PHYSICS

BOOKS - DISHA PHYSICS (HINGLISH)

MAGNETIC EFFECTS OF CURRENT

Physics

1. The magnitude of magnetic field at a point having perpendicular distance 50 mm from a

long straight conducting wire carrying a current of 3A is

A. 0.12 G

B. 1.2 G

C. 12 G

D. 0.012 G

Answer:

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2. A circular arc of wire of radius of curvature r subtends an angle of p/4 radian at its centre. If i current is flowing in it then the magnetic induction at its centre is -

A. $\frac{\mu_0 i}{8r}$

B. $\frac{\mu_0 i}{4r}$

C. $\frac{\mu_0 i}{16r}$

D. 0

Answer:

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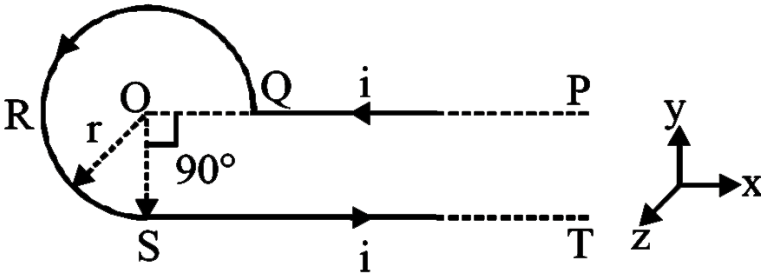
3. A current i is flowing in a conductor PQRST shaped as shown in the figure. The radius of curved part QRS is r and length of straight portions PQ and ST is very large. The magnetic field at the centre O of the curved part is -



A. $\frac{\mu_0 i}{4\pi i}\left[\frac{3\pi}{2}+1\right]\hat{k}$

B. $\frac{\mu_0 i}{4\pi r}\left[\frac{3\pi}{2}-1\right]\hat{k}$

C. $\frac{\mu_0 i}{4\pi r}\left[\frac{3\pi}{2}+1\right]\left(-\hat{k}\right)$

D. $\frac{\mu_0 i}{4\pi r}\left[\frac{3\pi}{2}-1\right]\left(-\hat{k}\right)$

Answer:

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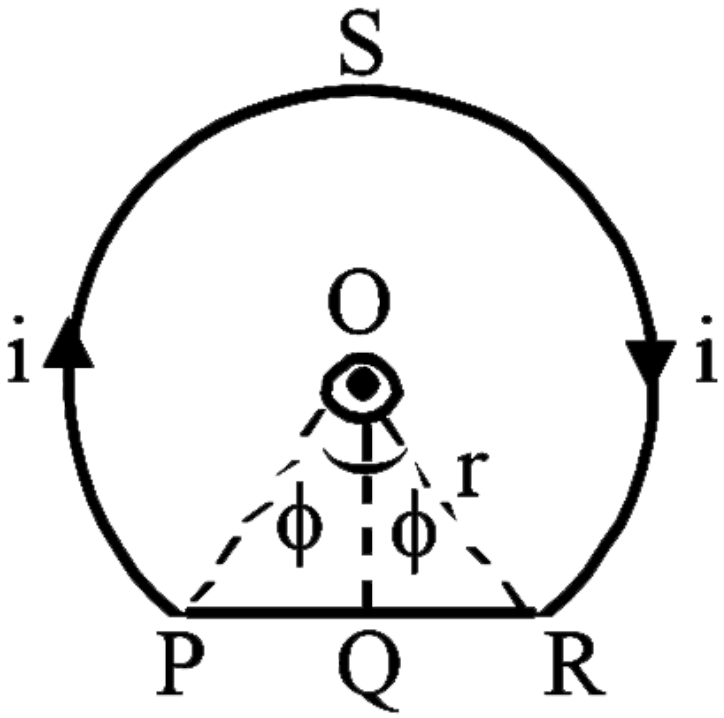
4. Consider the loop PQRSP, carrying clockwise current i, shown in the figure. The magnitude of magnetic field at the centre O of the curved

portion is



A. $\frac{\mu_0 i}{2\pi r}[\pi - \phi + \tan\phi]$

B. $\frac{\mu_0 i}{2\pi r}$

C. 0

D. $\frac{\mu_0 i}{2\pi r}[\pi - \phi + \tan\phi]$

Answer:

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5. A circular coil of 0.2 m diameter has 100 turns and carries a current of 0.1 ampere. The intensity of magnetic field at the centre of the coil is -

A. $6.28 \times 10^{-4} N/A.m$

B. $62.8 \times 10^{-4} N/A.m$

C. $6.28 \times 10^{-5} N/A.m$

D. $62.8 \times 10^{-5} N / A . m$

Answer:

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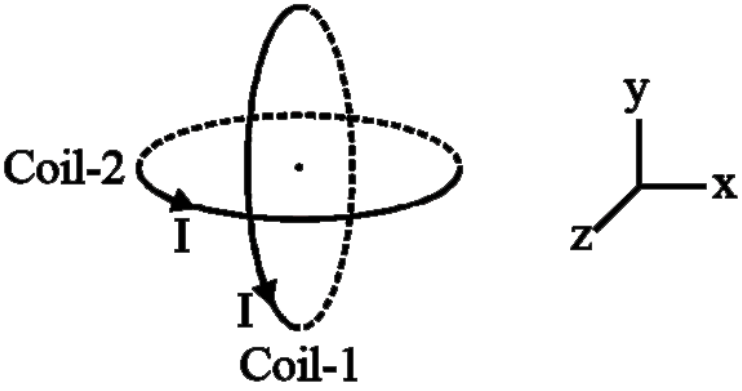
6. For the arrangement of two current carrying identical coils shown in the figure, the magnetic field at the center O is (N and a represent number of turns and radius of each

coil)-



A. $\frac{\mu_0 NI}{\sqrt{2}a}$

B. $\frac{\mu_0 NI}{2\sqrt{2}a}$

C. $\frac{\mu_0 NI}{2}$

D. $\frac{\mu_0 NI}{2a}$

Answer:

