

Moving Charges and Magnetism — NEET Physics PYQ (2005-2021)

Class 12 Physics · 36 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. In the product

$$\mathbf{F} = q(\vec{v} \times \mathbf{B})$$

$$= q \vec{v} \times (\mathbf{B} \hat{i} + \mathbf{B} \hat{j} + B_0 \hat{k})$$

For $q = 1$ and $\vec{v} = 2\hat{i} + 4\hat{j} + 6\hat{k}$ and $\mathbf{F} = 4\hat{i} - 20\hat{j} + 12\hat{k}$

What will be the complete expression for $\mathbf{B}$?

- (A) $-8\hat{i} - 8\hat{j} - 6\hat{k}$
- (B) $-6\hat{i} - 6\hat{j} - 8\hat{k}$
- (C) $8\hat{i} + 8\hat{j} - 6\hat{k}$
- (D) $6\hat{i} + 6\hat{j} - 8\hat{k}$

NEET 2021

2. A uniform conducting wire of length $12a$ and resistance ' R ' is wound up as a current carrying coil in the shape of,

(i) an equilateral triangle of side ' a '.

(ii) a square of side ' a '.

The magnetic dipole moments of the coil in each case respectively are :

- (A) $\sqrt{3} la^2$ and $3 la^2$
- (B) $3 la^2$ and la^2
- (C) $3 la^2$ and $4 la^2$
- (D) $4 la^2$ and $3 la^2$

NEET 2020 · Q172

3. A long solenoid of 50 cm length having 100 turns carries a current of 2.5 A. The magnetic field at the centre of the solenoid is : ($\mu_0 = 4\pi \times 10^{-7} \text{ T m A}^{-1}$)

- (A) $6.28 \times 10^{-4} \text{ T}$
- (B) $3.14 \times 10^{-4} \text{ T}$
- (C) $6.28 \times 10^{-5} \text{ T}$
- (D) $3.14 \times 10^{-5} \text{ T}$

NEET 2019 · Q3

4. Ionized hydrogen atoms and α -particles with same momenta enters perpendicular to a constant magnetic field, B . The ratio of their radii of their paths $r_H : r_\alpha$ will be:

- (A) 2 : 1
- (B) 1 : 2
- (C) 4 : 1
- (D) 1 : 4

NEET 2018 · Q26

5. A metallic rod of mass per unit length 0.5 kg m^{-1} is lying horizontally on a smooth inclined plane which makes an angle of 30° with the horizontal. The rod is not allowed to slide down by flowing a current through it when a magnetic field of induction 0.25 T is acting on it in the vertical direction. The current flowing in the rod to keep it stationary is

- (A) 14.76 A
- (B) 5.98 A
- (C) 7.14 A
- (D) 11.32 A

NEET 2018 · Q29

6. Current sensitivity of a moving coil galvanometer is 5 div/mA and its voltage sensitivity (angular deflection per unit voltage applied) is 20 div/V. The resistance of the galvanometer is

- (A) 250 Ω
- (B) 25 Ω
- (C) 40 Ω
- (D) 500 Ω

NEET 2016 Phase 2 · Q27

7. A long wire carrying a steady current is bent into a circular loop of one turn. The magnetic field at the centre of the loop is B. It is then bent into a circular coil of n turns. The magnetic field at the centre of this coil of n turns will be

- (A) nB
- (B) n^2B
- (C) 2nB
- (D) $2n^2B$

NEET 2016 Phase 2 · Q29

8. An electron is moving in a circular path under the influence of a transverse magnetic field of 3.57×10^{-2} T. If the value of e/m is 1.76×10^{11} C/kg, the frequency of revolution of the electron is

- (A) 1 GHz
- (B) 100 MHz
- (C) 62.8 MHz
- (D) 6.28 MHz

NEET 2016 Phase 1 · Q26

9. A long straight wire of radius a carries a steady current I. The current is uniformly distributed over its cross-section. The ratio of the magnetic fields B and B', at radial distances a/2 and 2a respectively, from the axis of the wire is:

- (A) 1/4
- (B) 1/2
- (C) 1
- (D) 4

AIPMT 2015

10. An electron moving in a circular orbit of radius r makes n rotations per second. The magnetic field produced at the centre has magnitude:

