Parishram (2025)

Physics

DPP : 7

Electric Charges and Fields

Q1 A particle of mass $20\ \mathrm{g}$ and charge $-3\ \mathrm{mC}$ moving with a speed $40\ \mathrm{m/s}$ enters a region of electric field $80\ \mathrm{N/C}$ in the same direction of the electric field. Speed of the particle after 3 seconds is:

(A) $76\ \mathrm{m/s}$ (B) $4\ \mathrm{m/s}$

(C) $40\ \mathrm{m/s}$ (D) $12\ \mathrm{m/s}$

Q2 A particle of mass m and charge q is placed at rest in a uniform electric field E and then released. The kinetic energy attained by the particle after moving a distance y is:

(A) qEy^2

(B) qE^2y

(C) qEy

(D) q^2Ey

Q3 Which of the following is deflected by electric field?

(A) X-ray

(B) γ-rays

(C) Neutrons

(D) α-particles

Q4 An electrons is moving towards X-axis. An electric field is along Y-direction then path of electron is:

(A) circular (B) elliptical

(C) parabola (D) none of these

Q5 The acceleration of an electron in an electric field of magnitude $50\ \mathrm{V/cm}$, if $\mathrm{e/m}$ value of the electron is $1.76 \times 10^{11}\mathrm{C/kg}$ is:

(A) $8.8 \times 10^{14}\ \mathrm{m/sec^2}$

(B) $6.2 \times 10^{13}\ \mathrm{m/sec^2}$

(C) $5.4 \times 10^{12}\ \mathrm{m/sec^2}$

(D) Zero

Q6 Cathode rays travelling from east to west enter into region of electric field directed towards north to south in the plane of paper. The deflection of cathode rays is towards.

(A) east (B) south

(C) west (D) north

Q7 Two equal and opposite charges of masses m_1 and m_2 are accelerated in a uniform electric field through the same distance. What is the ratio of their accelerations if their ratio of masses is $\frac{m_1}{m_2} = 0.5$?

(A) $\frac{a_1}{a_2} = 0.5$

(B) $\frac{a_1}{a_2} = 1$

(C) $\frac{a_1}{a_2} = 2$

(D) $\frac{a_1}{a_2} = 3$

Q8 An electron enters uniform electric field maintained by parallel plates and of value $\vec{E}\ \ \mathrm{Vm^{-1}}$ with a velocity $v\ \mathrm{ms^{-1}}$, the plates are separated by a distance d metre, then acceleration of the electron in the field is:

(A) $\frac{\vec{E}e}{m}$

(B) $\frac{-\vec{E}e}{m}$

(C) $\frac{\vec{E}e}{md}$

(D) $\vec{E}e\frac{d}{m}$

Q9 An electron moving with the speed of $5 \times 10^6\ \mathrm{m/s}$ is shooted parallel to the electric field of intensity $1 \times 10^3\ \ \mathrm{N/C}$. Field is responsible for the retardation of motion of electron. Now evaluate the distance travelled by the electron before coming to rest for an instant (mass of $e = 9 \times 10^{-31}\ \mathrm{kg}$, charge $= 1.6 \times 10^{-19}\mathrm{C}$).

(A) 7 m (B) $0.7\ \mathrm{mm}$

(C) $7\ \mathrm{cm}$ (D) $0.7\ \mathrm{cm}$

Q10 A charged particle of mass m and charge q is released from rest in uniform electric field E. Neglecting the effect of gravity, the kinetic energy of the charged particle after t second is:

(A) $\frac{Eq^2M}{2t^2}$

(B) $\frac{2E^2t^2}{mq}$

(C) $\frac{E^2q^2t^2}{2m}$

(D) $\frac{Eqm}{t}$

Answer Key

Q1	(B)	Q6	(D)
Q2	(C)	Q7	(C)
Q3	(D)	Q8	(B)
Q4	(C)	Q9	(C)
Q5	(A)	Q10	(C)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

$a = \frac{qE}{m}$

$= \frac{3\times10^{-3}\times80}{20\times10^{-3}}$

$= 12\ {}^{m}/_{s^2}$

$\Rightarrow u = 40\ m/s$

$\Rightarrow Velocity = u + at = 40 + (-12) \times 3$

$= 4m/s$

Video Solution:

Q2 Video Solution:

Q3 Video Solution:

Q4 Video Solution:

Q5 Video Solution:

Q6 Video Solution:

Q7 Video Solution:

Q8 Video Solution:

Q9 Video Solution:

Q10 Video Solution: