RAVI MATHS TUITION CENTER , CHENNAI- 82. WHATSAPP - 8056206308

Magnetic Effects Of Electric Current MCQ TEST

10th Standard

Science

25 x 1 = 25

1) The magnetic field inside a long straight solenoid-carrying current

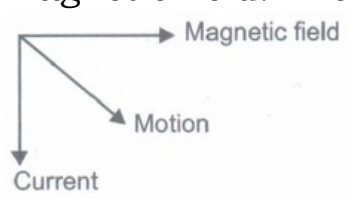
(a) is zero (b) decrease as we move towards its end (c) increases a swe move towards its end

(d) is the same at all points.

2) Which of the following property of a proton can change while it moves freely in a magnetic field ?

(a) mass (b) speed (c) velocity (d) momentum

3) A positively charged particle (alpha-particle) projected towards west is deflected towards north by a magnetic field. The direction of magnetic field is



(a) towards south (b) towards east (c) downward (d) upward

4) A rectangular coil of copper wire is rotated in a magnetic field. The direction of the induced current changes once in each

(a) Two revolutions (b) One revolution (c) Half revolution (d) One-fourth revolution

5) Which of the following correctly describes the magnetic field near a long straight wire ?

(a) The field consists of straight lines perpendicular to the wire.

(b) The field consists of straight lines Parallel to the wire.

(c) The field consists of radial lines originating from the wire.

(d) The field consists of concentric circles centred on the wire.

6) The phenomenon of electromagnetic induction is

(a) the process of charging a body.

(b) the process of generating magnetic field due to a current passing through a coil.

(c) producing induced current in a coil due to relative motion between a magnet and the coil.

(d) the process of rotating a coil of an electric motor.

7) The device used for producing electric current is called a

(a) generator (b) galvanometer (c) ammeter (d) motor

8) The essential difference between an AC generator and a DC generator is that

(a) AC generator has an electromagnet while a DC generator has permanent magnet.

(b) DC generator will generate a higher voltage. (c) AC generator will generate a higher voltage

(d) AC generator has slip rings while the DC generator has a commutator.

9) At the time of short circuit, the current in the circuit

(a) reduces substantially (b) does not change (c) increases heavily (d) vary continuously

10) Choose the incorrect statement from the following regarding magnetic lines of field.

(a) The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points.

(b) Magnetic field lines are closed curves

(c) if magnetic field lines are parallel and equidistant, they represent zero field strength

(d) Relative strength of magnetic field is shown by the degree of closeness of the field lines.

11) For a current in a long straight solenoid N- and S- poles are created at the two ends. Among the following statements, the incorrect statement is

(a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid

(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.

(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.

(d) The N- and S- Poles exchange position when the direction of current through the solenoid is reversed

12) Commercial electric motors do not use

(a) An electromagnet to rotate the armature

(b) Effectively large number of turns of conducting wire in the current carrying coil

(c) A permanent magnet to rotate the armature (d) A soft iron core on which the coil is wound

13) Choose the incorrect statement

(a) Fleming's right-hand rule is a simple rule to know the direction of induced current.

(b) The right-hand thumb rule is used to find the direction of magnetic fields due to current carrying conductors.

(c) The difference between the direct and alternating currents is that the direct current always flows in one direction, whereas the alternating current reverses its direction periodically.

(d) In India, the AC changes direction after every 1/50 second.

14) The strength of magnetic field inside a long current carrying straight solenoid is

(a) More at the ends than at the centre (b) Minimum in the middle (c) Same at all points

(d) Found to increase from one end to the other.

15) To convert an AC generator into DC generator

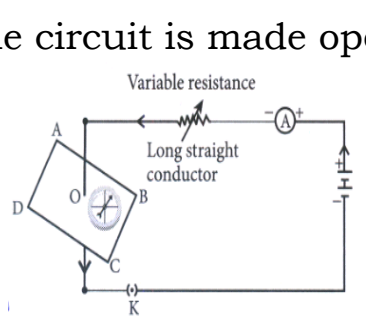
(a) Split-ring type commutator must be used (b) Slip rings and brushes must be used

(c) A stronger magnetic field has to be used (d) A rectangular wire has to be used.