- (A) $\mu_0 ne/(2r)$
- (B) $\mu_0 ne/(2\pi r)$
- (C) Zero
- (D) $\mu_0 n^2 e/r$

AIPMT 2014

11. Two identical long conducting wires AOB and COD are placed at right angle to each other, with one above other such that 'O' is their common point for the two. The wires carry I_1 and I_2 currents respectively. Point 'P' is lying at distance 'd' from 'O' along a direction perpendicular to the plane containing the wires. The magnetic field at the point 'P' will be:

- (A) $(\mu_0/2\pi d)(I_1 + I_2)$
- (B) $(\mu_0/2\pi d)(I_1^2 + I_2^2)$
- (C) $(\mu_0/2\pi d)(I_1^2 + I_2^2)^{1/2}$
- (D) $(\mu_0/2\pi d)(I_1/I_2)$

AIPMT 2014

12. In an ammeter 0.2% of main current passes through the galvanometer. If resistance of galvanometer is G , the resistance of ammeter will be:

- (A) $(499/500)G$
- (B) $(1/500)G$
- (C) $(500/499)G$
- (D) $(1/499)G$

NEET 2013

13. When a proton is released from rest in a room, it starts with an initial acceleration a_0 towards west. When it is projected towards north with a speed v_0 it moves with an initial acceleration $3a_0$ towards west. The electric and magnetic fields in the room are

- (A) ma_0/e west, $2ma_0/(ev_0)$ up
- (B) ma_0/e west, $2ma_0/(ev_0)$ down
- (C) ma_0/e east, $3ma_0/(ev_0)$ up
- (D) ma_0/e east, $3ma_0/(ev_0)$ down

NEET 2013

14. A current loop in a magnetic field -

- (A) experiences a torque whether the field is uniform or non-uniform in all orientations
- (B) can be in equilibrium in one orientation
- (C) can be in equilibrium in two orientations, both the equilibrium states are unstable
- (D) can be in equilibrium in two orientations, one stable while the other is unstable

AIPMT 2012 Mains

15. A proton carrying 1 MeV kinetic energy is moving in a circular path of radius R in uniform magnetic field. What should be the energy of an α -particle to describe a circle of same radius in the same field?

- (A) 2 MeV
- (B) 1 MeV
- (C) 0.5 MeV
- (D) 4 MeV

AIPMT 2012 Prelims

16. Two similar coils of radius R are lying concentrically with their planes at right angles to each other. The currents flowing in them are I and $2I$, respectively. The resultant magnetic field induction at the centre will be

- (A) $\mu_0 I/R$
- (B) $\sqrt{5} \mu_0 I/(2R)$
- (C) $3\mu_0 I/(2R)$
- (D) $\mu_0 I/(2R)$

AIPMT 2012 Prelims

17. A millivoltmeter of 25 millivolt range is to be converted into an ammeter of 25 ampere range. The value (in ohm) of necessary shunt will be

- (A) 0.05
- (B) 0.001
- (C) 0.01
- (D) 1

18. Charge q is uniformly spread on a thin ring of radius R . The ring rotates about its axis with a uniform frequency f Hz. The magnitude of magnetic induction at the center of the ring is

- (A) $\mu_0 q / (2\pi f R)$
- (B) $\mu_0 q f / (2\pi R)$
- (C) $\mu_0 q f / (2R)$
- (D) $\mu_0 q / (2f R)$

19. A current carrying closed loop in the form of a right angle isosceles triangle ABC (right angle at B) is placed in a uniform magnetic field acting along AB. If the magnetic force on the arm BC is F , the force on the arm AC is

- (A) $\sqrt{2} F$
- (B) $-\sqrt{2} F$
- (C) $-F$
- (D) F

20. A uniform electric field and a uniform magnetic field are acting along the same direction in a certain region. If an electron is projected in the region such that its velocity is pointed along the direction of fields, then the electron

- (A) Will turn towards left of direction of motion
- (B) Will turn towards right of direction of motion
- (C) Speed will decrease
- (D) Speed will increase

21. A current loop consists of two identical semicircular parts each of radius R , one lying in the x - y plane and the other in x - z plane. If the current in the loop is i . The resultant magnetic field due to the two semicircular parts at their common centre is

- (A) $\mu_0 i / (2\sqrt{2} R)$
- (B) $\mu_0 i / (2R)$
- (C) $\mu_0 i / (4R)$
- (D) $\mu_0 i / (\sqrt{2} R)$