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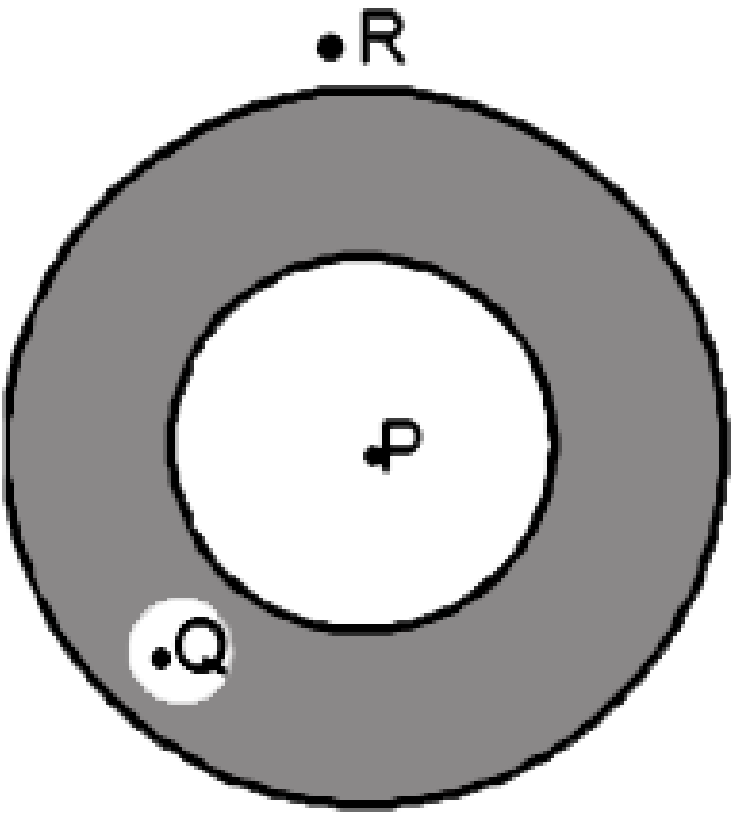
7. A current is flowing through a conducting hollow pipe whose area of cross-section is shown in the fig. The value of magnetic

induction will be zero at-



A. Point P,Q and R

B. Point R but not at P and Q

C. Point Q but not at P and R

D. Point P but not at Q and R

Answer:

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8. Dimensional formula of μ_0 is-

A. $MLT^{-2}A^{-2}$

B. $MLT^{-2}A^{-2}$

C. $MLT^{-2}A^{2}$

D. $MLT^{2}A^{2}$

Answer:

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9. A current of 1.0 ampere is flowing in the sides of an equilateral triangle of side 4.5×10^{-2} m. Find the magnetic field at the centroid of the triangle. (Permeability constant $\mu_0 = 4\pi \times 10^{-7} V - s / A - m$)

A. 4.0×10^{-5} weber $/ m^2$

B. 6.0×10^{-8} weber $/ m^2$

C. $2.0 \times 10^{-5} \text{weber} / m^2$

D. $7.0 \times 10^{-12} \text{weber} / m^2$

Answer:

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10. An air-solenoid has 500 turns of wire in its 40 cm length. If the current in the wire be 1.0 ampere then the magnetic field on the axis inside the solenoid is -

A. 15.7 gauss

B. 1.57 gauss

C. 0.157 gauss

D. 0.0157 gauss

Answer:

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11. A solenoid of length 0.2m has 500 turns on it. If $8.71 \times 10^{-6} \text{Weber}/m^2$ be the magnetic

field at an end of the solenoid, then the current flowing in the solenoid is –

A. $\frac{0.174}{\pi}A$

B. $\frac{0.0174}{\pi}A$

C. $\frac{17.4}{\pi}A$

D. $\frac{174}{\pi}A$

Answer:

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12. A circular current carrying coil has a radius R. The distance from the centre of the coil on the axis where the magnetic induction will be $\frac{1}{8}$ th to its value at the centre of the coil, is

A. $\frac{R}{\sqrt{3}}$

B. $R\sqrt{3}$

C. $2\sqrt{3}R$

D. $\frac{2}{\sqrt{3}}R$

Answer:

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13. The average radius of an air cored made toroid is 0.1 m and it has 500 turns. If it carries 0.5 ampere current, then the magnetic field inside it is :

A. 5×10^{-4} tesla

B. 5×10^{-3} tesla

C. 5×10^{-2} tesla

D. 2×10^{-3} tesla

Answer:

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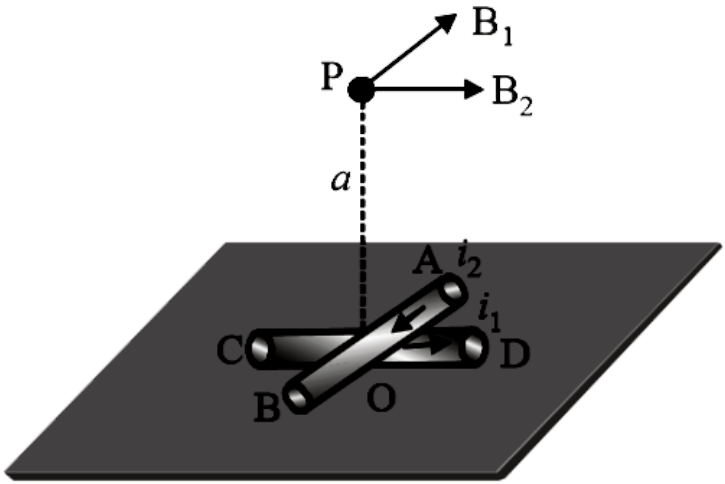
14. The straight long conductors AOB and COD are perpendicular to each other and carry current i_1 and i_2. The magnitude of the magnetic induction at point P at a distance a from the point O in a direction perpendicular

to the plane ACBD is



A. $\frac{\mu_0}{2\pi a}(i_1 + i_2)$

B. $\frac{\mu_0}{2\pi a}(i_1 - i_2)$

C. $\frac{\mu_0}{2\pi a}\left(i_1^2 + i_2^2\right)^{1/2}$

D. $\frac{\mu_0}{2\pi a}\frac{i_1 i_2}{(i_1 + i_2)}$

Answer:

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15. A conducting circular loop of radius r carries a constant current i. It is placed in a uniform magnetic field B such that B is perpendicular to the plane of loop. What is the magnetic force acting on the loop?

