CHAPTER 01

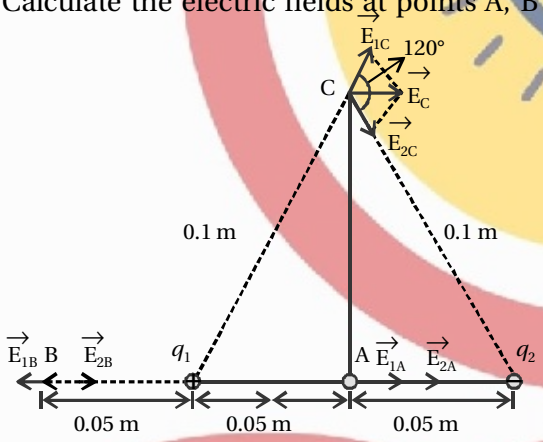
OPEN STUDENT FOUNDATION
Physics (Class 12)
PRACTICE SHEET DAY

Date : 18/02/24

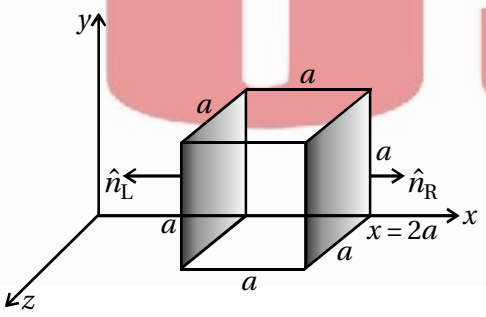
Section A

● **Write the answer of the following questions. [Each carries 1 Mark]** **[10]**

1. What is the force between two small charged spheres having charges 2×10^{-7} C and 3×10^{-7} C placed 30 cm apart in air ?
2. Write four important general properties of electric field lines.
3. Express Coulomb's law in the vector form.
4. An electron falls through a distance of 1.5 cm in a uniform electric field of magnitude 2×10^4 NC^{-1}. The direction of the field is reversed keeping its magnitude unchanged and a proton falls through the same distance. Compute the time of fall in each case.
5. Derive an expression for the electric field due to an infinitely long straight uniformly charged wire.
6. For electric dipole,
   (a) At any point on the axis
   (b) At any point of the equatorial plane obtain the equations of electric field.
7. Two point charges q_1 and q_2, of magnitude $+10^{-8}$ C and -10^{-8} C, respectively, are placed 0.1 m apart. Calculate the electric fields at points A, B and C shown in figure.

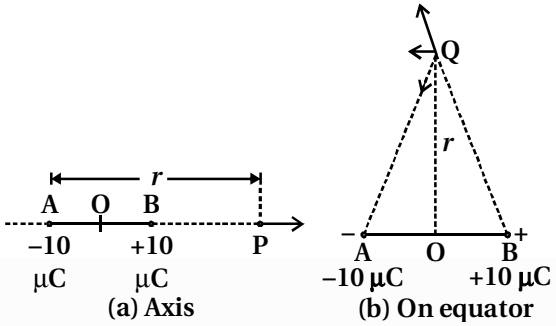


8. The electric field components in figure are $E_x = \alpha x^{1/2}$, $E_y = E_z = 0$ in which $\alpha = 800$ N/C $m^{1/2}$. Calculate (a) the flux through the cube and (b) the charge within the cube. Assume that $a = 0.1$ m. [$\varepsilon_0 = 8.854 \times 10^{-12}$ $C^2N^{-1}m^{-2}$]



9. Two charges ± 10 μC are placed 5.0 mm apart. Determine the electric field at (a) a point P on the axis of the dipole 15 cm away from its centre O on the side of the positive charge, as shown in figure (a) and (b) a point Q, 15 cm away from O on a line passing through O and normal to the axis of the dipole

as shown in figure (b).



10. If 10^9 electrons move out of a body to another body every second, how much time is required to get a total charge of 1 C on the other body ?

