

PYQSide

JEE MAIN ELECTRIC CHARGES AND FIELDS — DIPOLE IN A UNIFORM EXTERNAL FIELD (TORQUE) — PYQS

Max. Marks: 16

Questions: 4

Section A (MCQ)

- Q.1** A rigid dipole undergoes a simple harmonic motion about its centre in the presence of an electric field $\vec{E}_1 = E_0 \hat{x}$. If another electric field $\vec{E}_2 = 2E_0(\hat{y} + \hat{z})$ is introduced to the system, what will be the percentage change in the frequency of the oscillation (approximate)?

[JEE Main 2026 (Online) 4th April Evening Shift]

- (1) 73% (2) 63% (3) 83% (4) 53%

Scan or tap for the
full solution



- Q.2** A dipole with two electric charges of $2 \mu\text{C}$ magnitude each, with separation distance $0.5 \mu\text{m}$, is placed between the plates of a capacitor such that its axis is parallel to an electric field established between the plates when a potential difference of 5 V is applied. Separation between the plates is 0.5 mm . If the dipole is rotated by 30° from the axis, it tends to realign in the direction due to a torque. The value of torque is:

[JEE Main 2025 (Online) 7th April Evening Shift]

- (1) $2.5 \times 10^{-9} \text{ Nm}$ (2) $2.5 \times 10^{-12} \text{ Nm}$
(3) $5 \times 10^{-3} \text{ Nm}$ (4) $5 \times 10^{-9} \text{ Nm}$

Scan or tap for the
full solution



- Q.3** Two small spherical balls of mass 10 g each with charges $-2 \mu\text{C}$ and $2 \mu\text{C}$, are attached to two ends of very light rigid rod of length 20 cm . The arrangement is now placed near an infinite non-conducting charge sheet with uniform charge density of $100 \mu\text{C}/\text{m}^2$ such that length of rod makes an angle of 30° with electric field generated by charge sheet. Net torque acting on the rod is: (Take $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{Nm}^2$)

[JEE Main 2025 (Online) 4th April Morning Shift]

- (1) 1.12 Nm (2) 2.24 Nm
(3) 11.2 Nm (4) 112 Nm

Scan or tap for the
full solution



- Q.4** An electric dipole of mass m , charge q , and length l is placed in a uniform electric field $\vec{E} = E_0 \hat{i}$. When the dipole is rotated slightly from its equilibrium position and released, the time period of its oscillations will be :

[JEE Main 2025 (Online) 29th January Morning Shift]

- (1) $\frac{1}{2\pi} \sqrt{\frac{ml}{2qE_0}}$ (2) $2\pi \sqrt{\frac{ml}{2qE_0}}$
(3) $2\pi \sqrt{\frac{ml}{qE_0}}$ (4) $\frac{1}{2\pi} \sqrt{\frac{2ml}{qE_0}}$

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4							
Ans.	1	4	1	2							