A. $ir\vec{B}$

B. $2\pi ri\vec{B}$

C. zero

D. $\pi ri\overrightarrow{B}$

Answer:

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16. The radius of a circular loop is r and a current i is flowing in it. The equivalent magnetic moment will be

A. ir

B. $2\pi ir$

C. $i\pi r^2$

D. $\frac{1}{r^2}$

Answer:

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17. A current of $30A$ is flowing in a vertical straight wire. If the horizontal component of earths magnetic is $2 \times 10^{-5}T$, then the position of null point will be

A. 0.9 m

B. 0.3 mm

C. 0.3 cm

D. 0.3 m

Answer:

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18. In a region, steady and uniform electric and magnetic fields are present . These two fields are parallel to each other. A charged particle is

released from rest in this region . The path of the particle will be a

A. Straight line

B. Circle

C. Helix

D. Cycloid

Answer:

19. A 6.28m long wire is turned into a coil of diameter 0.2m and a current of 1 amp is passed in it. The magnetic induction at its centre will be -

A. $6.28 \times 10^{-5} T$

B. $0T$

C. $6.28T$

D. $6.28 \times 10^{-3} T$

Answer:

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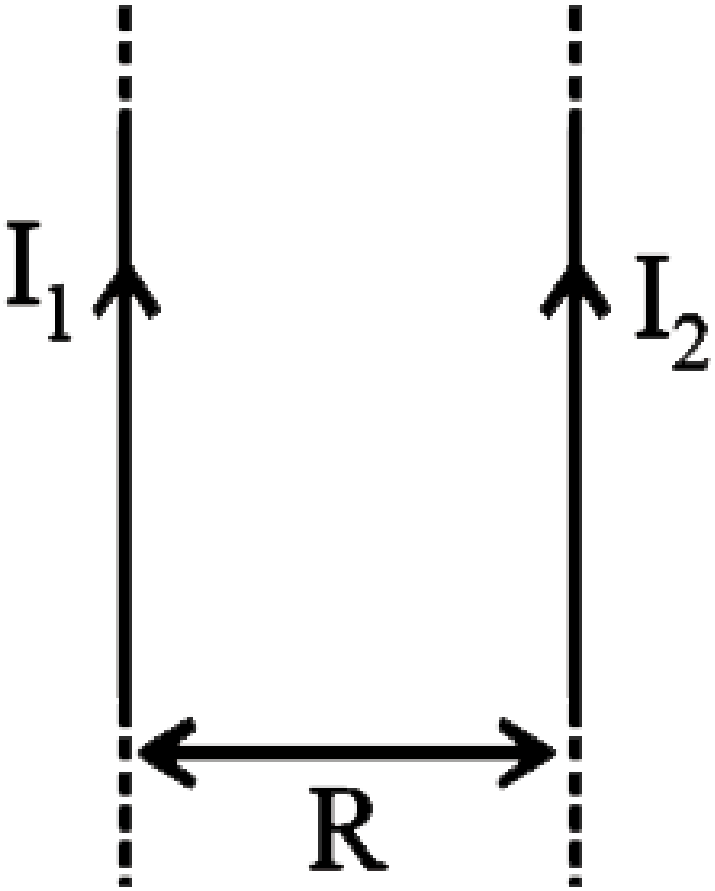
20. Two long straight parallel wires carry currents I1 and I2 respectively, in the same direction (as shown). The distance between the wires is R. The magnetic field at the centre of the two wires will



(1) $\frac{\mu_0(I_1 - I_2)}{\pi R}$ into the plane of paper (If $I_1 > I_2$)

(2) $\frac{\mu_0(I_2 - I_1)}{\pi R}$ out of the plane of paper (if $I_2 > I_1$)

(3) $\frac{\mu_0(I_1 - I_2)}{\pi R^2}$ out of the plane of paper (if $I_2 > I_1$)

(4) $\frac{\mu_0(I_2 - I_1)}{\pi R^2}$ into the plane of paper (if $I_1 > I_2$)

A. 1,2 and 3 are correct

B. 1 and 2 are correct

C. 2 and 4 are correct

D. 1 and 3 are correct

Answer:

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21. A wire of length L carrying current I is bent into a circle of one turn. The field at the center of the coil is B1. A similar wire of length L carrying current I is bent into a square of one turn. The field at its center is B2. Then

(1) $B_1 > B_2$

(2) $B_1 = B_2$

(3) $\frac{B_1}{B_2} = 2$

(4) $B_1 < B_2$

A. 1,2 and 3 are correct

B. 1 and 2 are correct

C. 2 and 4 are correct

D. 1 and 3 are correct

Answer:

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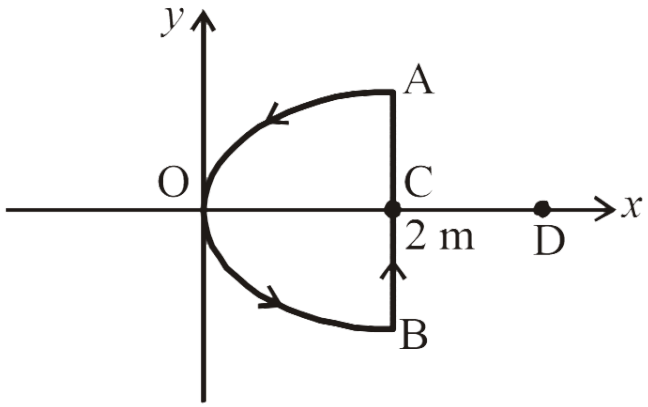
22. A conducting wire is bent into a loop as shown in the figure. The segment AOB is parabolic given by the equation $y^2 = 2x$ while segment BA is a straight line parallel to the y-

axis. The magnetic field in the region is $\overrightarrow{B} - 8\hat{k}$ and the current in the wire is 2A.



The torque on the loop will be

A. $16\sqrt{2}Nm$

B. $16Nm$

C. $18\sqrt{2}Nm$

D. zero

Answer:

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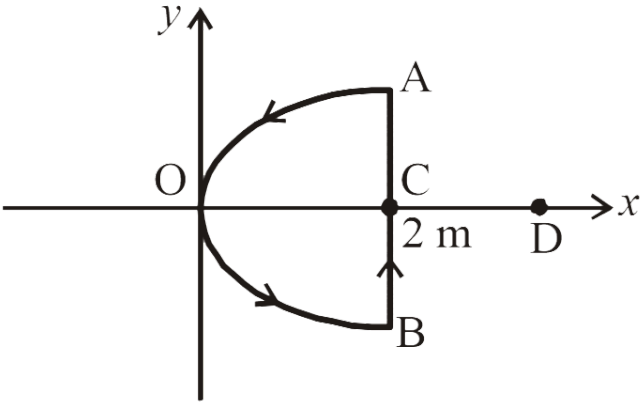
23. A conducting wire is bent into a loop as shown in the figure. The segment AOB is parabolic given by the equation $y^2 = 2x$ while segment BA is a straight line parallel to the y-axis. The magnetic field in the region is $\overrightarrow{B} - 8\hat{k}$ and the current in the wire is 2A.



The field created by the current in the loop at point C will be

A. $-\frac{\mu_0}{2\pi}\hat{k}$

B. $-\frac{\mu_0}{2\pi}\hat{k}$

C. $-\frac{\mu_0\sqrt{2}}{\pi}\hat{k}$

D. None of these

Answer:

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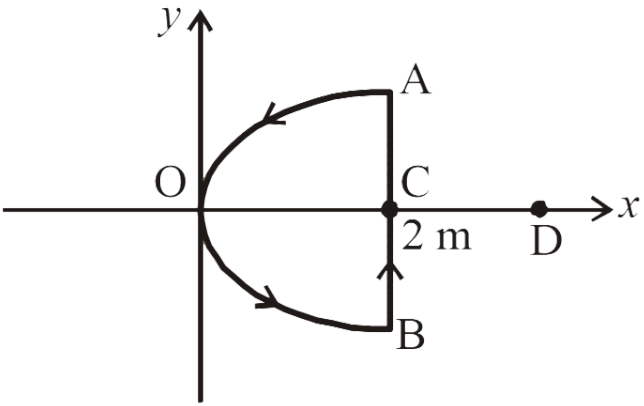
24. A conducting wire is bent into a loop as shown in the figure. The segment AOB is parabolic given by the equation $y^2 = 2x$ while segment BA is a straight line parallel to the y-axis. The magnetic field in the region is $\vec{B} - 8\hat{k}$ and the current in the wire is 2A.



Magnetic field at point D due to segment AO of the loop is directed parallel to

A. $\hat{k}$

B. $-\hat{k}$

C. $\hat{i}$

D. $\hat{j}$

Answer:

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25. Statement -1: Cyclotron does not accelerate electron. Statement-2: Mass of the electron is very small.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation for Statement-1

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is False

Answer:

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26. Assertion: The ion cannot move with a speed beyond a certain limit in a cyclotron.

Reason: As velocity increases time taken by ion increases.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation for Statement-1

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is False

Answer:

27. Assertion: If an electron, while coming vertically from outerspace, enter the earth's magnetic field, it is deflected towards west.

Reason: Electron has negative charge.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation

for Statement-1

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is False

Answer:

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28. A proton, a deuteron and an α particle are accelerated through same potential difference and then they enter a normal uniform

magnetic field, the ratio of their kinetic energies will be

A. $2:1:3$

B. $1:1:2$

C. $1:1:1$

D. $1:2:4$

Answer:

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29. A proton of energy $8eV$ is moving in a circular path in a uniform magnetic field. The energy of an alpha particle moving in the same magnetic field and along the same path will be

A. 4eV

B. 2eV

C. 8eV

D. 6eV

Answer:

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30. An electron is revolving in a circular path of radius 2×10^{-10} m with a speed of 3×10^{6} m/s. The magnetic field at the centre of circular path will be-

A. 1.2 T

B. 2.4 T

C. 0

D. 3.6 T

Answer:

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31. An α particle travels at an angle of 30° to a magnetic field 0.8 T with a velocity of 10^{5} m/s. The magnitude of force will be-

A. 1.28×10^{14} N

B. $(1.28)\sqrt{3} \times 10^{-4} N$

C. $1.28 \times 10^{-4} N$

D. $(12.8)\sqrt{3} \times 10^{-4} N$

Answer:

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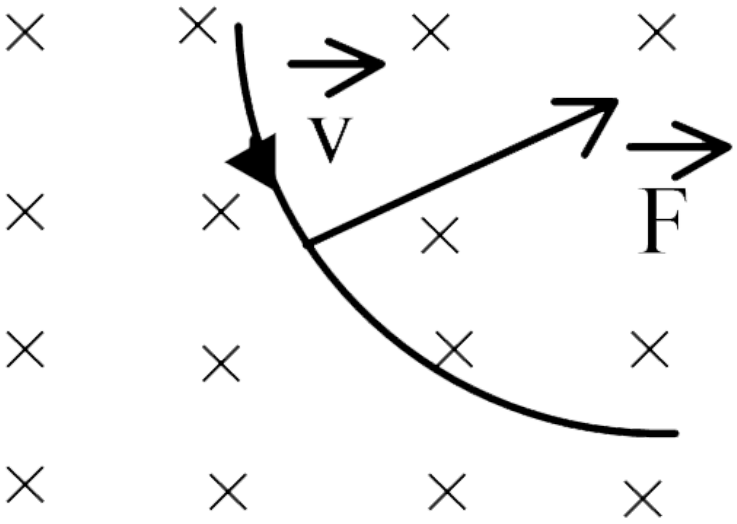
32. A beam of protons is moving horizontally towards you. As it approaches, it passes through a magnetic field directed downward.

The beam deflects-



A. to your left side

B. to your right side

C. does not deflect

D. nothing can be said

Answer:

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33. If a particle moves in a circular path in clockwise direction after entering into a downward vertical magnetic field. The charge on the particle is-

A. positive

B. negative

C. nothing can be said

D. neutral

Answer:

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34. In the example above, after how much time, particle comes to the starting point for the first time. (mass of particle = m)

A. $\frac{2\pi m}{3qB}$

B. $\frac{2\pi m}{qB}$

C. Never

D. It will leave the circular path before coming to the starting point

Answer:

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35. A current of 2.0 amp is flowing through a wire of length 50 cm. If this wire be placed at an angle of 60° with the direction of a uniform magnetic field of 5.0×10^{-4} N/Am the force on the wire will be-

A. $4.33 \times 10^{-4} N$

B. $2.50 \times 10^{-4} N$

C. $5.0 \times 10^{-4} N$

D. $2.33 \times 10^{-4} N$

Answer:

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36. A particle of mass m and charge q moves with a constant velocity v along the positive x direction. It enters a region containing a

uniform magnetic field B directed along the negative z direction, extending from x = a to x = b. The minimum value of v required so that the particle can just enter the region x lt b is

A. qb B/m

B. $q(b-a)B/m$

C. qa B/m

D. $q(b+a)B/2m$

Answer:

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37. A particle with charge q, moving with a momentum p, enters a uniform magnetic field normally. The magnetic field has magnitude B and is confined to a region of width d, where $d < \frac{p}{Bq}$, The particle is deflected by an angle q in crossing the field. Then

A. $\sin\theta = \frac{Bqd}{p}$

B. $\sin\theta = \frac{p}{Bqd}$

C. $\sin\theta = \frac{Bp}{qd}$

D. $\sin\theta = \frac{pd}{Bq}$

Answer:

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38. An a particle is moving in a magnetic field of $\left(3\hat{i} + 2\hat{j}\right)$ tesla with a velocity of $5 \times 10^5 \hat{i}$ m/s. The magnetic force acting on the particle will be-

A. 3.2×10^{-13} dyne

B. $3.2 \times 10^{13} N$

C. 0

D. $3.2 \times 10^{-13} N$

Answer:

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39. If an $\alpha -$ particle moving with velocity 'v' enters perpendicular to a magnetic field then the magnetic force acting on it will be-

A. evB

B. 2evB

C. 0

D. 4evB

Answer:

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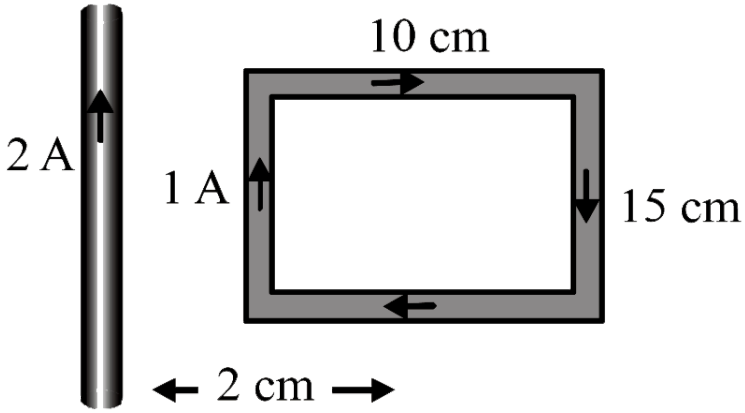
40. What is the net force on the square coil ?



A. $25 \times 10^{-7} N$ towards wire

B. $25 \times 10^{-7} N$ away from wire

C. $35 \times 10^{-7} N$ towards wire

D. $35 \times 10^{-7} N$ away from wire

Answer:

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41. A proton is to circulate the earth along the equator with a speed of 1.0×10^7 m/s. The minimum magnetic field which should be created at the equator for this purpose. (The mass of proton $= 1.7 \times 10^{-27}$ kg and radius of earth $= 6.37 \times 10^6$ m.) will be (in $\mathrm{Wb/m^2}$)

A. 1.6×10^{-19}

B. 1.67×10^{-8}

C. 1.0×10^{-7}

D. 2×10^{-7}

Answer:

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42. An α-particle is describing a circle of radius 0.45 m in a field of magnetic induction $1.2 \text{weber}/\text{m}^2$. The potential difference required to accelerate the particle, (The mass of a-particle is 6.8×10^{-27} kg and its charge is 3.2×10^{-19} coulomb.) will be —

A. $6 \times 10^6 V$

B. $2.3 \times 10^{12} V$

C. $7 \times 10^6 V$

D. $3.2 \times 10^{-12} V$

Answer:

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43. An electron beam passes through a magnitic field of $2 \times 10^{-3} \text{weber} / m^2$ and an electric field of $1.0 \times 10^4 \text{volt/m}$ both acting

simultaneously. If the electric field is removed, what will be the radius of the electron path ?

A. 1.43 cm

B. 0.43 cm

C. 2.43 cm

D. 2.43 cm

Answer:

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44. A straight horizontal copper wire carries a current i = 30 A. The linear mass density of the wire is 45 g/m. What is the magnitude of the magnetic field needed to balance its weight?

A. 147 G

B. 441 G

C. 14.7 G

D. 0 G

Answer:

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45. A 1m long conducting wire is lying at right angles to the magnetic field. A force of 1 kg. wt is acting on it in a magnetic field of 0.98 tesla. The current flowing in it will be-

A. $100A$

B. $10A$

C. $1A$

D. 0

Answer:

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46. In the fig the two parallel wires PQ and ST are at 30 cm apart. The currents flowing in the wires are according to fig. The force acting over a length of 5m of the wires is-

(1) $5 \times 10^{-4} N$

(2) attraction

(3) $5 \times 10^{-8} N$

(4) repulsion

A. 1,2 and 3 are correct

B. 1 and 2 are correct

C. 2 and 4 are correct

D. 1 and 3 are correct

Answer:

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47. A beam of protons enters a uniform magnetic field of 0.3 tesla with a velocity of 4×10^5 m/s at an angle of 60 to the field. Then, (Mass of the proton $= 1.7 \times 10^{-27}$ kg.)

(1) the radius of the helical path is 1.226×10^{-2} m

(2) the pitch of the helix is 4.45×10^{-2} m

(3) the radius of the helical path is 1.226×10^{-3} m

(4) the pitch of the helix is 4.45×10^{-4} m

A. 1,2 and 3 are correct

B. 1 and 2 are correct

C. 2 and 4 are correct

D. 1 and 3 are correct

Answer:

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48. A charge particles q enters in a magnetic field $\overrightarrow{B} = y\hat{i} + x\hat{j}$ with the velocity $\overrightarrow{v} = x\hat{i}y\hat{j}$. Neglect any force other than magnetic force. Now answer the following

question.

When particle arrives at any point P (2, 2) then force acting on it, will be –

A. Zero

B. $4\sqrt{2}q$

C. $8q$

D. $2\sqrt{2}q$

Answer:

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49. A charge particles q enters in a magnetic field $\overrightarrow{B} = y\hat{i} + x\hat{j}$ with the velocity $\overrightarrow{v} = x\hat{i}y\hat{j}$. Neglect any force other than magnetic force. Now answer the following question.

Magnetic force F acting on charge is proportional to –

A. $F \propto \left(x^2 - y^2\right)$

B. $F \propto \left(x^2 + y^2\right)$

C. $F \propto \sqrt{x^{2y^2}}$

D. F does not depend on x or y co-ordinate

Answer:

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50. A charge particles q enters in a magnetic field $\overrightarrow{B} = y\hat{i} + x\hat{j}$ with the velocity $\overrightarrow{v} = x\hat{i}y\hat{j}$. Neglect any force other than magnetic force. Now answer the following question.

Which of the following is true for the direction of magnetic force ?

A. if $x > y$ then force works along (-z) direction

B. if $x < y$ then force works along (+z) direction

C. if $x > y$ then force works along (+z) direction

D. None of these

Answer:

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51. Statement -1 : If two long wires, hanging freely are connected to a battery in series, they come closer to each other. Statement -2 : Force of repulsion acts between the two wires carrying current.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation

for Statement-1

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is False

Answer:

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52. Statement - 1 : For a charged particle to pass through a uniform electro-magnetic field without change in velocity, its velocity vector must be perpendicular to the magnetic field.

Statement - 2 : Net Lorentz force on the particle is given by $\overrightarrow{F} = q\left[\overrightarrow{E} + \overrightarrow{v} \times \overrightarrow{B}\right]$.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-2

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation for Statement-2

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is False

Answer:

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53. Statement - 1 : If an electron is not deflected while passing through a certain region of space, then only possibility is that there is no magnetic region. Statement - 2 : Magnetic force is directly proportional to the magnetic field applied.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-3

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation for Statement-3

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is False

Answer:

54. A circular coil of radius $4cm$ and of 20 turns carries a current of 3 amperes. It is placed in a magnetic field of intensity of $0.5weber/m^2$. The magnetic dipole moment of the coil is

A. 0.15 ampere m^2

B. 0.3 ampere m^2

C. 0.45 ampere m^2

D. 0.6 ampere m^2

Answer:

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55. A circular coil of radius 4 cm has 50 turns. In this coil a current of $2A$ is flowing. It is placed in a magnetic field of $0.1\text{weber}/m^2$. The amount of work done is rotation it through 180° from its equilibrium position will be

A. 0.1 J

B. 0.2 J

C. 0.4 J

D. 0.8 J

Answer:

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56. The deflection in a moving coil galvanometer is

A. directly proportional to the torsional constant

B. directly proportional to the number of turns in the coil

C. inversely proportional to the area of the coil

D. inversely proportional to the current flowing

Answer:

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57. A moving coil galvanometer has N numbr of turns in a coil of effective area A, it carries a current I. The magnetic field B is radial. The torque acting on the coil is

A. NA^2B^2I

B. $NABI^2$

C. N^2ABI

D. $NABI$

Answer:

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58. A current carrying loop is free to turn in a uniform magnetic field.The loop will then come into equilibrium when its plane is inclined at

A. 0° to the direction of the field

B. 45° to the direction of the field

C. 90° to the direction of the field

D. $135^{2\circ}$ to the direction of the field

Answer:

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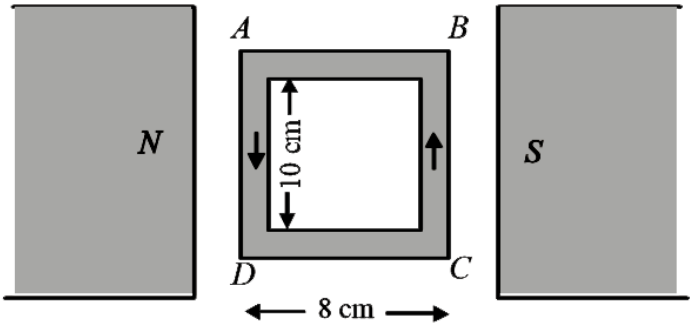
59. A 100 turns coil shown in figure carries a current of 2 amp in a magnetic field $B = 0.2Wb/m^2$. The torque acting on the coil is



A. 0.32 Nm tending to rotate the side AD out of the page

B. 0.32 Nm tending to rotate the side AD into the page

C. 0.0032 Nm tending to rotate the side AD out of the page

D. 0.0032 Nm tending to rotate the side AB into the page

Answer:

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60. A rectangular coil $20cm \times 20cm$ has 100 turns and carries a current of $1A$. It is placed in a uniform magnetic field $B = 0.5T$ with the direction of magnetic field parallel to the plane of the coil. The magnitude of the torque required to hold this coil in this position is

A. zero

B. 200 Nm

C. 2 Nm

D. 10 Nm

Answer:

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61. A circular loop of area $0.01m^2$ carrying a current of $10A$, is held perpendicular to a magnetic field of intensity $0.1T$. The torque acting on the loop is

A. Zero

B. 0.01 Nm

C. 0.001 Nm

D. 0.8 Nm

Answer:

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62. The magnetic moment of a circular coil carrying current is

A. directly proportional to the length of the wire

B. inversely proportional to the length of the wire

C. directly proportional to the square of the length of the wire

D. inversely proportional to the square of the length of the wire

Answer:

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63. What is the shape of magnet in moving coil galvanometer to make the radial magnetic field ?