16) The most important safety method used for protecting home appliances from short circuiting or overloading is

(a) Earthing (b) Use of fuse (c) Use of stabilisers (d) Use of electric meter.

17) If the key in the arrangement (below figure) is taken out (the circuit is made open) and magnetic field lines are drawn over the horizontal plane ABCD, the lines are



(a) Concentric circles (b) Elliptical in shape (c) Straight lines parallel to each other

(d) Concentric circles near the point O but of elliptical shapes as we go away from it.

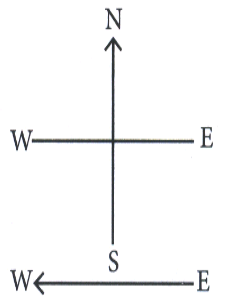
18) A uniform magnetic field exists in the plane of paper pointing from left to right as shown in Figure. In the field an electron and a proton move as shown in the figure. The electron and the proton experience

(a) Forces both pointing into the plane of paper (b) Forces both pointing out of the plane of paper

(c) Forces pointing into the plane of paper and out of the plane of paper, respectively.

(d) Force pointing opposite and along the direction of the uniform magnetic field respectively.

19) A constant current flows in a horizontal wire in the plane of the paper from east to west as shown in the figure. The direction of the magnetic field at a point will be North to South



(a) Directly above the wire (b) directly below the wire

(c) At a point located in the plane of the paper, on the north side of the wire

(d) At a point located in the plane of the paper, on the south side of the wire.

20) The core of an electromagnet must be of

(a) soft iron (b) hard iron (c) rusted iron (d) none of the above

21) An instrument which can detect the presence of electric current in a circuit is

(a) galvanometer (b) motor (c) generator (d) none of the above

22) The right-hand thumb rule is stated by

(a) Oersted (b) Maxwell (c) Fleming (d) none of the above

23) No force acts on a current carrying conductor when it is placed

(a) perpendicular to the magnetic field (b) parallel to the magnetic field

(c) far away from the magnetic field (d) inside a magnetic field.

24) The condition necessary for electromagnetic induction is that

(a) there must be a relative motion between the coil of wire and galvanometer.

(b) there must be a relative motion between the coil of wire and a magnet.

(c) there must be a relative motion between the galvanometer and a magnet (d) all of the above.

25) In all the electrical appliances, the switches are put in the

(a) live wire (b) earth wire (c) neutral wire (d) none of the above

22 x 1 = 22

26) **Assertion:** Electricity and magnetism are related phenomena.
Reason: A magnet gets deflected when an electric current passed through a metallic wire placed nearby.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

27) **Assertion:** The unit of magnetic field strength is named by the Oersted.
Reason: Ampere suggested that the magnet exerts an equal and opposite force on the current - carrying conductor.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

28) **Assertion:** Solenoid is like a bar magnet.
Reason: One end of the solenoid behaves as a magnetic north pole, while the other behaves as the south pole.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

29) **Assertion:** The magnitude of the force is the highest when the direction of current is at right angle to the direction of the magnetic field.
Reason: Fleming's left-hand rule illustrates the same by stretching first three fingers of left hand.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

30) **Assertion:** Electrical appliances are connected parallel to each other.
Reason: In order that each appliance has equal potential difference.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

31) **Assertion:** Magnetic field lines have both direction and magnitude.
Reason: The field lines, emerge from the north pole and merge at south pole
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

32) **Assertion:** Magnets are used to generate electricity.
Reason: Electric current flowing through a wire produces magnetic effect.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false.

33) **Assertion**: Force experienced by moving charge will be maximum if direction of velocity of charge is parallel to applied magnetic field.
Reason: Force on moving charge is depends on direction of applied magnetic field.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

34) **Assertion**: In electric circuits, wires carrying currents in opposite directions are often twisted together.
Reason: If the wire are not twisted together, the combination of the wires forms a current loop. The magnetic field generated by the loop might affect adjacent circuits or components
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

35) **Assertion:** When two long parallel wires, hanging freely are connected in parallel to a battery, they come closer to each other.
Reason: Wires carrying current in opposite directions repel each other.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

36) **Assertion:** Magnetic field lines show the direction (at every point) along which a small magnetised needle aligns (at the point).
Reason: Magnetic field lines certainly represent the direction of magnetic field, but not the direction of force, this is because force is always perpendicular to magnetic field *B.*
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

37) **Assertion:** When a charged particle moves perpendicular to magnetic field then its kinetic energy and momentum gets affected.
Reason: Force does not change velocity of charged particle.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

38) **Assertion:** The direction of force is given by Fleming's left hand rule.
Reason : A magnetic field exert a force on a moving charge in the same direction as the direction of field itself.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

39) **Assertion:** A moving coil galvanometer is based on magnetic effect of current.
Reason: On keating, the coil starts to rotate in direction of moving coil galvanometer.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

40) **Assertion:** Magnetic field lines forms closed loops in nature.
Reason: Mono-magnetic pole does not exist in nature.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

41) **Assertion:** Magnetic field interacts with a moving charge and not with a stationary charge.
Reason: A moving charge produces a magnetic field
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

42) **Assertion:** The magnetic field intensity at the centre of a circular coil carrying current changes, if the current through the coil is doubled.
Reason: The magnetic field intensity is dependent on current in conductor.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

43) **Assertion:** For a point on the axis of a circular coil carrying current, magnetic field is maximum at the centre of the coil.
Reason: Magnetic field is proportional to the distance of point from the circular coil.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

44) **Assertion:** A solenoid tends to expand, when a current passes through it.
Reason: Two straight parallel metallic wires carrying current in same direction attract each other.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

45) **Assertion:** No net force acts on a rectangular coil carrying a steady current when suspended freely in a uniform magnetic field.
Reason: Forces acting on each pair of the opposite sides of the coil are equal and opposite.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true

46) **Assertion:** In a conductor, free electrons keep on moving but no magnetic force acts on a conductor in a magnetic field.
Reason: Force on free electron due to magnetic field always acts perpendicular to its direction of motion.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true

47) **Assertion:** The magnetic field produced by a current carrying solenoid is independent of its length and cross sectional area.
Reason: The magnetic field inside the solenoid is uniform.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true

9 x 4 = 36

48) An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the solenoid. The strength of magnetic field produced by a current carrying solenoid is directly proportional to the number of turns and strength of current in the solenoid.

(i) The strength of magnetic field inside a long current -carrying straight solenoid is

(a) more at the ends than at the centre

(b) minimum in the middle

(c) same at all points

(d) found to increase from one end to the other.

(ii) The north-south polarities of an electromagnet can be found easily by using

(a) Fleming's right-hand rule **(b) Fleming's left-hand rule**

(c) Clock face rule **(d) Left-hand thumb rule**

(iii) For a current in a long straight solenoid N-and S-poles are created at the two ends.

Among the following statements, the incorrect statement is

(a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.

(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.

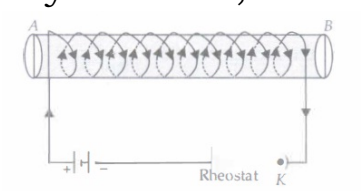
(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.

(d) The N- and S-poles exchange position when the direction of current through the solenoid is reversed.

(iv) A long solenoid carrying a current produces a magnetic field B along its axis. If the current is double and the number of turns per cm is halved, then new value of magnetic field is

(a) B **(b) 2B** **(c) 4B** **(d) B/2**

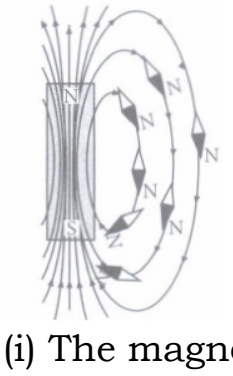
(v) A soft iron bar is enclosed by a coil of insulated copper wire as shown in figure. When the plug of the key is closed, the face B of the iron bar marked as



(a) N-pole **(b) S-pole**

(c) N-pole if current is large **(d) S-pole if current is small**

49) A magnetic field is described by drawing the magnetic field lines. When a small north magnetic pole is placed in the magnetic field created by a magnet, it will experience a force. And if the north pole is free, it will move under the influence of magnetic field. The path traced by a north magnetic pole free to move under the influence of a magnetic field is called a magnetic field line. Since the direction of magnetic field line is the direction of force on a north pole, so the magnetic field lines always begin from the N-pole of a magnet and end on the S-pole of the magnet. Inside the magnet, however the direction of magnetic field lines is from the S-pole of the magnet to the N-pole of the magnet. Thus, the magnetic field lines are closed curves. When a small compass is moved along a magnetic field line, the compass needle always sets itself along the line tangential to it. So, a line drawn from the south pole of the compass needle to its north pole indicates the direction of the magnetic field at that point.



(i) The magnetic field lines

(a) intersect at right angle to one another

(b) intersect at an angle of 45° to each other

(c) do not cross one another

(d) cross at an angle of 60° to one another.

(ii) A strong bar magnet is placed vertically above a horizontal wooden board. The magnetic lines of force will be

(a) only in horizontal plane around the magnet

(b) only in vertical plane around the magnet

(c) in horizontal as well as in vertical planes around the magnet

(d) in all the planes around the magnet.

(iii) Magnetic field lines can be used to determine

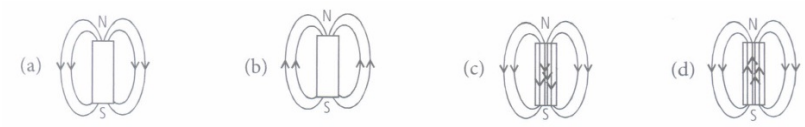
(a) the shape of the magnetic field

(b) only the direction of the magnetic field

(c) only the relative strength of the magnetic field

(d) both the direction and the relative strength of the magnetic field.

(iv) The magnetic field lines due to a bar magnet are correctly shown in figure



(v) Which of the following is not true about magnetic field lines?

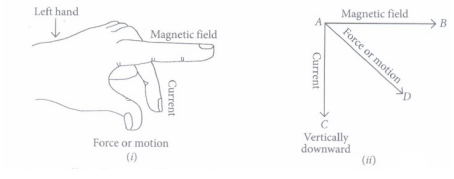
(a) Magnetic field lines are the closed and continuous curve.

(b) No two field lines can cross each other.

(c) Crowdness of field lines represents the strength of magnetic field.

(d) The direction of field lines is from the north pole to the south pole inside a bar magnet.

50) Andre Marie Ampere suggested that a magnet must exert an equal and opposite force on a current carrying conductor, which was experimentally found to be true. But we know that current is due to charges in motion. Thus, it is clear that a charge moving in a magnetic field experience a force, except when it is moving in a direction parallel to it. If the direction of motion is perpendicular to the direction of magnetic field, the magnitude of force experienced depends on the charge, velocity (v), strength of magnetic field (B), and sine of the angle between v and B. Direction of magnetic force is given by Fleming's left hand rule.



(i) If an electron is travelling horizontally towards east. A magnetic field in vertically downward direction exerts a force on the electron along

(a) east **(b) west** **(c) north** **(d) south**

(ii) If a charged particle is moving along a magnetic field line. The magnetic force on the particle is

(a) along its velocity **(b) opposite to its velocity**

(c) perpendicular to its velocity **(d) zero**

(iii) A magnetic field exerts no force on

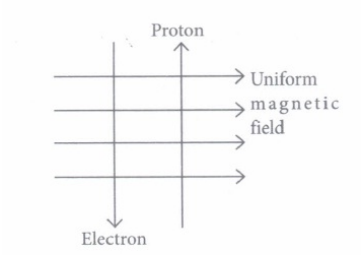
(a) a stationary electric charge

(b) a magnet

(c) an electric charge moving perpendicular to its direction

(d) an unmagnetised iron bar

(iv) A uniform magnetic field exists in the plane of paper pointing from left to right as shown in figure. In the field an electron and a proton move as shown. The electron and the proton experience



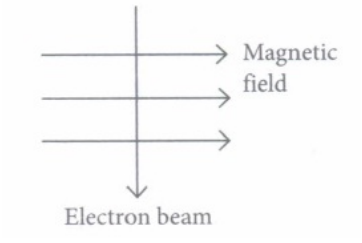
(a) forces both pointing into the plane of paper

(b) forces both pointing out of the plane of paper

(c) forces pointing into the plane of paper and out of the plane of paper, respectively

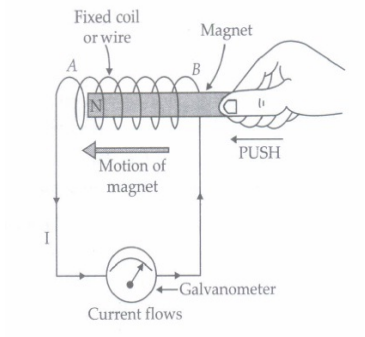
(d) force pointing opposite and along the direction of the uniform magnetic field respectively

(v) An electron beam enters a magnetic field at right angles to it as shown in the figure. The direction of force acting on the electron beam will be

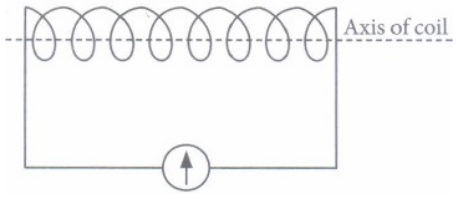


(a) to the left **(b) to the right** **(c) into the page** **(d) out of the page**

51) A current carrying wire produces magnetic field around it. The phenomena in which an electromotive force and current (if the conductor is in the form of a closed circuit) is induced by changing magnetic field (or by passing magnetic field lines) through it is called electromagnetic induction. The emf so developed is called induced emf and current made to flow is called induced current. The cause of induced emf carried out by Faraday and Henry. It can be concluded that the induced current flows in a conductor as long as the magnetic lines of force change within the conductor. In case of relative motion i.e., motion of coil w.r.t to magnet or vice versa, the direction of the current flowing in the conductor is determined by the direction of the relative motion of the conductor with respect to the magnetic field. The induced emf or current is directly proportional to the rate of change in magnetic field.

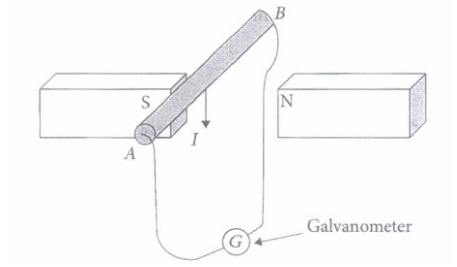


(i) A student connects a coil of wire with a sensitive galvanometer as shown in figure. He will observe the deflection in the galvanometer if bar magnet is



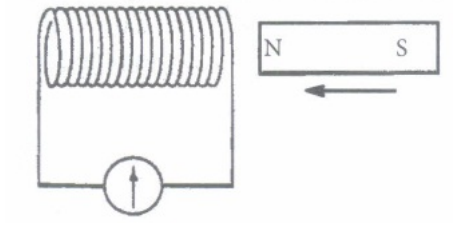
(a) placed near one of the faces of the coil and parallel to the axis of the coil
(b) placed near one of the faces of the coil and perpendicular to the axis of the coil
(c) placed inside the coil
(d) moved towards or away from the coil parallel to the axis of the coil.

(ii) A conducting rod AB moves across two magnets as shown in figure and the needle in the galvanometer deflects momentarily. What is the name of this physical phenomenon?