22. A galvanometer has a coil of resistance 100 ohm and gives a full scale deflection for 30 mA current. If it is to work as a voltmeter of 30 volt range, the resistance required to be added will be

- (A) 1000 Ω
- (B) 900 Ω
- (C) 1800 Ω
- (D) 500 Ω

23. A square current carrying loop is suspended in a uniform magnetic field acting in the plane of the loop. If the force on one arm of the loop is F , the net force on the remaining three arms of the loop is

- (A) F
- (B) $3F$
- (C) $-F$
- (D) $-3F$

24. A thin ring of radius R meter has charge q coulomb uniformly spread on it. The ring rotates about its axis with a constant frequency of f revolutions/s. The value of magnetic induction in Wb/m^2 at the centre of the ring is

- (A) $\mu_0 q f / (2R)$
- (B) $\mu_0 q f / (2\pi R)$
- (C) $\mu_0 q / (2\pi f R)$
- (D) $\mu_0 q / (2f R)$

25. A beam of cathode rays is subjected to crossed electric (E) and magnetic (B) fields. The fields are adjusted such that the beam is not deflected. The specific charge of the cathode rays is given by (where V is the potential difference between cathode and anode)

- (A) $E^2 / (2VB^2)$
- (B) $B^2 / (2VE^2)$
- (C) $2VB^2 / E^2$
- (D) $2VE^2 / B^2$

26. A galvanometer having a coil resistance of $60\ \Omega$ shows full scale deflection when a current of 1.0 amp passes through it. It can be converted into an ammeter to read currents upto 5.0 amp by:

- (A) putting in series a resistance of $15\ \Omega$
- (B) putting in series a resistance of $240\ \Omega$
- (C) putting in parallel a resistance of $15\ \Omega$
- (D) putting in parallel a resistance of $240\ \Omega$

27. The magnetic force acting on a charged particle of charge $-2\ \mu\text{C}$ in a magnetic field of $2\ \text{T}$ acting in y direction, when the particle velocity is $(2\hat{i} + 3\hat{j}) \times 10^6\ \text{m s}^{-1}$, is:

- (A) $4\ \text{N}$ in z direction
- (B) $8\ \text{N}$ in y direction
- (C) $8\ \text{N}$ in z direction
- (D) $8\ \text{N}$ in $-z$ direction

28. Under the influence of a uniform magnetic field, a charged particle moves with constant speed V in a circle of radius R . The time period of rotation of the particle:

- (A) depends on R and not on V
- (B) is independent of both V and R
- (C) depends on both V and R
- (D) depends on V and not on R

29. A particle of mass m , charge Q and kinetic energy T enters a transverse uniform magnetic field of induction B . After 3 seconds the kinetic energy of the particle will be

- (A) $4T$
- (B) $3T$
- (C) $2T$
- (D) T

30. A beam of electron passes undeflected through mutually perpendicular electric and magnetic fields. If the electric field is switched off, and the same magnetic field is maintained, the electrons move

- (A) in a circular orbit
- (B) along a parabolic path
- (C) along a straight line
- (D) in an elliptical orbit

31. In a mass spectrometer used for measuring the masses of ions, the ions are initially accelerated by an electric potential V and then made to describe semicircular path of radius R using a magnetic field B . If V and B are kept constant, the ratio (charge on the ion/mass of the ion) will be proportional to

- (A) $1/R^2$
- (B) R^2
- (C) R
- (D) $1/R$

32. A charged particle (charge q) is moving in a circle of radius R with uniform speed v . The associated magnetic moment μ is given by

- (A) qvR^2
- (B) $qvR^2/2$
- (C) qvR
- (D) $qvR/2$

33. Under the influence of a uniform magnetic field a charged particle is moving in a circle of radius R with constant speed v . The time period of the motion

- (A) depends on both R and v
- (B) is independent of both R and v
- (C) depends on R and not on v
- (D) depends on v and not on R

34. When a charged particle moving with velocity $\vec{v}$ is subjected to a magnetic field of induction B , the force on it is non-zero. This implies that :

- (A) angle between $\vec{v}$ and B is necessarily 90°
- (B) angle between $\vec{v}$ and B can have any value other than 90°
- (C) angle between $\vec{v}$ and B can have any value other than zero and 180°
- (D) angle between $\vec{v}$ and B is either zero or 180°

35. A coil in the shape of an equilateral triangle of side l is suspended between the pole pieces of a permanent magnet such that B is in plane of the coil. If due to a current i in the triangle a torque τ acts on it, the side l of the triangle is :

- (A) $(2/\sqrt{3}) (\tau/Bi)^{1/2}$
- (B) $(2/\sqrt{3}) (\tau/Bi)$
- (C) $2 (\tau/(\sqrt{3} Bi))^{1/2}$
- (D) $(1/\sqrt{3}) (\tau/Bi)$

36. An electron moves in a circular orbit with a uniform speed v . It produces a magnetic field B at the centre of the circle. The radius of the circle is proportional to :

- (A) B/v
- (B) v/B
- (C) $\sqrt{v/B}$
- (D) $\sqrt{B/v}$

Answer key and explanations

1. Answer: (B) $-6\hat{i} - 6\hat{j} - 8\hat{k}$

With $B = B\hat{i} + B\hat{j} + B_0\hat{k}$ and $v = 2\hat{i} + 4\hat{j} + 6\hat{k}$: $v \times B = (4B_0 - 6B)\hat{i} + (6B - 2B_0)\hat{j} + (2B - 4B)\hat{k}$. Matching the $\hat{k}$ term, $-2B = 12$ so $B = -6$; matching $\hat{i}$, $4B_0 + 36 = 4$ so $B_0 = -8$. Check $\hat{j}$: $-36 + 16 = -20$, so $B = -6\hat{i} - 6\hat{j} - 8\hat{k}$.

2. Answer: (A) $\sqrt{3} la^2$ and $3 la^2$

Triangle: each turn uses $3a$, so $12a$ gives 4 turns of area $(\sqrt{3}/4)a^2$, and $m = 4I(\sqrt{3}/4)a^2 = \sqrt{3} la^2$. Square: each turn uses $4a$, so 3 turns of area a^2 , and $m = 3la^2$.

3. Answer: (A) $6.28 \times 10^{-4} \text{ T}$

Turns per metre $n = 100/0.5 = 200$, so $B = \mu_0 n I = 4\pi \times 10^{-7} \times 200 \times 2.5 = 2\pi \times 10^{-4} \approx 6.28 \times 10^{-4} \text{ T}$. Using the total turns per 1 m (100) instead of per 0.5 m halves the answer to $3.14 \times 10^{-4} \text{ T}$.

4. Answer: (A) $2 : 1$

$r = p/(qB)$; with equal momenta $r \propto 1/q$. The proton has charge e and the α -particle $2e$, so $r_H : r_\alpha = 2 : 1$. Taking $1 : 2$ inverts the dependence on charge.

5. Answer: (D) 11.32 A

The magnetic force BIl is horizontal; balancing components along the incline: $BIl \cos 30^\circ = mg \sin 30^\circ$. $I = (m/l)g \tan 30^\circ / B = 0.5 \times 9.8 \times 0.577/0.25 \approx 11.32 \text{ A}$. Taking the force along the incline (without the $\cos 30^\circ$) would give a smaller current.

6. Answer: (A) 250Ω

Voltage sensitivity = current sensitivity / G , so $G = (5 \text{ div/mA})/(20 \text{ div/V}) = (5000 \text{ div/A})/(20 \text{ div/V}) = 250 \Omega$. Forgetting the mA-to-A conversion gives 0.25Ω -type answers.

7. Answer: (B) $n^2 B$

With the same wire, n turns means each turn has radius r/n . $B' = \mu_0 n I / (2(r/n)) = n^2 \times \mu_0 I / (2r) = n^2 B$. nB forgets that the radius also shrinks by a factor of n .

8. Answer: (A) 1 GHz

$f = (e/m)B/(2\pi) = (1.76 \times 10^{11} \times 3.57 \times 10^{-2})/(2\pi) = 6.28 \times 10^9/6.28 \approx 1 \times 10^9 \text{ Hz} = 1 \text{ GHz}$. 6.28×10^9 is the angular frequency ω , so dividing by 2π is essential; 100 MHz is off by a factor of 10.

9. Answer: (C) 1

Inside the wire $B = \mu_0 I r / (2\pi a^2)$, so at $a/2$, $B = \mu_0 I / (4\pi a)$. Outside $B' = \mu_0 I / (2\pi r)$, so at $2a$, $B' = \mu_0 I / (4\pi a)$. The ratio is 1. Treating the inside point as if all the current were enclosed (using $1/r$ there) would wrongly give a ratio of 4.

10. Answer: (A) $\mu_0 ne / (2r)$

The orbiting electron is a current loop with $I = \text{charge passing per second} = ne$. The field at the centre of a loop is $\mu_0 I / (2r) = \mu_0 ne / (2r)$. $\mu_0 ne / (2\pi r)$ is the formula for a long straight wire.

11. Answer: (C) $(\mu_0 / 2\pi d)(I_1^2 + I_2^2)^{1/2}$

P is at distance d from each long wire, so each gives $B = \mu_0 I / (2\pi d)$. The two wires are perpendicular, so their fields at P are perpendicular and add as vectors: $B = (\mu_0 / 2\pi d)\sqrt{I_1^2 + I_2^2}$, not the simple sum.

12. Answer: (B) $(1/500)G$

The galvanometer carries $I/500$, and since it is in parallel with the shunt, the voltage across the ammeter is $(I/500)G$. Ammeter resistance = $V/I = G/500$; $G/499$ is the shunt alone, not the combination.

13. Answer: (B) ma_0/e west, $2ma_0/(ev_0)$ down

At rest only the electric force acts: $eE = ma_0$ westward, so $E = ma_0/e$ towards west. Moving north, the extra $2ma_0$ westward comes from the magnetic force: $ev_0 B = 2ma_0$, $B = 2ma_0/(ev_0)$. For a positive charge, v (north) $\times B$ must point west, which happens when B points down.

14. Answer: (D) can be in equilibrium in two orientations, one stable while the other is unstable

Torque on a loop is $\tau = m \times B$, which is zero when the magnetic moment is parallel or antiparallel to B . The parallel position (minimum energy) is stable and the antiparallel position (maximum energy) is unstable. A loop does not feel a torque in every orientation.

15. Answer: (B) 1 MeV

$r = \sqrt{(2mK)/(qB)}$, so for the same r and B , $K \propto q^2/m$. For an α -particle $q^2/m = (2e)^2/(4m_p) = e^2/m_p$, the same as the proton, so it needs the same 1 MeV.

16. Answer: (B) $\sqrt{5} \mu_0 I/(2R)$

The coils give fields $\mu_0 I/(2R)$ and $\mu_0 (2I)/(2R) = \mu_0 I/R$ at the centre, and these are perpendicular because the coil planes are perpendicular. Resultant $B = \sqrt{[(\mu_0 I/(2R))^2 + (\mu_0 I/R)^2]} = \sqrt{5} \mu_0 I/(2R)$. Simply adding them ($3\mu_0 I/(2R)$) ignores that the fields are at right angles.

17. Answer: (B) 0.001

The meter gives full deflection at 25 mV across it; with the shunt carrying almost all 25 A, the shunt resistance is $S \approx V/I = 25 \times 10^{-3}/25 = 10^{-3} \Omega = 0.001 \Omega$. 0.01Ω would pass only 2.5 A at 25 mV.

18. Answer: (C) $\mu_0 qf/(2R)$

The rotating ring is equivalent to a current $I = q/T = qf$. The field at the centre of a circular loop is $\mu_0 I/(2R) = \mu_0 qf/(2R)$. The expression with $2\pi R$ in the denominator is the formula for a long straight wire, not a loop.

19. Answer: (C) $-F$

The field is along AB, so the force on arm AB is zero. The net magnetic force on any closed current loop in a uniform field is zero, so $F(BC) + F(AC) = 0$ and the force on AC is $-F$. A factor of $\sqrt{2}$ is the trap from the longer length of AC, but only the component of AC perpendicular to B (equal to BC) matters.

20. Answer: (C) Speed will decrease

Since the velocity is parallel to B , the magnetic force $qv \times B$ is zero and there is no sideways turning. The electron's charge is negative, so the electric force is opposite to E , i.e. opposite to its velocity, and it decelerates, so its speed decreases.

21. Answer: (A) $\mu_0 i/(2\sqrt{2} R)$

Each semicircle gives $\mu_0 i/(4R)$ at the centre, half the field of a full loop. Because the two semicircles lie in perpendicular planes, their fields are perpendicular, so the resultant is $\sqrt{2} \times \mu_0 i/(4R) = \mu_0 i/(2\sqrt{2} R)$. Simply adding the two fields gives $\mu_0 i/(2R)$, which wrongly treats them as parallel.

