1. An electric dipole having a dipole moment of 4×10^{-9} C m is placed in a uniform electric field such that the dipole is in stable equilibrium. If the magnitude of the electric field is 3×10^{3} N/C, what is the work done in rotating the dipole to a position of unstable equilibrium?

(a) Zero (b) 1.2×10^{-5} J

(c) 2.4×10^{-5} J (d) -1.2×10^{-5} J **(CBSE PRACTICE SET-1 2023)**

2. Which one of the following statements is correct?
Electric field due to static charges is

(a) Conservative and field lines do not form closed loops.
(b) Conservative and field lines form closed loops.
(c) Non-conservative and field lines do not form closed loops.
(d) Non-conservative and field lines form closed loops. **(CBSE 2025)**

3. Consider two identical dipoles D_1 and D_2. Charges - q and q of dipole D_1 are located at (0,0) and (a,0) and that of dipole D_2 at (0,a) and (0,2a) in x-y plane, respectively. The net dipole moment of the system is

(a) $qa(\hat{i}+\hat{j})$ (b) $-qa(\hat{i}+\hat{j})$

(c) $qa(\hat{i}-\hat{j})$ (d) $-qa(\hat{i}-\hat{j})$ **(CBSE 2025)**

4. An infinite line of charge has a linear charge density of 10^{-7} C/m. What will be the magnitude of the force acting on an alpha particle placed at a distance of 4 cm from the line of charge?
(a) 14.4×10^{-15} N (b) 7.2×10^{-15} N
(c) 4.5×10^{4} N (d) 9×10^{4} N **(CBSE PRACTICE SET-1 2023)**

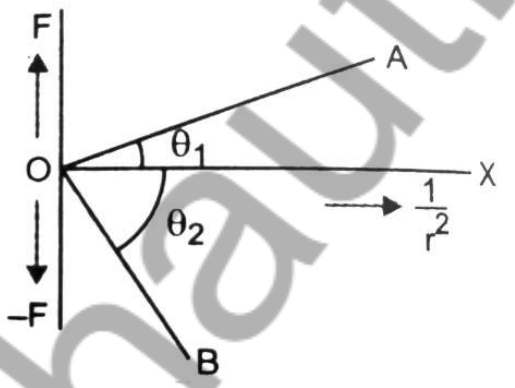
5. An electric dipole placed in an electric field of intensity 2 × 105 N/C at an angle of 30° experiences a torque equal to 4 Nm. The charge on the dipole of dipole length 2 cm is
(a) 7 μC (b) 8 mC
(c) 2 mC (d) 5 Mc **(CBSE SQP 2023)**

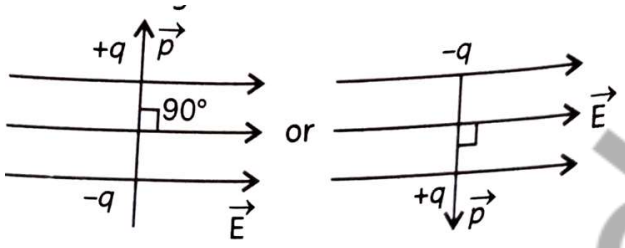
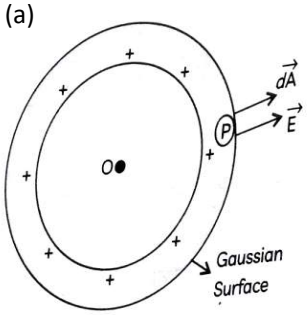
6. Two point charges placed in a medium of dielectric constant 5 are at a distance r between them, experience an electrostatic force 'F'. The electrostatic force between them in vacuum at the same distance r will be- (i) 5F (ii) F (iii) F/2 (iv) F/5
(CBSE Term-1 2021)

7. A square sheet of side 'a' is lying parallel to XY plane at z = a. The electric field in the region is $\vec{E} = cz^2\hat{k}$. The electric flux through the sheet is :
(a) a^4c (b) $\frac{1}{3}a^3c$
(c) $\frac{1}{3}a^4c$ (d) 0 **(CBSE term-1 2021)**

