HOLIDAY HOME WORK

Class 12th (Physics)

Dear Parents,

We wish you and your child a very happy summer holidays . It's time to enjoy and create a bond with family, friends and relatives. To utilize this time in the most constructive way we have prepared Holiday Homework for the students on the principle of 'learning by doing' for their holistic development.

So here we start.....

1. Morning Blessings

Help your child inculcate good habits like doing ''Surya Namaskar'' and encourage him/her to wish all elders in the morning. If possible, visit a temple or any other religious place of your choice.

2. Physical Development

- Take the child with you for morning/evening walk.
- Play different games like hide and seek, football, ludo, chess, snakes and ladders, carrom board etc. with your child.

3. Language Development

- Encourage your child to converse in English.
- Choose any 1 object from your surroundings every day. Let the child speak few lines on it.

4. Being Good

- Help your child inculcate good habits like doing 'Surya Pranam' & encourage him / her to greet all elders in the morning.
- Help your child to use 4 magical words: PLEASE, SORRY, THANK YOU, EXCUSE ME as the part of basics of good manners.
- Encourage your child to listen.
- Gently care for animals. Encourage your child to be empathetic towards animals.
- Involve your child to sow a plant in a pot and give water. Give knowledge about plants and trees.
- Explain to them that they are an integral part of their growing up.
- Have at least two meals together with your children. Teach them the importance and hard work of the farmer and ask them not to waste their food.
- Let them take their own plates after every meal . Children learn dignity of labour from such activities.

5. Health and Hygiene

"Healthy mind resides in a healthy body." So start your day early and set a routine even during vacations.

In addition you and your little one can spend some quality time playing, cycling, and swimming to keep yourself fit and healthy. Encourage your child to take care of personal hygiene by inculcating the habits like washing hands, practicing yoga, eating healthy food etc.

General instructions:-

1. Attempt your work neatly.

2. Use homework notebook to write answers.

3. Make investigatory project report assigned by teacher in class.

4. Revise chapter 1, 2, 3, and 4 for test.

Do all following MCQ.

CHAPTER-1 ELECTRIC CHARGE, FIELD AND FLUX

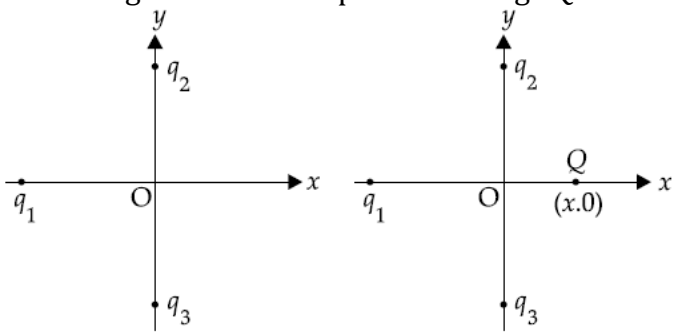
Q. 1. Plastic rod rubbed with fur and glass rod rubbed with silk
(A) repel each other (B) mix up with each other (C) attract each other (D) None of the above

Q. 2. Electric charge between two bodies can be produced by
(A) sticking (B) rubbing (C) oiling (D) passing AC current

Q. 3. Electric charges under action of electric forces is called
(A) electrostatic (B) electric flux (C) electric field (D) electric field lines

Q. 4. Law stating that "force is directly proportional to product of charges and inversely proportional to square of separation between them" is called
(A) Newton's law. (B) Coulomb's law (C) Gauss's law. (D) Ohm's law

Q. 5. In given figure, two positive charges $q2$ and $q3$ fixed along the y axis, exert a net electric force in the + x direction on a charge $q1$ fixed along the x axis. If a positive charge Q is added at (x, 0), the force on $q1$