22. Answer: (B) 900 Ω

Total resistance needed = $V/I_g = 30/0.030 = 1000 \Omega$. Series resistance = $1000 - 100 = 900 \Omega$. 1000 Ω forgets to subtract the coil's own resistance.

23. Answer: (C) $-F$

The net magnetic force on a closed current loop in a uniform field is zero. So the other three arms together must give $-F$, cancelling the force on the first arm.

24. Answer: (A) $\mu_0 qf/(2R)$

The rotating charge acts as a current $I = qf$. Field at the centre of a ring is $B = \mu_0 I/(2R) = \mu_0 qf/(2R)$. Putting $2\pi R$ in the denominator confuses it with the field of a long straight wire.

25. Answer: (A) $E^2/(2VB^2)$

No deflection means $eE = evB$, so $v = E/B$. Accelerated through V : $eV = \frac{1}{2}mv^2$, so $e/m = v^2/(2V) = E^2/(2VB^2)$. The inverted forms come from writing $v = B/E$.

26. Answer: (C) putting in parallel a resistance of 15 Ω

Shunt $S = IgG/(I - Ig) = (1 \times 60)/(5 - 1) = 15 \Omega$ connected in parallel, so the extra 4 A bypasses the coil. A series resistance would make a voltmeter, not an ammeter.

27. Answer: (D) 8 N in $-z$ direction

$F = q(\vec{v} \times \vec{B})$. Only the x component of velocity matters: $(2 \times 10^6 \hat{i}) \times (2\hat{j}) = 4 \times 10^6 \hat{k}$. Multiplying by $q = -2 \times 10^{-6} C$ gives $-8\hat{k} N$, i.e. 8 N in $-z$ direction. Ignoring the negative charge gives $+z$.

28. Answer: (B) is independent of both V and R

$qVB = mV^2/R$ gives $R = mV/qB$, and $T = 2\pi R/V = 2\pi m/qB$. Since R grows in proportion to V , T depends on neither speed nor radius.

29. Answer: (D) T

The magnetic force $qv \times B$ is always perpendicular to the velocity, so it does no work. The particle moves in a circle at constant speed and its kinetic energy stays T . The 3 seconds is a distractor: the elapsed time does not matter.

30. Answer: (A) in a circular orbit

With only the magnetic field, the force $qv \times B$ is always perpendicular to the velocity, which is itself perpendicular to B , so the electrons move in a circle. A parabolic path needs a constant force such as an electric field, which has been switched off.

31. Answer: (A) $1/R^2$

$qV = \frac{1}{2}mv^2$ and $R = mv/(qB)$ give $R^2 = 2mV/(qB^2)$, so $q/m = 2V/(B^2R^2) \propto 1/R^2$. Answering $1/R$ ignores that v itself depends on q/m .

32. Answer: (D) $qvR/2$

The circulating charge is a current $I = q/T = qv/(2\pi R)$; $\mu = I \times \pi R^2 = qvR/2$. qvR misses the factor $\frac{1}{2}$.

33. Answer: (B) is independent of both R and v

$T = 2\pi R/v = 2\pi m/(qB)$; a larger speed gives a proportionally larger radius, so the period depends on neither R nor v .

34. Answer: (C) angle between $\vec{v}$ and $\vec{B}$ can have any value other than zero and 180°

The magnetic force is $F = qvB \sin \theta$, which vanishes only when $\theta = 0^\circ$ or 180° . So a non-zero force tells us only that θ is anything other than 0° and 180° . It need not be exactly 90° ; 90° simply gives the maximum force.

35. Answer: (C) $2(\tau/(\sqrt{3}Bi))^{1/2}$

With B in the plane of the coil the torque is maximum: $\tau = iAB$ with $A = (\sqrt{3}/4)l^2$. So $l^2 = 4\tau/(\sqrt{3}Bi)$ and $l = 2(\tau/(\sqrt{3}Bi))^{1/2}$. The trap $(2/\sqrt{3})(\tau/Bi)^{1/2}$ wrongly keeps $\sqrt{3}$ outside the square root.

36. Answer: (C) $\sqrt{v/B}$

The orbiting electron is a current $I = ev/(2\pi r)$, giving $B = \mu_0 I/(2r) = \mu_0 ev/(4\pi r^2)$. So $r^2 \propto v/B$ and $r \propto \sqrt{v/B}$. v/B would follow from $B \propto v/r$, which ignores that the current itself depends on r .

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