}}(\hat{\imath} + \hat{\jmath} + \hat{k})$

Q 7. Two equipotential surfaces of 40V and 50V potential are separated by 2 cm. If the electric field present between them is uniform, then its strength is:

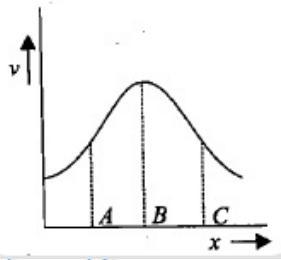
(a) $200\ V/m$ (b) $1000\ V/m$

(c) $400\ V/m$ (d) $500\ V/m$

Q 8. Electric field in a region is given by $E = \left(\frac{M}{x^3}\right)\hat{\imath}$, then the correct expression for the potential in the region is (assume potential at infinity is zero)

(a) $\frac{M}{2x^2}$ (b) Mx^2 (c) $\frac{M}{3x^4}$ (d) None of these

Q 9. Variation of electrostatic potential along x−direction is shown in the figure. The correct statement about electric field is:



(a) x-component at point B is maximum

(b) x-component at point A is towards positive x-axis

(c) x-component at point C is towards negative x-axis

(d) x-component at point C is towards positive x-axis

Q 10. In a certain $0.1\ m^3$ free space, electric potential is found to be 5 V throughout. What is the electric field in this region?

(a) 5 N/C (b) -5 N/C

(c) zero (d) Cannot be determined

Answer Key

Q.1 a	**Q.2 a**	**Q.3 a**	**Q.4 b**	**Q.5 d**
Q.6 b	**Q.7 d**	**Q.8 a**	**Q.9 d**	**Q.10 c**