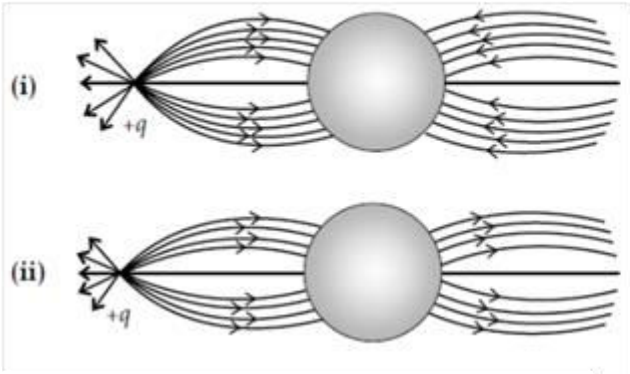
(A) shall increase along the positive x-axis.
(B) shall decrease along the positive x-axis.
(C) shall point along the negative x-axis.
(D) shall increase but the direction changes because of the intersection of Q with $q2$ and $q3$.

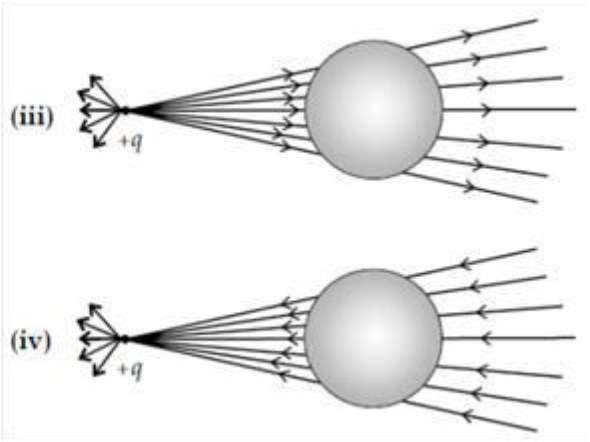
Q. 6. The magnitude of electric force, F is
(A) directly proportional to the multiplication of both charges.
(B) directly proportional to the distance between both charges.
(C) directly proportional to the square of the distance between both charges.
(D) constant.

Q. 7. A body is negatively charged means
(A) It has only negative charges.
(B) Positive charges have been neutralized by negative charges.
(C) The quantity of negative charge present is more than the quantity positive charge present.
(D) The positive are displaced from their original positions.

Q. 8. When a body is charged by conduction, its mass
(A) remains same. (B) increases. (C) decreases. (D) increase or decrease.

Q. 9. A point positive charge is brought near an isolated conducting sphere in Figure. The electric field is best given by:



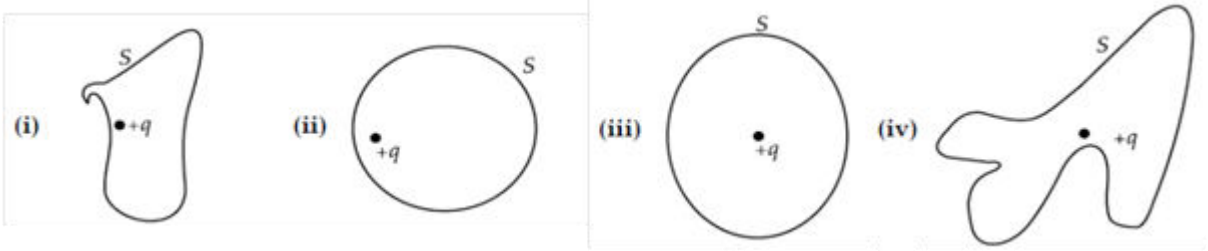


(A) Fig (i) (B) Fig (iii) (C) Fig (ii) (D) Fig (iv)

Q. 10. A point charge $+q$, is placed at a distance d from an isolated conducting plane. The field at a point P on the other side of the plane is
(A) directed perpendicular to the plane and away from the plane.
(B) directed perpendicular to the plane but towards the plane.
(C) directed radially away from the point charge.
(D) directed radially towards the point charge.

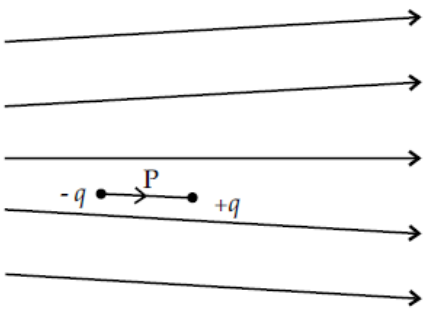
Q. 11. A hemisphere is uniformly charged positively. The electric field at a point on a diameter away from the centre is directed
(A) perpendicular to the diameter.
(B) parallel to the diameter.
(C) at an angle tilted towards the diameter.
(D) at an angle tilted away from the diameter.

Q. 12. The electric flux through the surface:



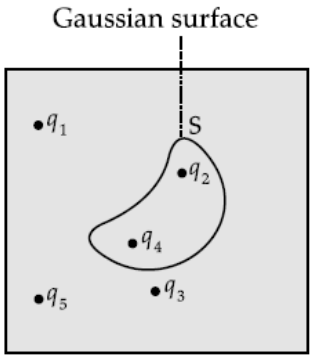
(A) in Figure (iv) is the largest. (B) in Figure (iii) is the least.
(C) in Figure (ii) is same as Figure (iii) but is smaller than Figure (iv).
(D) is the same for all the figures.

Q. 13. Figure shows electric field lines in which an electric dipole p is placed as shown. Which of the following statements is correct?



(A) The dipole will not experience any force. (B) The dipole will experience a force towards right.
(C) The dipole will experience a force towards left. (D) The dipole will experience a force upwards.

Q .14. Five charges q_1, q_2, q_3, q_4, and q_5 are fixed at their positions as shown in Figure. S is a Gaussian surface. The Gauss's law is given by:
$\oint E.ds = q / \varepsilon 0$



Which of the following statements is correct?
(A) E on the LHS of the above equation will have a contribution from $q1$, $q5$ and $q3$, while q on the RHS will have a contribution from $q2$ and $q4$ only.
(B) E on the LHS of the above equation will have a contribution from all charges, while q on the RHS will have a contribution from $q2$ and $q4$ only.
(C) E on the LHS of the above equation will have a contribution from all charges, while q on the RHS will have a contribution from $q1$, $q3$ and $q5$ only.
(D) Both E on the LHS and q on the RHS will have contributions from $q2$ and $q4$ only.

Q. 15. The Electric field at a point is
(A) always discontinuous.
(B) discontinuous if there is a positive charge at that point.
(C) discontinuous only if there is a negative charge at that point.
(D) discontinuous if there is a charge at that point.

CHAPTER-2 ELECTRIC POTENTIAL AND CAPACITANCE

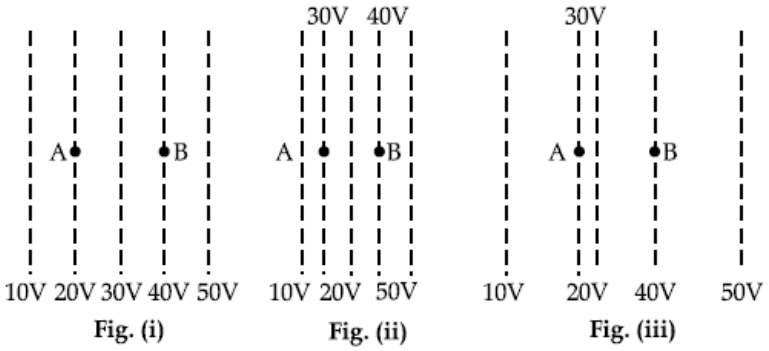
Q.1. The electrostatic potential on the surface of a charged conducting sphere is 100 V.
Two statements are made in this regard:
S_1: At any point inside the sphere, electric intensity is zero.
S_2: At any point inside the sphere, the electrostatic potential is 100 V.
Which of the following is a correct statement?
(A) S_1 is true, but S_2 is false.
(B) Both S_1 and S_2 are false.
(C) S_1 is true, S_2 is also true and S_1 is the cause of S_2.
(D) S_1 is true, S_2 is also true but the statements are independent.