(a) Electromagnetism
(b) Induced magnetism
(c) Electromagnetic induction
(d) Static induction

(iii) A bar magnet is pushed steadily into a long solenoid connected to a sensitive meter.



Which of the following would affect the magnitude of the deflection of the meter?
(a) How fast the magnet is pushed into the coil.
(b) The direction in which the coil is wound.
(c) The end of the solenoid the magnet enters.
(d) The pole of the magnet enters the coil first.

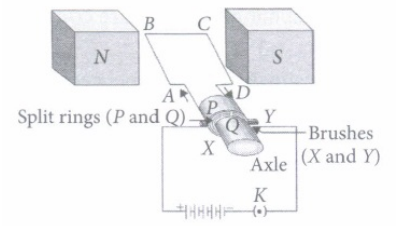
(iv) What is the condition of an electromagnetic induction?
(a) There must be a relative motion between galvanometer and coil of wire.
(b) There must be a relative motion between galvanometer and a magnet.
(c) There must be a relative motion between galvanometer and electric motor.
(d) There must be a relative motion between the coil of wire and a magnet.

(v) An induced emf is produced when a magnet is plunged into a coil. The magnitude of induced emf does not depend on

(a) the number of turns in the coil
(b) the speed with which the magnet is moved

(c) the strength of the magnet **(d) the resistivity of the material of the coil**

52) An electric motor is a rotating device that converts electrical energy into mechanical energy. Electric motor is used as an important component in electric fans, refrigerators, mixers, washing machines, computers, MP3 players, etc.



An electric motor consists of a rectangular coil ABCD of insulated copper wire. The coil is placed between the two poles of a magnetic field such that the arm AB and CD are perpendicular to the direction of the magnetic field. The ends of the coil are connected to the two halves P and Q of a split ring. The inner sides of these halves are insulated and attached to an axle. The external conducting edges of P and Q touch two conducting stationary brushes X and Y,respectively, as shown in the figure. Commercial motors use an electromagnet in place of a permanent magnet, a large number of turns of conducting wire in the current carrying coil and a soft iron core on which the coil is wound.

(i) Choose incorrect statement from the following regarding split rings.

(a) Split rings are used to reverse the direction of current in coil.

(b) Split rings are also known as commutator.

(c) Split ring ii a discontinuous or a broken ring.

(d) Both (a) and (b)

(ii) Which of the following has no effect on the size of the turning effect on the coil of an electric motor?

(a) The amount of the current in the coil **(b) The direction of the current in the coil.**

(c) The number of turns in the coil. **(d) The strength of the magnetic field**

(iii) When current is switched ON, an electric fan converts

(a) mechanical energy to chemical energy **(b) electrical energy to mechanical energy**

(c) chemical energy to mechanical energy **(d) mechanical energy to electrical energy.**

(iv) In an electric motor, device that makes contact with the rotating rings and through them to supply current to coil is

(a) axle **(b) brushes** **(c) coil** **(d) split rings.**

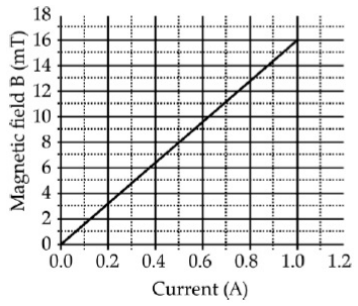
(v) In an electric motor, the direction of current in the coil changes once in each

(a) two rotations **(b) one rotation** **(c) half rotation** **(d) one-fourth rotation**

53) A solenoid is a long helical coil of wire through which a current is run in order to create a magnetic field. The magnetic field of the solenoid is the superposition of the fields due to the current through each coil. It is nearly uniform inside the solenoid and close to zero outside and is similar to the field of a bar magnet having a north pole at one end and a south pole at the other depending upon the direction of current flow. The magnetic field produced in the solenoid is dependent on a few factors such as, the current in the coil, number of turns per unit length etc.

