BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

Date: 14/11/2021

Subject: Physics

Topic : Moving Charges and Magnetism

Class: Standard XII

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1. An electron is projected into a uniform magnetic field of $3\ \mathrm{T}$ and moves along a helical path of radius $1\ \mathrm{cm}$ with pitch $2\pi\ \mathrm{cm}$. Find the angle of projection of the electron with the magnetic filed.

   A. 30°

   B. 45°

   C. 60°

   D. 75°

2. A beam of electron passes, un-deflected through mutually perpendicular electric and magnetic fields. If the electric field is switched off, and the same magnetic field is maintained, the electrons moves

   A. in a circular orbit

   B. along a parabolic path

   C. along a straight line

   D. in an elliptical orbit.

3. A cyclotron can accelerate

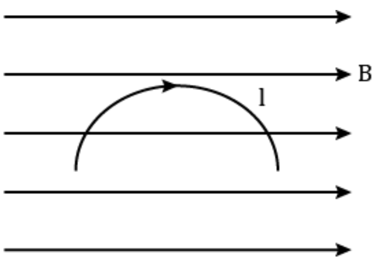
   A. neutrons

   B. α-particles

   C. high velocity γ-particles

   D. high velocity x-rays

4. What is the force experienced by a semicircular wire of radius R when it is carrying a current I and is placed in a uniform magnetic field of induction B as shown in figure?



A. Zero

B. $2IRB$

C. IRB

D. $2\pi IRB$

5. A circular loop of wire having a radius of $8.0\ \mathrm{cm}$ carries a current of $0.2\ \mathrm{A}$. A vector of unit length and parallel to the dipole moment $\vec{\mu}$ of the loop is given by $0.60\hat{i} - 0.80\hat{j}$. If the loop is located in uniform magnetic field given by $\vec{B} = (0.25)\hat{i} + (0.30)\hat{k}$. Find the torque acting on the loop.

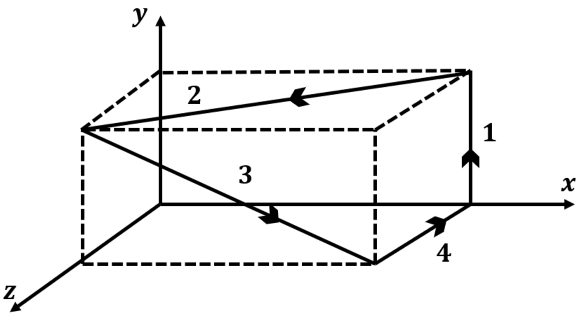
A. $(-9.6\hat{i} - 7.2\hat{j} + 8.0\hat{k}) \times 10^{-3}\ \mathrm{Nm}$

B. $(-9.6\hat{i} - 7.2\hat{j} - 8.0\hat{k}) \times 10^{-4}\ \mathrm{Nm}$

C. $(9.6\hat{i} + 7.2\hat{j} + 8.0\hat{k}) \times 10^{-4}\ \mathrm{Nm}$

D. $(-9.6\hat{i} - 7.2\hat{j} + 8.0\hat{k}) \times 10^{-4}\ \mathrm{Nm}$

6. A wire carrying a $10\ \mathrm{A}$ current is bent to pass through various sides of a cube of side $10\ \mathrm{cm}$ as shown in the figure. A magnetic field $\vec{B} = (2\hat{i} - 3\hat{j} + \hat{k})\ \mathrm{T}$ is present in the region. Find the magnetic moment vector of the loop.



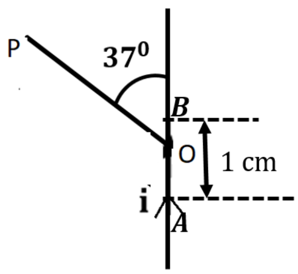
A. $(0.1\hat{i} + 0.05\hat{j} - 0.05\hat{k})\ \mathrm{Am^2}$

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

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

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

7. A wire carries a steady current of $50\ \mathrm{A}$ as shown in the figure. Find the magnetic field caused by segment AB of length $1\ \mathrm{cm}$ of the wire at a point P where $OP = 1\ \mathrm{m}$.



A. $30\ \mathrm{nT} \otimes$

B. $50\ \mathrm{nT} \otimes$

C. $30\ \mathrm{nT} \odot$

D. $50\ \mathrm{nT} \odot$

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

8. A current $i = 2.5\ \mathrm{A}$ flows along the circular coil of three turns in anticlockwise direction. The equation of circle is given by $x^2 + y^2 = 9\ \mathrm{cm}^2$ (x & y are in cm). The magnetic field at point $P\ (0, 0, 4\ \mathrm{cm})$ is :
[consider x and y axis in the plane of paper and perpendicular outward direction as $+z$ - axis]

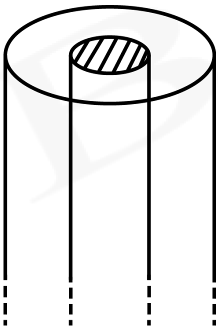
A. $(36\pi \times 10^{-7}\ \mathrm{T})\ \hat{k}$

B. $(108\pi \times 10^{-7}\ \mathrm{T})\ \hat{k}$

C. $\left(\frac{9\pi}{5} \times 10^{-7}\ \mathrm{T}\right)\ (-\hat{k})$

D. $(36\pi \times 10^{-7}\ \mathrm{T})\ (-\hat{k})$

9. In a coaxial, straight cable, the central conductor and the outer conductor carry equal currents in opposite directions. The magnetic field is zero at



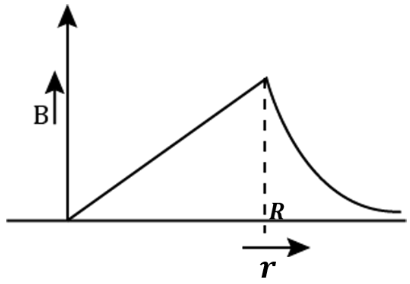
A. Outside the cable

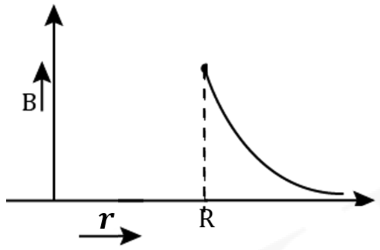
B. Inside the inner conductor

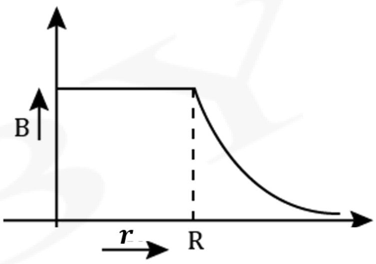
C. Inside the outer conductor

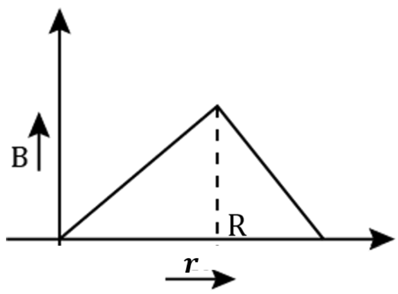
D. In between the two conductors

10. Draw a graph for a thin current carrying hollow conductor for variation of magnetic field with respect to distance R from its axis along the radius.

A. 

B. 

C. 

D. 

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

11. Statement A : A current carrying wire is placed parallel to the external magnetic field. The force on it due to the external magnetic field is zero.

Statement R : The net charge on current wire is zero.

A. Both A and R are true, and R is the correct explanation of A.

B. Both A and R are true but R is not correct explanation of A.

C. A is true, but R is false.

D. A is false, but R is true.

12. Assertion : A rectangular current loop is in an arbitrary orientation in an external uniform magnetic field. No work is required to rotate the loop about an axis perpendicular to its plane.

Reason :All positions represent the same level of energy.

A. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.

B. Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion.

C. Assertion is correct, Reason is incorrect.

D. Assertion is incorrect, but Reason is correct.

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

13. Consider the following statements about the Oersted experiment.

Statement P : The magnetic field due to a straight current carrying conductor is in the form of circular loops around it.