Q. 2. Equipotential at a great distance from a collection of charges whose total sum is not zero are approximately
(A) spheres. (B) planes. (C) paraboloids. (D) ellipsoids.

Q. 3. A positively charged particle is released from rest in an uniform electric field. The electric potential energy of the charge
(A) remains a constant because the electric field is uniform.
(B) increases because the charge moves along the electric field.

(C) decreases because the charge moves along the electric field.
(D) decreases because the charge moves opposite to the electric field.

Q. 4. Figure shows some equipotential lines distributed in space. A charged object is moved from point A to point B.



(A) The work done in Figure (i) is the greatest.
(B) The work done in Figure (ii) is least.
(C) The work done is the same in Figure (i), Figure (ii) and Figure (iii).
(D) The work done in Figure (iii) is greater than Figure (ii), but equal to that in Figure (i).

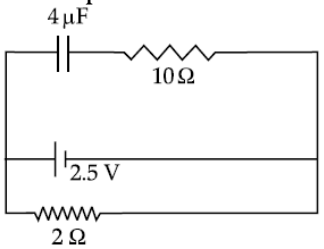
Q. 5. The work done to move a charge along an equipotential surface from A to B
(A) cannot be defined. (B) is a negative quantity. (C) is zero. (D) is a positive quantity.

Q. 6. The shape of equipotential surfaces due to an isolated charge is
(A) Concentric spherical shells and the distance between the shells increases with the decrease in electric field
(B) Concentric spherical shells and the distance between the shells decreases with the decrease in electric field
(C) Equi-spaced concentric spherical shells
(D) Changes with the polarity of the charge.

Q. 7. Electric potential inside a conducting sphere
(A) is zero. (B) remains constant.
(C) decreases from centre to surface. (D) increases from centre to surface.

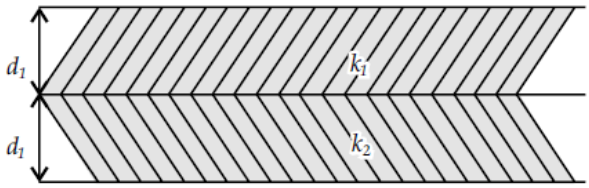
Q. 8. The electric potential at a point on the equatorial line of a electric dipole is
(A) directly proportional to the square of the distance.
(B) indirectly proportional to the square of the distance.
(C) directly proportional to the charge.
(D) None of the above

Q. 9. A capacitor of 4 μF is connected as shown in the circuit Figure. The internal resistance of the battery is 0.5 Ω. The amount of charge on the capacitor plates will be:



(A) 0 μC (B) 4 μC (C) 16 μC (D) 8 μC

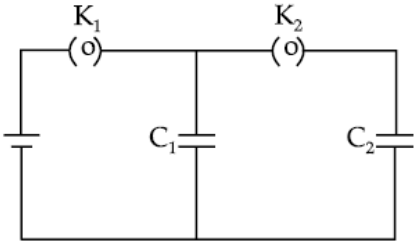
Q. 10. A parallel plate capacitor is made of two dielectric blocks in series. One of the blocks has thickness d_1 and dielectric constant k_1 and the other has thickness d_2 and dielectric constant k_2 as shown in Figure. This arrangement can be thought as a dielectric slab of thickness d ($=d_1 + d2$) and effective dielectric constant k. The k is:



(A) $\frac{k_1d_1+k_2d_2}{d_1+d_2}$ (B) $\frac{k_1d_1+k_2d_2}{k_1+k_2}$

(C) $\frac{k_1k_2(d_1+d_2)}{(k_1d_1+k_2d_2)}$ (D) $\frac{2k_1k_2}{k_1+k_2}$

Q. 11. In the circuit shown in Figure, initially key K_1 is closed and key K_2 is open. Then K_1 is opened and K_2 is closed. Then