A. Concave cylindrical

B. Horse shoe magnet

C. Convex cylindrical

D. None of these

Answer:

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64. Current i is carried in a wire of length L. If the wire is turned into a circular coil, the maximum magnitude of torque in a given magnetic field B will be

A. $\frac{LiB^2}{2}$

B. $\frac{Li^2B}{2}$

C. $\frac{L^2iB}{4\pi}$

D. $\frac{Li^2B}{4\pi}$

Answer:

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65. In ballistic galvanometer, the frame on which the coil is wound is non-metallic. It is

A. to avoid the production of induced e.m.f

B. to avoid the production of eddy currents

C. to increase the production of eddy currents

D. to increase the production of induced e.m.f

Answer:

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66. A solenoid of length 0.4 m and having 500 turns of wire carries a current of 3 amp. A thin coil having 10 turns of wire and of radius 0.01 m carries a current of 0.4 amp. The torque (in Nm) required to hold the coil in the middle of

the solenoid with its axis perpendicular to the axis of the solenoid is ($\mu_0 = 4\pi \times 10^{-7}$ V-s/A-m)

A. 59.2×10^{-6}

B. 5.92×10^{-6}

C. 0.592×10^{-6}

D. 0.592×10^{-4}

Answer:

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67. If an electron is moving with velocity v in an orbit of radius r in a hydrogen atom, then the equivalent magnetic moment is

A. $\frac{\mu_0 e}{2r}$

B. $\frac{ev}{r^2}$

C. $\frac{ev \times 10^{-7}}{r^3}$

D. $\frac{evr}{2}$

Answer:

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68. In a moving coil galvanometer, the deflection of the coil q is related to the electrical current i by the relation

A. $i \propto \tan\theta$

B. $i \propto \theta$

C. $i \propto \theta^2$

D. $i \propto \sqrt{\theta}$

Answer:

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69. A thin circular wire carrying a current I has a magnetic moment M. The shape of the wire is changed to a square and it carries the same current. It will have a magnetic moment

A. M

B. $\frac{4}{\pi^2}M$

C. $\frac{4}{\pi}M$

D. $\frac{\pi}{4}M$

Answer:

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70. A ring of radius R, made of an insulating material carries a charge Q uniformly distributed on it. If the ring rotates about the axis passing through its centre and normal to plane of the ring with constant angular speed ω, then the magnitude moment of the ring is

A. $Q\omega R^2$

B. $\frac{1}{2}Q\omega R^2$

C. $Q\omega^2 R$

D. $\frac{1}{2}Q\omega^2 R$

Answer:

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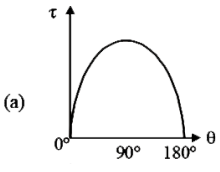
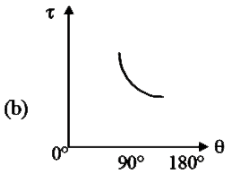
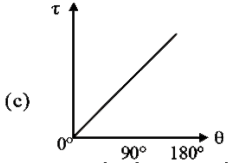
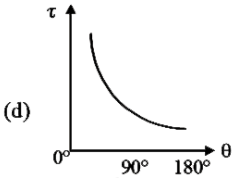
71. The $(\tau - \theta)$ graph for a current carrying coil placed in a uniform magnetic field is

A. 

B. 

C. 

D. 

Answer:

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72. A rectangular loop carrying a current i is placed in a uniform magnetic field B. The area enclosed by the loop is A. If there are n turns

in the loop, the torque acting on the loop is given by

A. $ni\vec{A} \times \vec{B}$

B. $ni\vec{A} . \vec{B}$

C. $\frac{1}{n}\left(i\vec{A} \times \vec{B}\right)$

D. $\frac{1}{n}\left(i\vec{A} . \vec{B}\right)$

Answer:

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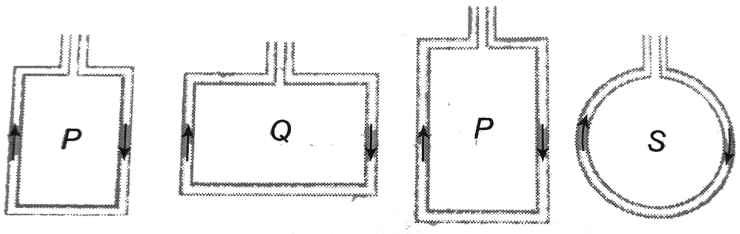
73. Four wires each of length 2.0 meters area bent into four loops P, Q, R and S and then suspended into uniform magnetic field. Same current is passed in each loop. Which statement is correct?



A. 1,2 and 3 are correct

B. 1 and 2 are correct

C. 2 and 4 are correct

D. 1 and 3 are correct

Answer:

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74. The sensitivity of a moving coil galvanometer can be increased by

(1) decreasing the couple per unit twist of the suspension

(2) increasing the number of turns in the coil

(3) decreasing the area of the coil

(4) decreasing the magnetic field

A. 1,2 and 3 are correct

B. 1 and 2 are correct

C. 2 and 4 are correct

D. 1 and 3 are correct

Answer:

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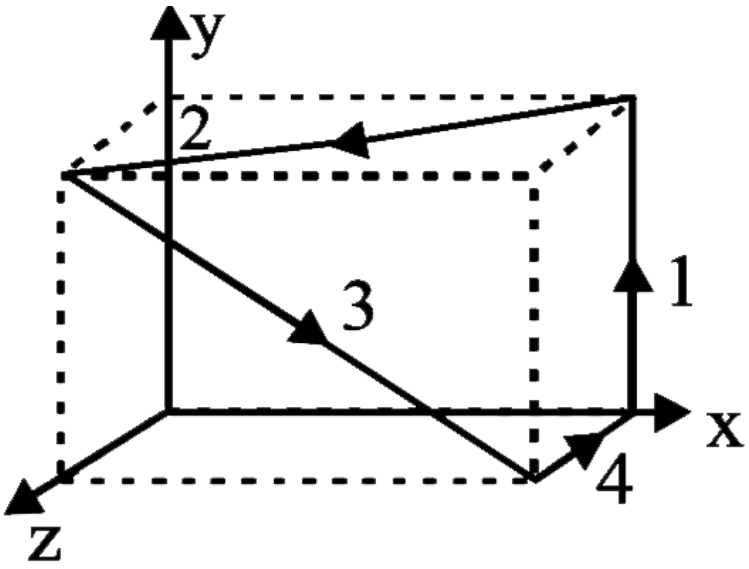
75. A wire carrying a 10 A current is bent to pass through sides of a cube of side 10 cm as shown in figure. A magnetic field $\overrightarrow{B} = \left(2\hat{i} - 3\hat{j} + \hat{k}\right)T$ is present in the region. Then, find



