

Electrostatics: Exam Revision Tracker



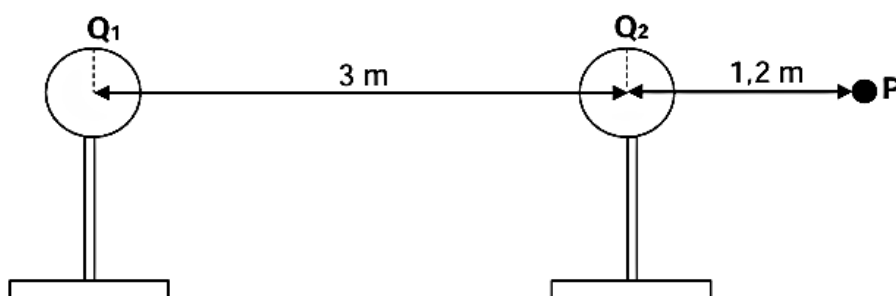
Attempt #1		Attempt #2		Attempt #3		Attempt #4		Attempt #5	
Total	Score	Total	Score	Total	Score	Total	Score	Total	Score
19		15		13		22		17	
Percentage =		Percentage =		Percentage =		Percentage =		Percentage =	

Electrostatics: Attempt #1



Total = 19 Marks

Two metal spheres charges, **Q₁** and **Q₂**, on insulated stands, carry charges of $+6 \times 10^{-6} \text{ C}$ and $-4 \times 10^{-6} \text{ C}$ respectively are separated by a distance of 3 m from their centres. A point charge at **P** is 1,2 m from **Q₂** in the same plane as indicated in the diagram below.



1. Define *Coulomb's law* in words. (2)
2. Draw the electric field pattern between the two charges. (3)
3. Calculate:
 - 3.1 The electrostatic force exerted by **Q₁** on **Q₂** (5)
 - 3.2 Calculate the electric field strength at point **P** as a result of **Q₁** and **Q₂** (7)
 - 3.3 How many electrons are in excess in **Q₂** (2)

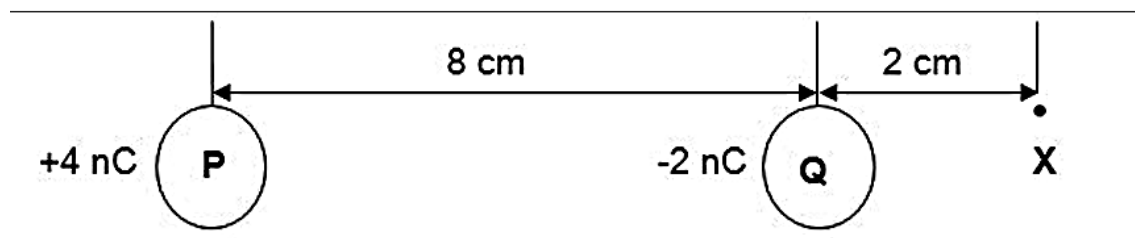
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Electrostatics: Attempt #2 ⚡

Total = 15 Marks

Two charges **P** and **Q** with charges $+4 \text{ nC}$ and -2 nC respectively, are placed 8 cm apart. A point charge **X** is placed 2 cm from **Q** as shown in the sketch below.

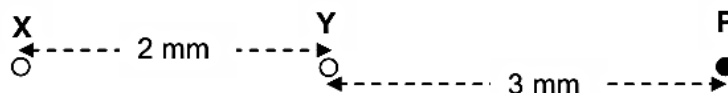


1. Define the term *electric field at a point*. (2)
2. Draw the electric field pattern between two oppositely charged particles. (3)
3. Calculate the net electric field strength at point **X** due to **P** and **Q**. (7)
4. Calculate the magnitude and direction of the electrostatic force on an electron if it is placed at point **X**. (3)

Electrostatics: Attempt #3 ⚡

Total = 13 Marks

Two IDENTICAL point charges, **X** and **Y**, are placed 2 mm apart. Point **P** is 3 mm to the right of charge **Y**. The net electric field at point **P** is $5,44 \times 10^6 \text{ N}\cdot\text{C}^{-1}$ to the left.