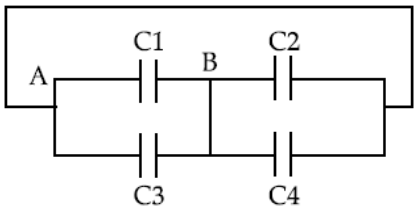


(A) Voltage across C_1 = Voltage across C_2 (B) Voltage across C_1 > Voltage across C_2, if $C_1 > C_2$
(C) Charge on C_1 = charge on C_2 (D) None of the above

Q. 12. Capacitance of a parallel plate capacitor can be increased by
(A) increasing the distance between the plates.
(B) decreasing the distance between the plates.
(C) decreasing the area of plates.
(D) increasing the thickness of the plates.

Q. 13. A parallel plate capacitor is charged by connecting it to a battery. Which of the following will remain constant if the distance between the plates of the capacitor is increased in this situation?
(A) Energy stored (B) Electric field
(C) Potential difference (D) Capacitance

Q. 14. 4 capacitors, each of 2 μF, are connected as shown. What will be the equivalent capacitor across the points A, B?



(A) 0.5 μF (B) 2 μF (C) 8 μF (D) 4 μF

Q. 15. The capacitance of a parallel plate capacitor is 10 μF. When a dielectric plate is introduced in between the plates, its potential becomes 1/4th of its original value. What is the value of the dielectric constant of the plate introduced?

(A) 4 (B) 40 (C) 2.5 (D) none of the above

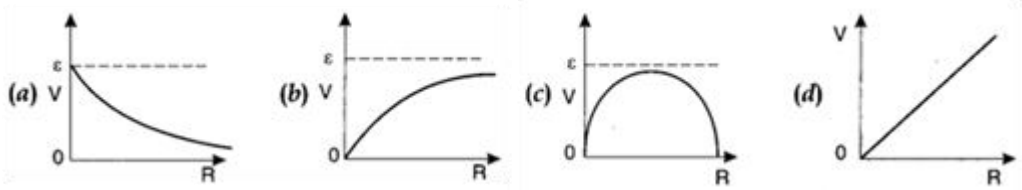
CHAPTER-3 CURRENT ELECTRICITY

1. An electric heater is connected to the voltage supply. After few seconds, current gets its steady value then its initial current will be
(a) equal to its steady current (b) slightly higher than its steady current
(c) slightly less than its steady current (d) zero

2. In the series combination of two or more than two resistances
(a) the current through each resistance is same.
(b) the voltage through each resistance is same.
(c) neither current nor voltage through each re-sistance is same.
(d) both current and voltage through each resis¬tance are same.

3. Combine three resistors 5 Ω, 4.5 Ω and 3 Ω in such a way that the total resistance of this combination is maximum
(a) 12.5 Ω (b) 13.5 Ω (c) 14.5 Ω (d) 16.5 Ω

4. A cell having an emf E and internal resistance r is connected across a variable external resistance R. As the resistance R is increased, the plot of potential difference V across R is given by



5. In parallel combination of n cells, we obtain
(a) more voltage (b) more current (c) less voltage (d) less current

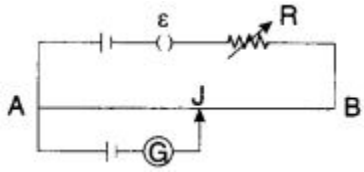
6. If n cells each of emf e and internal resistance r are connected in parallel, then the total emf and internal resistance will be
(a) $\varepsilon, \frac{r}{n}$ (b) ε, nr
(d) $n\varepsilon, \frac{r}{n}$ (d) $n\varepsilon, nr$

7. In a Wheatstone bridge if the battery and galvanometer are interchanged then the deflection in galvanometer will
(a) change in previous direction (b) not change
(c) change in opposite direction (d) none of these.

