

# PYQSide

## JEE MAIN ELECTRIC CHARGES AND FIELDS — APPLICATIONS OF GAUSS'S LAW (LINE, SHEET, SHELL) — PYQS

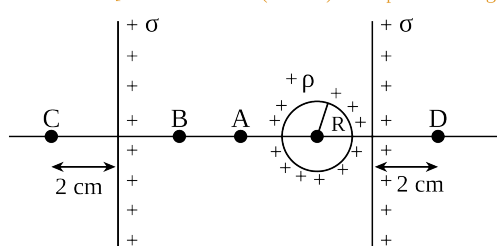
Max. Marks: 16

Questions: 4

### Section A (MCQ)

- Q.1** Two infinite identical charged sheets and a charged spherical body of charge density ' $\rho$ ' are arranged as shown in figure. Then the correct relation between the electrical fields at A, B, C and D points is:

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



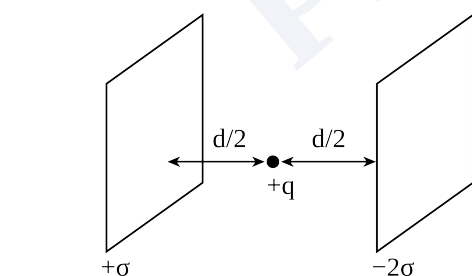
- (1)  $|\vec{E}_A| = |\vec{E}_B|$ ;  $\vec{E}_C > \vec{E}_D$
- (2)  $\vec{E}_A = \vec{E}_B$ ;  $\vec{E}_C = \vec{E}_D$
- (3)  $\vec{E}_C \neq \vec{E}_D$ ;  $\vec{E}_A > \vec{E}_B$
- (4)  $\vec{E}_A > \vec{E}_B$ ;  $\vec{E}_C = \vec{E}_D$

Scan or tap for the full solution



- Q.2** Consider two infinitely large plane parallel conducting plates as shown below. The plates are uniformly charged with a surface charge density  $+\sigma$  and  $-2\sigma$ . The force experienced by a point charge  $+q$  placed at the mid point between two plates will be:

[JEE Main 2025 (Online) 2nd April Morning Shift]



- (1)  $\frac{3\sigma q}{4\epsilon_0}$
- (2)  $\frac{3\sigma q}{2\epsilon_0}$
- (3)  $\frac{\sigma q}{4\epsilon_0}$
- (4)  $\frac{\sigma q}{2\epsilon_0}$

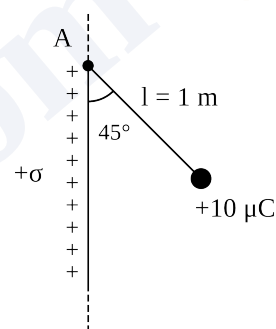
Scan or tap for the full solution



- Q.3** A small bob of mass 100 mg and charge  $+10 \mu\text{C}$  is connected to an insulating string of length 1 m. It is brought near to an infinitely long non-conducting sheet of charge density ' $\sigma$ ' as shown in figure. If string subtends an angle of  $45^\circ$  with the sheet at equilibrium the charge density of sheet will be:

(Given,  $\epsilon_0 = 8.85 \times 10^{-12} \frac{\text{F}}{\text{m}}$  and acceleration due to gravity,  $g = 10 \frac{\text{m}}{\text{s}^2}$ )

[JEE Main 2025 (Online) 2nd April Morning Shift]



- (1)  $1.77 \text{ nC/m}^2$
- (2)  $0.885 \text{ nC/m}^2$
- (3)  $885 \text{ nC/m}^2$
- (4)  $17.7 \text{ nC/m}^2$

Scan or tap for the full solution



- Q.4** Match List - I with List - II.

| List - I |                                                                                                                                                   | List - II |                      |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|
| A.       | Electric field inside (distance $r > 0$ from center) of a uniformly charged spherical shell with surface charge density $\sigma$ , and radius R.  | I.        | $\sigma/\epsilon_0$  |
| B.       | Electric field at distance $r > 0$ from a uniformly charged infinite plane sheet with surface charge density $\sigma$ .                           | II.       | $\sigma/2\epsilon_0$ |
| C.       | Electric field outside (distance $r > 0$ from center) of a uniformly charged spherical shell with surface charge density $\sigma$ , and radius R. | III.      | 0                    |

| List - I |                                                                                                                           | List - II |                                     |
|----------|---------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------|
| D.       | Electric field between 2 oppositely charged infinite plane parallel sheets with uniform surface charge density $\sigma$ . | IV.       | $\frac{\sigma R^2}{\epsilon_0 r^2}$ |

Choose the correct answer from the options given below :

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

(1) (A)-(IV), (B)-(I), (C)-(III), (D)-(II)

(2) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

(3) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)

(4) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)

Scan or tap for the  
full solution



### ANSWER KEY

| Ques. | 1 | 2 | 3 | 4 |  |  |  |  |  |  |  |  |
|-------|---|---|---|---|--|--|--|--|--|--|--|--|
| Ans.  | 3 | 2 | 1 | 3 |  |  |  |  |  |  |  |  |