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Section [A] : 1 Marks Questions					
No	Ans	Chap	Sec	Que	Universal_QueId
1.	-	Chap 1	S8	1	QP23P11B1211_P1C1S8Q1
2.	-	Chap 1	S8	2	QP23P11B1211_P1C1S8Q2
3.	-	Chap 1	S8	3	QP23P11B1211_P1C1S8Q3
4.	-	Chap 1	S8	4	QP23P11B1211_P1C1S8Q4
5.	-	Chap 1	S8	5	QP23P11B1211_P1C1S8Q5
6.	-	Chap 1	S8	6	QP23P11B1211_P1C1S8Q6
7.	-	Chap 1	S10	21	QP23P11B1211_P1C1S10Q21
8.	-	Chap 1	S9	17	QP23P11B1211_P1C1S9Q17
9.	-	Chap 1	S9	21	QP23P11B1211_P1C1S9Q21
10.	-	Chap 1	S10	15	QP23P11B1211_P1C1S10Q15

Section A

● **Write the answer of the following questions.** [Each carries 1 Mark] **[10]**

1. What is the force between two small charged spheres having charges 2×10^{-7} C and 3×10^{-7} C placed 30 cm apart in air ?

➠ 6×10^{-3} N

2. Write four important general properties of electric field lines.

➠ Try Yourself

3. Express Coulomb's law in the vector form.

➠ Try Yourself

4. An electron falls through a distance of 1.5 cm in a uniform electric field of magnitude 2×10^4 NC^{-1}. The direction of the field is reversed keeping its magnitude unchanged and a proton falls through the same distance. Compute the time of fall in each case.

➠ t_e = 2.921 ns, t_p = 0.13 μs

5. Derive an expression for the electric field due to an infinitely long straight uniformly charged wire.

➠ Try Yourself

6. For electric dipole,
   (a) At any point on the axis
   (b) At any point of the equatorial plane obtain the equations of electric field.

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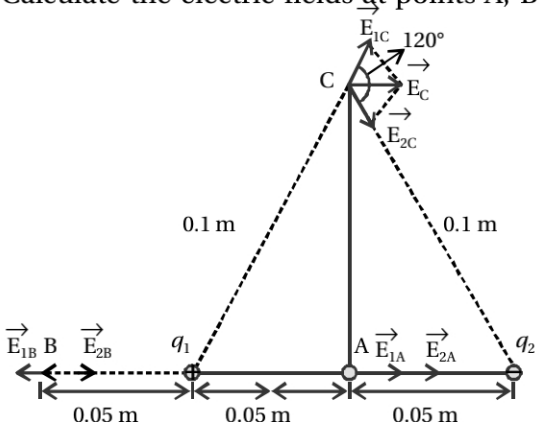
7. Two point charges q_1 and q_2, of magnitude + 10^{-8} C and – 10^{-8} C, respectively, are placed 0.1 m apart. Calculate the electric fields at points A, B and C shown in figure.



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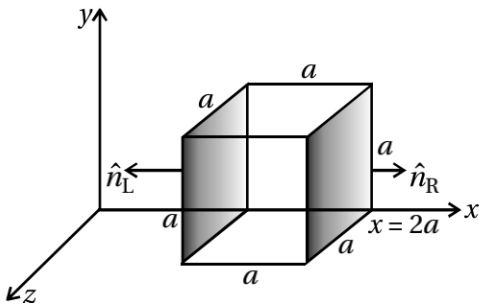

➠ Try Yourself

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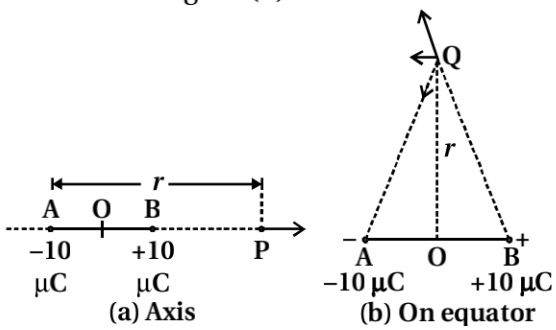

➠ Try Yourself

10. If 10^9 electrons move out of a body to another body every second, how much time is required to get a total charge of 1 C on the other body ?

➠ Try Yourself