Statement Q :The magnetic field due to a current carrying conductor is strong at far points from the conductor, compared to the near points.

A. Both P and Q are true

B. P is true but Q is false

C. P is false but Q is true

D. Both P and Q are false

14. In the question given below, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of the statements mark the correct answer.

Assertion (A): Power of a magnetic force on a charged particle is always zero.

Reason (R): Power of electric force on charged particle cannot be zero.

A. Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'.

B. Both 'A' and 'R' are true and 'R' is not the correct explanation of 'A'

C. 'A' is true and 'R' is false

D. 'A' is false and 'R' is true

15. Assertion(A): If an electron, while coming vertically from outerspace, enter the earth's magnetic field, it is deflected towards west.
Reason(R): Electron has negative charge.

A. Both A and R are true and R is correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

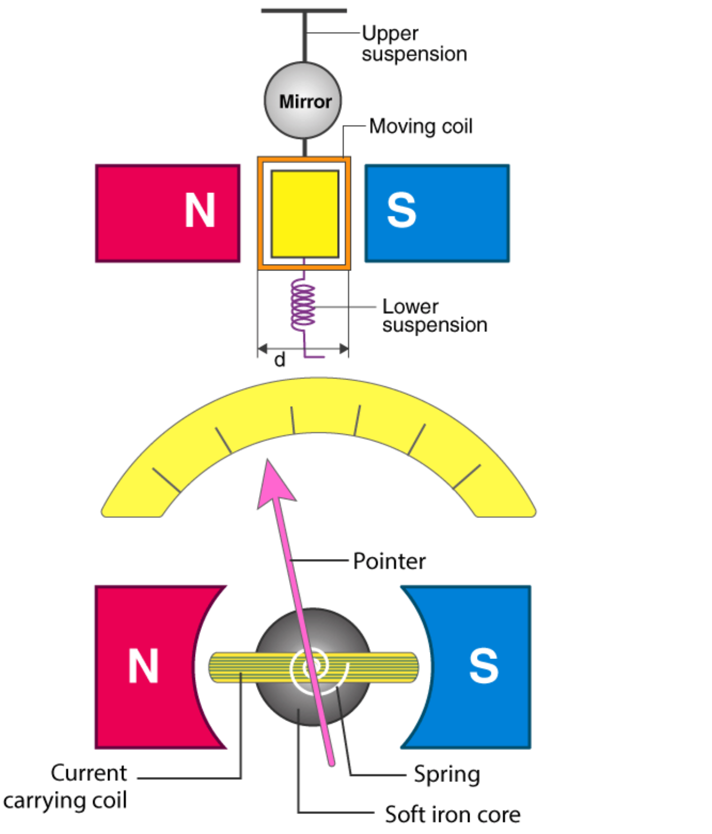
C. A is true but R is false

D. A is false but R is true

16. Moving coil galvanometer operates on Permanent Magnet Moving Coil (PMMC) mechanism.

Moving coil galvanometers are of two types
(a) Suspended coil
(b) Pivoted coil type or tangent galvanometer,

Its working is based on the fact that when a current carrying coil is placed in a magnetic field, it experiences a torque. This torque tends to rotate the coil about its axis of suspension in such a way that the magnetic flux passing through the coil is maximum.



Moving coil galvanometer

(i) A moving coil galvanometer is an instrument which

A. is used to measure emf

B. is used to measure potential difference

C. is used to measure resistance

D. gives a deflection when a current flows through its coil

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

17. Moving coil galvanometer operates on Permanent Magnet Moving Coil (PMMC) mechanism.

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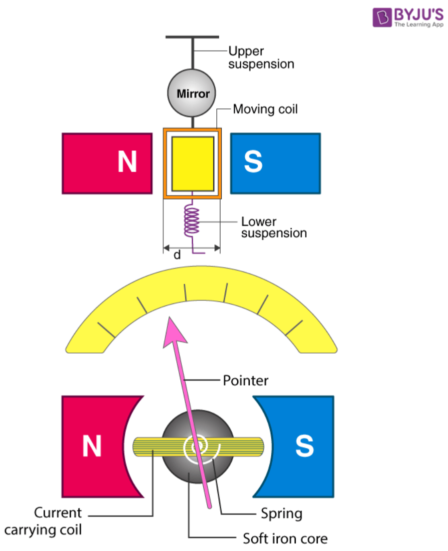

Moving coil galvanometer

(ii) To make the field radial in a moving coil galvanometer

A. number of turns of coil is kept small

B. magnet is taken in the form of horse-shoe

C. poles are of very strong magnets

D. poles are cylindrically cut

18. Moving coil galvanometer operates on Permanent Magnet Moving Coll (PMMC) mechanism.

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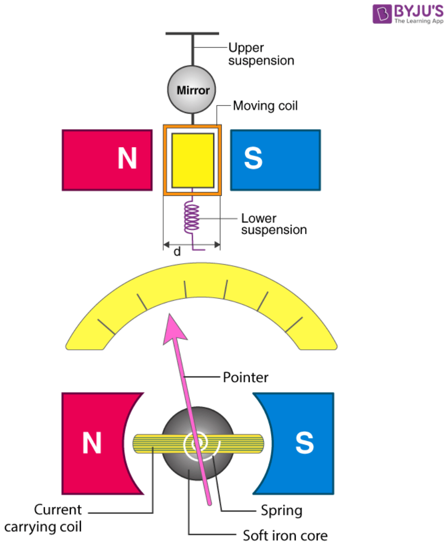

Moving coil galvanometer

(iii)The deflection in a moving coil galvanometer is

A. directly proportional to torsional constant of spring

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 in the coil

19. Moving coil galvanometer operates on Permanent Magnet Moving Coll (PMMC) mechanism.

Moving coil galvanometers are of two types
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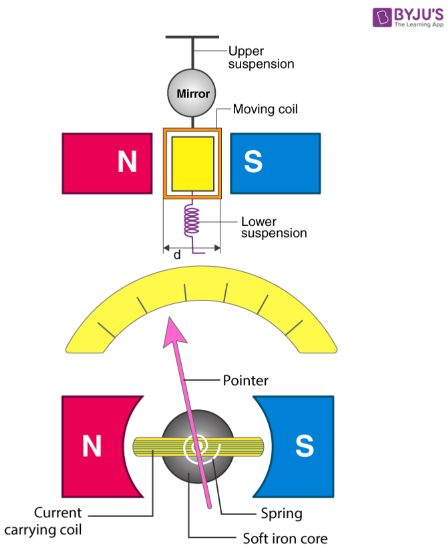

Moving coil galvanometer

(iv) In a moving coil galvanometer, having a coil of N-turns of area A and carrying current I is placed in a radial field of strength B. The torque acting on the coil is

A. NA^2B^2I

B. $NABI^2$

C. N^2ABI

D. $NABI$

20. Moving coil galvanometer operates on Permanent Magnet Moving Coll (PMMC) mechanism.

Moving coil galvanometers are of two types
(i) Suspended coil
(ii) Pivoted coil type or tangent galvanometer,

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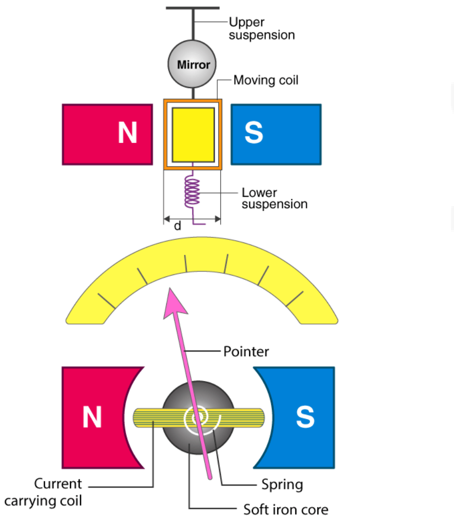

Moving coil galvanometer

(v) To increase the current sensitivity of a moving coil galvanometer, we should decrease

A. strength of magnet

B. torsional constant of spring

C. number of turns in coil

D. area of coil