The net force on the loop

A. $\vec{F}_{\text{net}} = 0$

B. $\vec{F}_{\text{net}} = \left(0.1\hat{i} - 0.2\hat{k}\right) N$

C. $\vec{F}_{\text{net}} = \left(0.3\hat{i} + 0.4\hat{k}\right) N$

D. $\vec{F}_{\text{net}} = \left(0.36\hat{k}\right) N$

Answer:

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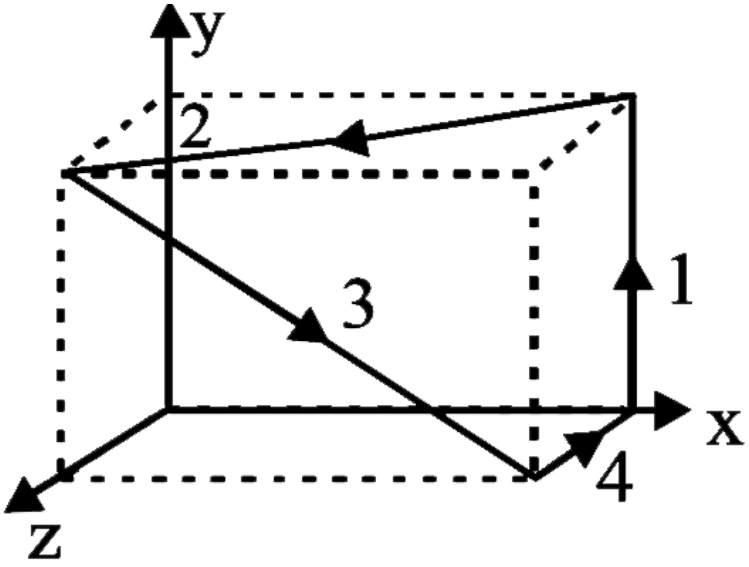
76. A wire carrying a 10 A current is bent to pass through sides of a cube of side 10 cm as shown in figure. A magnetic field

$\overrightarrow{B} = \left(2\hat{i} - 3\hat{j} + \hat{k}\right)T$ is present in the region. Then, find



The magnetic moment vector of the loop.

A. $\left(0.1\hat{i} + 0.05\hat{j} - 0.05\hat{k}\right)Am^2$

B. $\left(0.1\hat{i} + 0.05\hat{j} + 0.05\hat{k}\right)Am^2$

C. $\left(0.1\hat{i} - 0.05\hat{j} + 0.05\hat{k}\right)Am^2$

D. $\left(0.1\hat{i} - 0.05\hat{j} - 0.05\hat{k}\right) Am^2$

Answer:

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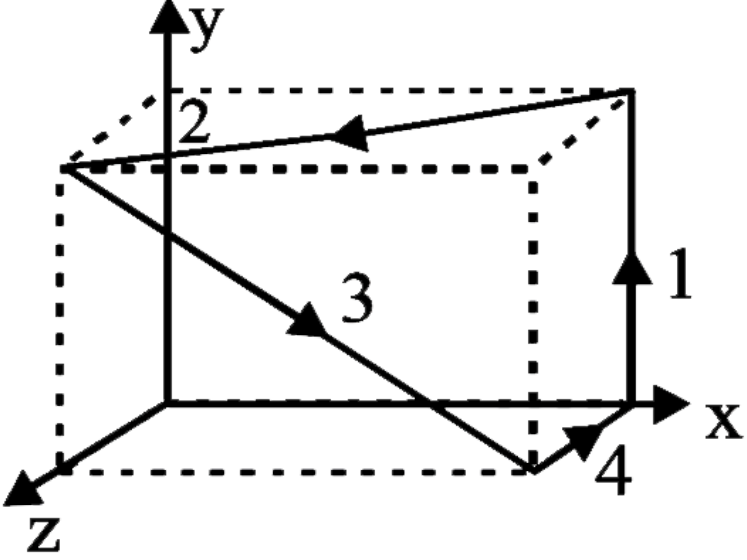
77. A wire carrying a 10 A current is bent to pass through sides of a cube of side 10 cm as shown in figure. A magnetic field $\overrightarrow{B} = \left(2\hat{i} - 3\hat{j} + \hat{k}\right)T$ is present in the region. Then, find



The net torque on the loop

A. $-0.1\hat{i} + 0.4\hat{k}Nm$

B. $0.2\hat{i} - 0.4\hat{k}Nm$

C. $0.1\hat{i} - 0.4\hat{k}Nm$

D. $0.1\hat{i} - 0.4\hat{k}Nm$

Answer:

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78. Assertion: The coil is bound over the metallic fram in moving coil galvanometer.

Reason: The metallic fram help in making steady deflected without any oscillation.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation for Statement-1

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-1

Answer:

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79. Assertion: Torque on the coil is the maximum, when coil is suspended in a radial magentic field.

Reason: The torque tends to rotates the coil on its own axis.

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-2

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation

for Statement-2

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-2

Answer:

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80. Statement-1 : A current carrying loop placed in equilibrium in a uniform magnetic field starts oscillating when disturbed from equilibrium. Statement-2 : A system when disturbed slightly from stable equilibrium oscillates

A. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-3

B. Statement-1 is True, Statement-2 is True , Statement-2 is NOT a correct explanation for Statement-3

C. Statement-1 is False, Statement-2 is True

D. Statement-1 is True, Statement-2 is True , Statement-2 is a correct explanation for Statement-3

Answer:

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