

PART 1 - PHYSICS

Topic : Moving charges and magnetism

SECTION-A : (Maximum Marks : 8)

This section contains **TWO** questions.

Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).

For each question, choose the option(s) corresponding to (all) the correct answer(s).

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 ONLY if (all) the correct option(s) is(are) chosen;

Partial Marks : +3 If all the four options are correct but ONLY three options are chosen;

Partial Marks : +2 If three or more options are correct but ONLY two options are chosen, both of which are correct;

Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is a correct option;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

Negative Marks : -1 In all other cases.

For example, in a question, if (A), (B) and (D) are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get -1 marks.

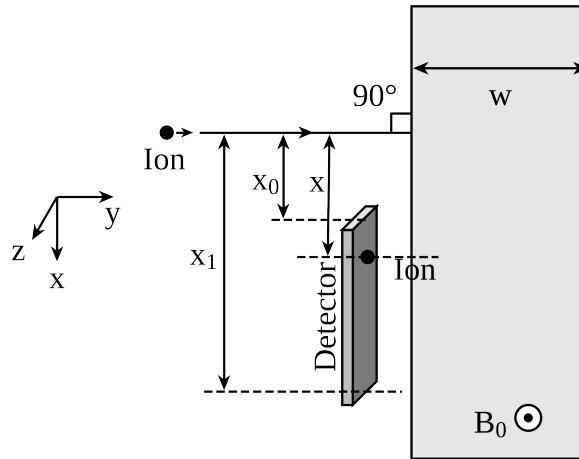
1. In a vacuum chamber, a particle of charge $1 \mu\text{C}$ and mass 1 mg is projected with a velocity $(\hat{i} + 2\hat{j}) \text{ m s}^{-1}$ from the XZ plane at time $t = 0$ in an electric field of $1\hat{i} \text{ V m}^{-1}$. At $t = 0.2 \text{ s}$, the electric field is switched off and a magnetic field of $6\hat{j} \text{ T}$ is switched on. The acceleration due to gravity is $-10\hat{j} \text{ m s}^{-2}$. Correct option(s) is/are: [JEE Advanced 2026 Paper 2]
- (A) The vertical distance of the particle from the XZ plane at $t = 0.3 \text{ s}$ is 15 cm .
 (B) The vertical distance of the particle from the XZ plane at $t = 0.4 \text{ s}$ is 10 cm .
 (C) The radius of the trajectory of the particle for $t > 0.2 \text{ s}$ is 20 cm .
 (D) The particle will be in the XZ plane at $t = 0.35 \text{ s}$.

Scan or tap for the full solution 

2. A positive, singly ionized atom of mass number A_M is accelerated from rest by the voltage 192 V . Thereafter, it enters a rectangular region of width w with magnetic field $\vec{B}_0 = 0.1\hat{k} \text{ Tesla}$, as shown in the figure. The ion finally hits a detector at the distance x below its starting trajectory.

[Given: Mass of neutron/proton = $(5/3) \times 10^{-27} \text{ kg}$, charge of the electron = $1.6 \times 10^{-19} \text{ C}$.]

Space for Rough Work



Which of the following option(s) is(are) correct?

[JEE Advanced 2024 Paper 2]

- (A) The value of x for H^+ ion is 4 cm.
- (B) The value of x for an ion with $A_M = 144$ is 48 cm.
- (C) For detecting ions with $1 \leq A_M \leq 196$, the minimum height ($x_1 - x_0$) of the detector is 55 cm.
- (D) The minimum width w of the region of the magnetic field for detecting ions with $A_M = 196$ is 56 cm.

Scan or tap for the full solution



Space for Rough Work

JEE ADVANCED MOVING CHARGES AND MAGNETISM — MOTION IN COMBINED ELECTRIC AND MAGNETIC FIELDS (VELOCITY SELECTOR, CYCLOTRON) — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A																								
Ques.	1	2																						
Ans.	A, C	A, B																						