The following graph is obtained by a researcher while doing an experiment to see the variation of the magnetic field with respect to the current in the solenoid. The unit of magnetic field as given in the graph attached is in milli-Tesla (mT) and the current is given in Ampere.

(i) What type of energy conversion is observed in a linear solenoid?



(a) Mechanical to Magnetic
(b) Electrical to Magnetic
(c) Electrical to Mechanical
(d) Magnetic to Mechanical

(ii) What will happen if a soft iron bar is placed inside the solenoid?

(a) The bar will be electrocuted resulting in short-circuit.
(b) The bar will be magnetised as long as there is current in the circuit.
(c) The bar will be magnetised permanently.
(d) The bar will not be affected by any means.

(iii) The magnetic field lines produced inside the solenoid are similar to that of ...

(a) a bar magnet
(b) a straight current carrying conductor
(c) a circular current carrying loop
(d) electromagnet of any shape

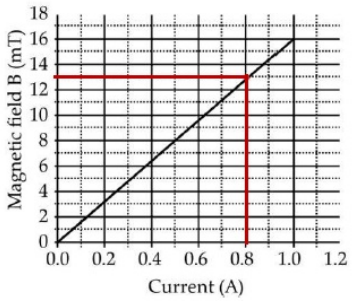
(iv) After analysing the graph a student writes the following statements.

I. The magnetic field produced by the solenoid is inversely proportional to the current.
II. The magnetic field produced by the solenoid is directly proportional to the current.
III. The magnetic field produced by the solenoid is directly proportional to square of the current.
IV. The magnetic field produced by the solenoid is independent of the current.

Choose from the following which of the following would be the correct statement(s).

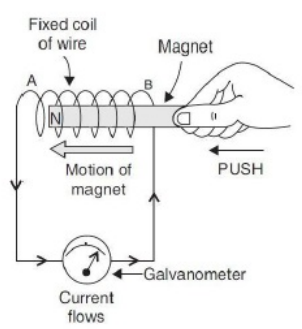
(a) Only IV
(b) I and III and IV
(c) I and II
(d) Only II

(v) From the graph deduce which of the following statements is correct.

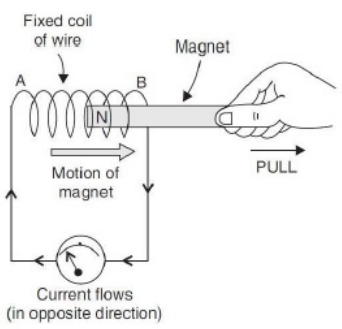


(a) For a current of 0.8A the magnetic field is 13 mT
(b) For larger currents, the magnetic field increases non-linearly.
(c) For a current of 0.8A the magnetic field is 1.3 mT
(d) There is not enough information to find the magnetic field corresponding to 0.8A current.

54) Ram is doing one experiment on Electromagnetic induction. He has a fixed coil of wire AB and he connected the two ends of the coil galvanometer. Now, he observe that when a bar magnet is held standstill inside the hollow coil of wire, then there is no deflection in the galvanometer pointer showing that no electric current is produced in the coil of wire when the magnet is held stationary in it. After that he moved bar magnet quickly into a fixed coil of wire AB. He observes that When a bar magnet is moved quickly into a fixed coil of wire AB, then a current is produced in the coil. This current causes a deflection in the galvanometer pointer [see Figure (a)]. Similarly, he observes that when the magnet is moved out quickly from inside the coil, even then a current is produced in the coil [see Figure (b)]. This current also causes a deflection in the galvanometer pointer but in the opposite direction (showing that when the direction of movement of magnet changes, then the direction of current produced in the coil also changes). So, he confirms that the current produced in this case is also alternating current or a.c.



(*a*) As a magnet is pushed into the fixed coil, a current is produced in the coil



(*b*) When the magnet is pulled out from the fixed coil, even then a current is produced in the coil (but in the opposite direction)

(i) The phenomenon of electromagnetic induction is :