LAKSHYA (JEE)

Electrostatic Potential & Capacitance

DPP-04

1. A given charge is situated at a certain distance from an electric dipole in the end-on position experiences a force F. If the distance of the charge is doubled, the force acting on the charge will be
(a) $2F$ (b) $F/2$
(c) $F/4$ (d) $F/8$

2. The electric potential at a point on the axis of an electric dipole depends on the distance r of the point from the dipole as
(A) $\propto \frac{1}{r}$ (B) $\propto \frac{1}{r^2}$
(C) $\propto r$ (D) $\propto \frac{1}{r^3}$

3. An electric dipole of moment p is placed in the position of stable equilibrium in uniform electric field of intensity E. It is rotated through an angle θ from the initial position. The potential energy of electric dipole in the final position is
(A) $pE\cos\theta$ (B) $pE\sin\theta$
(C) $pE(1-\cos\theta)$ (D) $-pE\cos\theta$

4. An electric dipole is placed along the x-axis at the origin O. A point P is at a distance of 20 cm from this origin such that OP makes an angle $\pi/3$ with the x-axis. If the electric field at P makes an angle θ with the x-axis, the value of θ would be
(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{3}+\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$
(C) $\frac{2\pi}{3}$ (D) $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

5. Electric charges q, q, $-2q$ are placed at the corners of an equilateral triangle ABC of side l. The magnitude of electric dipole moment of the system is
(A) ql (B) $2ql$
(C) $\sqrt{3}ql$ (D) $4\,ql$

6. Two opposite and equal charges 4×10^{-8} coulomb when placed 2×10^{-2} cm away, form a dipole. If this dipole is placed in an external electric field 4×10^{8} newton/coulomb, the value of maximum torque and the work done in rotating it through 180° will be
(A) 64×10^{-4} Nm and 64×10^{-4} J
(B) 32×10^{-4} Nm and 32×10^{-4} J
(C) 64×10^{-4} Nm and 32×10^{-4} J
(D) 32×10^{-4} Nm and 64×10^{-4} J

7. If E_a be the electric field strength of a short dipole at a point on its axial line and E_e that on the equatorial line at the same distance, then
(A) $E_e = 2E_a$ (B) $E_a = 2E_e$
(C) $E_a = E_e$ (D) None of the above

8. The potential at a point due to an electric dipole will be maximum and minimum when the angles between the axis of the dipole and the line joining the point to the dipole are respectively
(A) 90° and 180° (B) 0° and 90°
(C) 90° and 0° (D) 0° and 180°

9. The ratio of electric fields on the axis and at equator of an electric dipole will be
(A) 1 : 1 (B) 2 : 1
(C) 4 : 1 (D) None of these

10. Two electric dipoles of moment P and 64 P are placed in opposite direction on a line at a distance of 25 cm. The electric field will be zero at point between the dipoles whose distance from the dipole of moment P is
(A) 5 cm (B) $\frac{25}{9}$ cm
(C) 10 cm (D) $\frac{4}{13}$ cm

ANSWER KEY

1. **(D)**
2. **(B)**
3. **(D)**
4. **(B)**
5. **(C)**
6. **(D)**
7. **(B)**
8. **(D)**
9. **(B)**
10. **(A)**

Note - If you have any query/issue

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