8. When a metal conductor connected to left gap of a meter bridge is heated, the balancing point
(a) shifts towards right (b) shifts towards left
(c) remains unchanged (d) remains at zero

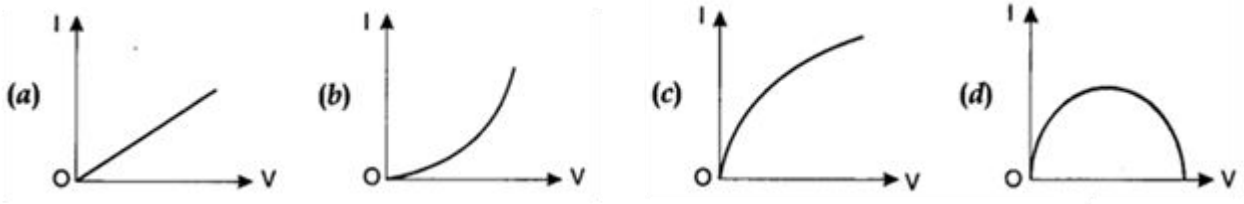
9. In a potentiometer of 10 wires, the balance point is obtained on the 7th wire. To shift the balance point to 9th wire, we should
(a) decrease resistance in the main circuit.
(b) increase resistance in the main circuit.
(c) decrease resistance in series with the cell whose emf is to be measured.
(d) increase resistance in series with the cell whose emf is to be determined.

10. AB is a wire of potentiometer with the increase in the value of resistance R, the shift in the balance point J will be

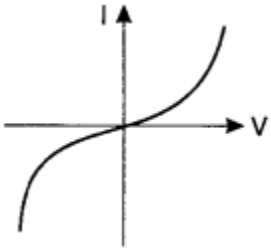


(a) towards B (b) towards A (c) remains constant (d) first towards B then back towards A.

11. A charge is moving across a junction, then
(a) momentum will be conserved. (b) momentum will not be conserved.
(c) at some places momenturii will be conserved and at some other places momentum will not be conserved.
(d) none of these.
12. Which of the following I-V graph represents ohmic conductors?

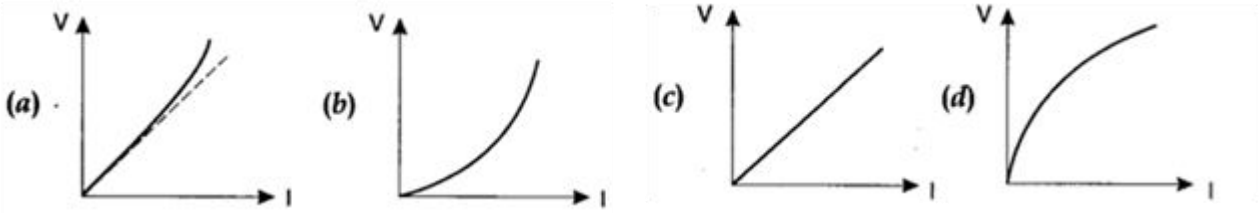


13. The I-V characteristics shown in figure represents



(a) ohmic conductors (b) non-ohmic conductors (c) insulators (d) superconductors

14. Which of the following is correct for V-I graph of a good conductor?



15. The resistivity of alloy manganin is
(a) Nearly independent of temperature (b) Increases rapidly with increase in temperature
(c) Decreases with increase in temperature (d) Increases rapidly with decrease in temperature

CHAPTER-4 MAGNETIC EFFECT OF ELECTRIC CURRENT

1. The nature of parallel and anti-parallel currents are
(a) parallel currents repel and antiparallel currents attract.
(b) parallel currents attract and antiparallel currents repel.
(c) both currents attract. ’
(d) both currents repel.

2. In a moving coil galvanometer the deflection (Φ) on the scale by a pointer attached to the spring is

(a) $\left(\frac{NA}{kB}\right)I$ (b) $\left(\frac{N}{kAB}\right)I$

(c) $\left(\frac{NAB}{k}\right)I$ (d) $\left(\frac{NAB}{kI}\right)$.

3. A moving coil galvanometer can be converted into an ammeter by
(a) introducing a shunt resistance of large value in series.
(b) introducing a shunt resistance of small value in parallel.
(c) introducing a resistance of small value in series.
(d) introducing a resistance of large value in parallel.

