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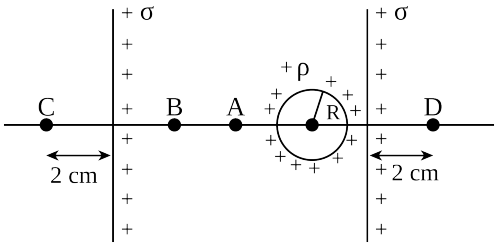
JEE MAIN ELECTRIC CHARGES AND FIELDS — APPLICATIONS OF GAUSS'S LAW (LINE, SHEET, SHELL) — PYQS

Max. Marks: 16 **Questions:** 4

Section A (MCQ) — 4 questions

Q.1 Two infinite identical charged sheets and a charged spherical body of charge density 'ρ' 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) $|\vec{E}_A| = |\vec{E}_B|; \vec{E}_C > \vec{E}_D$

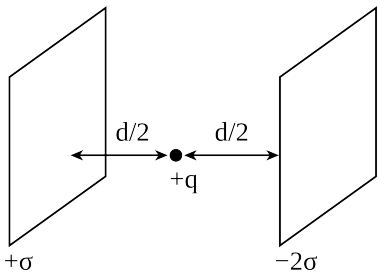
(2) $\vec{E}_A = \vec{E}_B; \vec{E}_C = \vec{E}_D$

(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 +σ and −2σ. 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) $\frac{3\sigma q}{4\varepsilon_0}$ (2) $\frac{3\sigma q}{2\varepsilon_0}$ (3) $\frac{\sigma q}{4\varepsilon_0}$ (4) $\frac{\sigma q}{2\varepsilon_0}$

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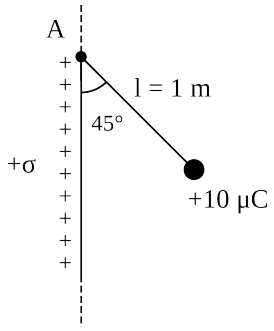
Q.3 A small bob of mass 100 mg and charge +10 μC is connected to an insulating string of length 1 m. It is brought near to an infinitely long non-conducting sheet of charge density 'σ' as shown in figure. If string subtends an angle of 45° with the sheet at equilibrium the charge density of sheet will be:

(Given, $\varepsilon_0 = 8.85 \times 10^{-12} \frac{F}{m}$ and acceleration due to gravity, $g = 10 \frac{m}{s^2}$)

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



(1) 1.77 nC/m^2 (2) 0.885 nC/m^2

(3) 885 nC/m^2 (4) 17.7 nC/m^2

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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 σ, and radius R.	I.	σ/ε_0
B.	Electric field at distance r > 0 from a uniformly charged infinite plane sheet with surface charge density σ.	II.	$\sigma/2\varepsilon_0$
C.	Electric field outside (distance r > 0 from center) of a uniformly charged spherical shell with surface charge density σ, 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 σ.	IV.	$\frac{\sigma R^2}{\varepsilon_0 r^2}$

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)

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ANSWER KEY

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