1. Define the term *electric field at a point*. (2)
2. Are the charges NEGATIVE or POSITIVE? (1)
3. Draw the resultant electric field pattern for charges **X** and **Y**. (3)
4. Calculate the magnitude of the charge **X**. (5)
5. Charge **Y** is now replaced by an identical oppositely charged point charge.

How will the magnitude of the net electric field at point **P** be affected?
 Choose from INCREASE, DECREASE or REMAIN THE SAME.

Give a reason for the answer. (2)

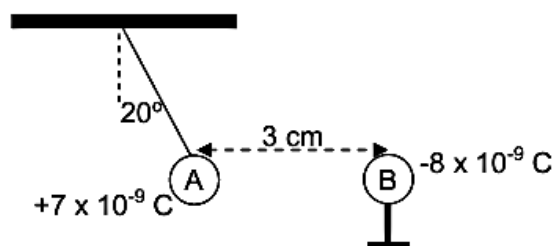
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Electrostatics: Attempt #4 ⚡

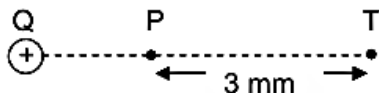
Total = 22 Marks

A small isolated sphere A, with a mass of 0,2 g, carrying a charge of $+7 \times 10^{-9}$ C, is suspended from a horizontal surface by a string of negligible mass. A second sphere B, carrying a charge of -8×10^{-9} C, on an isolated stand, attracts sphere A so that the string forms an angle of 20° to the vertical. The horizontal distance between the centres of the two spheres is 3 cm. Refer to the diagram below.



1. State *Coulomb's law* in words. (2)
2. Draw a VECTOR DIAGRAM of the forces acting on sphere A. Indicate at least ONE angle. (4)
3. Calculate the magnitude of the electrostatic force that sphere B exerts on sphere A. (4)
4. Calculate the magnitude of the tension force in the string. (3)

Two points, P and T, are situated 3 mm apart in the electric field of positive charge Q, as shown below.



5. Draw the electric field pattern around charge Q. (2)

The magnitude of the electric field at point P is $4 \times 10^6 \text{ N}\cdot\text{C}^{-1}$ and at point T the magnitude is $2,5 \times 10^5 \text{ N}\cdot\text{C}^{-1}$.

6. Calculate:
 - 6.1 The ratio of the electric field at point P to the electric field at point T. Write the answer as $E_P : E_T$. (1)
 - 6.2 The distance between charge Q and point P (4)
 - 6.3 The magnitude of charge Q (2)

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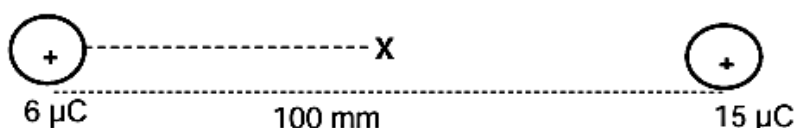
Electrostatics: Attempt #5 ⚡

Total = 17 Marks

A small sphere **A** carrying a charge of $-15\ \mu\text{C}$ is brought into contact with an identical neutral sphere **B**. After a while, sphere **B** gains a charge of Q and the spheres repel each other and are then separated to a distance 100 mm apart as shown on the diagram below.



1. Calculate the number of electrons that will be transferred to the neutral sphere after they are separated. (3)
2. Draw the electric field pattern around the two charged spheres after they are separated. (3)
3. Calculate the electrostatic force between the two charged spheres. (4)
4. The charge on each sphere is now doubled, and the distance increased to 200 mm. How will the new electrostatic force between the charges compare to the answer calculated in QUESTION 8.3? Explain how you arrived at your answer. (2)
5. Two positive point charges of magnitude $6\ \mu\text{C}$ and $15\ \mu\text{C}$ are placed 100 mm apart in a vacuum as shown on the diagram below.



When an electron is placed at point **X**, a distance r to the right of the $6\ \mu\text{C}$, it experiences zero acceleration.

Calculate the distance r in metres. (5)