4. The conversion of a moving coil galvanometer into a voltmeter is done by
(a) introducing a resistance of large value in series.
(b) introducing a resistance of small value in parallel.
(c) introducing a resistance of large value in parallel.
(d) introducing a resistance of small value in series.

5. When a magnetic compass needle is carried nearby to a straight wire carrying current, then
(I) the straight wire cause a noticeable deflection in the compass needle.
(II) the alignment of the needle is tangential to an imaginary circle with straight wire as its centre and has a plane perpendicular to the wire
(a) (I) is correct
(b) (II) is correct
(c) both (I) and (II) are correct
(d) neither (I) nor (II) is correct

6. A strong magnetic field is applied on a stationary electron. Then the electron
(a) moves in the direction of the field.
(b) remained stationary.
(c) moves perpendicular to the direction of the field.
(d) moves opposite to the direction of the field.

7. In an inertial frame of reference, the magnetic force on a moving charged particle is $\vec{F}$ Its value in another inertial frame of reference will be
(a) remained same
(b) changed due to change in the amount of charge
(c) changed due to change in velocity of charged particle
(d) changed due to change in field direction

8. Which one of the following is correct statement about magnetic forces?
(a) Magnetic forces always obey Newton's third law.
(b) Magnetic forces do not obey Newton's third law.
(c) For very high current, magnetic forces obey Newton's third law.
(d) Inside low magnetic field, magnetic forces obey Newton's third law.

9. A charged particle is moving on circular path with velocity v in a uniform magnetic field B, if the velocity of the charged particle is doubled and strength of magnetic field is halved, then radius becomes
(a) 8 times (b) 4 times (c) 2 times (d) 16 times

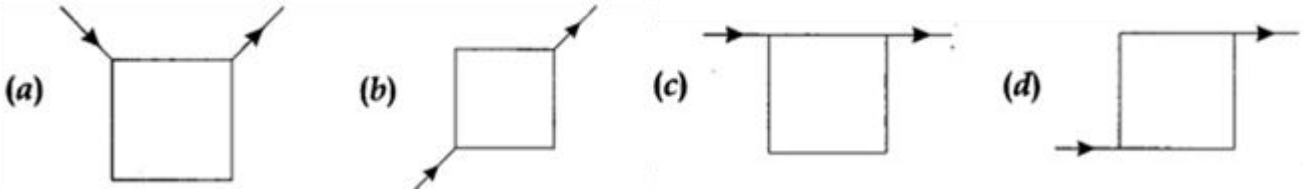
10. Two a-particles have the ratio of their velocities as 3 : 2 on entering the field. If they move in different circular paths, then the ratio of the radii of their paths is
(a) 2 : 3 (b) 3 : 2 (c) 9 : 4 (d) 4 : 9

11. The magnetic moment of a current I carrying circular coil of radius r and number of turns N varies as
(a) $1/r^2$ (b) $1/r$ (c) r (d) r^2

12. A short bar magnet has a magnetic moment of 0. 65 J T^{-1}, then the magnitude and direction of the magnetic field produced by the magnet at a distance 8 cm from the centre of magnet on the axis is
(a) 2.5 × 10-4 T, along NS direction
(b) 2.5 × 10-4 T along SN direction
(c) 4.5 × 10-4 T, along NS direction
(d) 4.5 × 10-4 T, along SN direction

13. A current carrying loop is placed in a uniform magnetic field. The torqe acting on it does not depend upon
(a) area of loop (b) value of current (c) magnetic field (d) None of these

14. Current flows through uniform, square frames as shown in the figure. In which case is the magnetic field at the centre of the frame not zero?



15. Ampere's circuital law is given by
(a) $\oint \vec{H}.\vec{dl} = \mu_0 I_{enc}$ (b) $\oint \vec{B}.\vec{dl} = \mu_0 I_{enc}$
(c) $\oint \vec{B}.\vec{dl} = \mu_0 J$ (d) $\oint \vec{H}.\vec{dl} = \mu_0 J$