8.	If the net electric flux through a closed surface is zero, then we can infer (a) No net charge is enclosed by the surface. (b) Uniform electric field exists within the surface. (c) Electric potential varies from point to point inside the surface. (d) Charge is present inside the surface. **(CBSE 2020)**
	ASSERTION AND REASON
	In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as (a) If both assertion and reason are true and reason is the correct explanation of assertion. (b) If both assertion and reason are true but reason is not the correct explanation of assertion. (c) If assertion is true but reason is false. (d) If assertion and reason are false.
9.	**Assertion (A):** A negative charge in an electric field moves along the direction of the electric field. **Reason (R):** On a negative charge a force acts in the direction of the electric field. **(CBSE term-1 2021)**
10.	**Assertion (A):** Work done in moving a charge between any two points in a uniform electric field is independent of the path followed by the charge, between these points. **Reason (R):** Electrostatic forces are non-conservative. **(CBSE 2023)**
	Short Answer Type Qs (2 & 3 Marks)
11.	State Gauss's theorem in electrostatics. Use this theorem to derive an expression for the electric field due to an infinitely long straight wire of linear charge density λ. **(CBSE SQP 2024)**
12.	(a) Define electric flux and write its SI unit… (b) Use gauss's law to obtain the expression for the electric field due to a uniformly charged infinite plane sheet of charge. **(CBSE SQP 2024)**

13.	Plot a graph showing the variation of coulomb force (F) versus $(\frac{1}{r2})$, where r is the distance between the two charges of each pair of charges: (1 μC, 2 μC and (2 μC,−3μC). Interpret the graphs obtained. **(CBSE 2011)**
14.	Two charges +q and -q are kept at (− x2, 0) and (x1, 0) respectively in the xy- plane. Find the magnitude and direction of the net electric field at the origin (0,0). **(CBSE 2009)**
15.	An electric dipole moment p is placed in a uniform electric field E. write the expression for the torque $\boldsymbol{\tau}$ experienced by the dipole. Identify two pairs of perpendicular vectors in the expression. Show diagrammatically the orientation of the dipole in the field for which the torque is (A) maximum, (B) half the maximum value. **(CBSE 2008)**
	Long Answer Type Qs (5 Marks)
16.	(A) What is difference between an open surface and a closed surface? Draw elementary surface vector $\overrightarrow{\mathbf{ds}}$ for a spherical surface S. (B) Define electric flux through a surface. Give the significance of a Gaussian surface. A charge outside a Gaussian surface does not contribute to total electric flux through the surface. Why? (C) A small spherical shell S_1 has point charges $q_1 = -3$ μC, $q_2 = -2$ μC and $q_3 = 9$ μC inside it. This shell is enclosed by another big spherical shell S_2. A point charge Q is placed in between the two surfaces S_1 and S_2. If the electric flux through the surface S_2 is four times the flux through surface S_1, find charge Q. **(CBSE 2025)**
17.	(A) Derive the expression for electric field at a point on the equatorial line of an electric dipole. (B) Two identical point charges, q each, are kept 2 m apart in air. A third pint charges Q of unknown magnitude and sign is placed on the line joining the charges such that the system remains in equilibrium. Find the position and nature of Q. **(CBSE 2019)**

	HINTS AND ANSWER
1.	(c)
2.	(a)
3.	(a)
4.	(a)
5.	(c)
6.	(a)
7.	(a)
8.	(a)
9.	(d)
10.	(a)
11.	**Derivation** $E=\frac{\lambda}{2\pi\varepsilon_0 r}$
12.	**Derivation** $E=\frac{\sigma}{2\varepsilon_0}$
13.	$F_1 : F_2 = 1 : -3$ 
14.	$\vec{E}$ = kq $(\frac{1}{x_1^2}+\frac{1}{x_2^2})\,\hat{\imath}$ The direction is towards (-q).
15.	(a)

	 (b) $\tau = \frac{1}{2}pE$
16.	(a)  (b) $\Phi\vec{E}.d.\vec{S} = \frac{q_{enc}}{\varepsilon_0}$ (c) Q= 12μc
17.	Q = $\frac{-q}{4}$ Hence, charges q must be negative in nature.

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