1. **Two straight long conductors *AOB* and *COD* are perpendicular to each other and carry currents  and . The magnitude of the magnetic induction at a point *P* at a distance *a* from the point *O* in a direction perpendicular to the plane *ACBD* is**

(a)  (b)  (c)  (d) 

1. **A cell is connected between the points *A* and *C* of a circular conductor *ABCD* of centre *O* with angle *A*. If  and  are the magnitudes of the magnetic fields at *O* due to the currents in *ABC*  and *ADC*  respectively, the ratio  is**

1*A*

*i*2

300o

*B*

*C*

*A*

*D*

60o

*i*1

*O*

(a) 0.2

(b) 6

(c) 1

(d) 5

1. **An infinitely long conductor *PQR* is bent to form a right angle as shown. A current *I* flows through *PQR* The magnetic field due to this current at the point *M* is *H*1. Now another infinitely long straight conductor *QS* is connected at *Q* so that the current is *I*/2in *QR* as well as in *QS, The current in PQ* remaining unchanged. The magnetic field at *M* is now The ratio  is given by**

90*o*

90*o*

*M*

*Q*

*P*

*–* ∞

*S*

+ ∞

*–* ∞

*R*

*I*

(a) 

(b) 1

(c) 

(d) 2

1. **Two coaxial solenoids 1 and 2 of the same length are set so that one is inside the other. The number of turns per unit length are  and . The currents  and  are flowing in opposite directions. The magnetic field inside the inner coil is zero. This is possible when**

(a)  and  (b) and  (c)  and  (d) 

1. **A coil having *N* turns is wound tightly in the form of a spiral with inner and outer radii *a* and *b* respectively. When a current I passes through the coil, the magnetic field at the centre is**

(a)  (b)  (c)  (d) 

1. **A non-planar loop of conducting wire carrying a current *I* is placed as shown in the figure. Each of the straight sections of the loop is of length 2*a*. The magnetic field due to this loop at the point *P* (*a,*0*,a)* points in the direction**

(a) 

(b) 

*z*

*y*

*x*

*i*

2*a*

(c) 

(d) 

1. **A horizontal rod of mass 10 *gm* and length 10 *cm* is placed on a smooth plane inclined at an angle of  with the horizontal, with the length of the rod parallel to the edge of the inclined plane. A uniform magnetic field of induction *B* is applied vertically downwards. If the current through the rod is 1.73 *ampere*, then the value of *B* for which the rod remains stationary on the inclined plane is**

(a) 1.73 *Tesla* (b)  *Tesla* (c) 1 *Tesla* (d)None of the above

1. **Two long wires are hanging freely. They are joined first in parallel and then in series and then are connected with a battery. In both cases, which type of force acts between the two wires**

(a) Attraction force when in parallel and repulsion force when in series

(b) Repulsion force when in parallel and attraction force when in series

(c) Repulsion force in both cases

(d) Attraction force in both cases

1. **A wire of length *L* *metre* carrying a current of *I ampere* is bent in the form of a circle. Its magnitude of magnetic moment will be**

(a)  (b)  (c)  (d) 

1. **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)  (c)  (d) 

1. **A particle of charge *q* and mass *m* moves in a circular orbit of radius *r* with angular speed . The ratio of the magnitude of its magnetic moment to that of its angular momentum depends on**

(a)  (b)  (c)  (d) 

1. **An elastic circular wire of length *l* carries a current *I.* It is placed in a uniform magnetic field  (Out of paper) such that its plane is perpendicular to the direction of . The wire will experience**

*B*

→

*B*

→

*B*

→

*B*

→

*B*

→

(a) No force (b) A stretching force

(c) A compressive force (d) A torque

1. ***A* and *B* are two conductors carrying a current *i* in the same direction. *x* and *y* are two electron beams moving in the same direction**

*A*

*B*

*x*

*y*

(a) There will be repulsion between *A* and *B* attraction between *x* and *y*

(b) There will be attraction between *A* and *B*, repulsion between *x* and *y*

(c) There will be repulsion between *A* and *B* and also *x* and *y*

(d) There will be attraction between *A* and *B* and also *x* and *y*

1. **Wires 1 and 2 carrying currents  and respectively are inclined at an angle  to each other. What is the force on a small element *dl* of wire 2 at a distance of *r* from wire 1 (as shown in figure) due to the magnetic field of wire1**

(a) 

*i*1

*i*2

*dl*

*θ*

*r*

➁

➀

(b) 

(c) 

(d) 

1. **A conducting loop carrying a current I is placed in a uniform magnetic field pointing into the plane of the paper as shown. The loop will have a tendency to**

*i*

*Y*

*X*

⊗

*B*

(a) Contract

(b) Expand

(c) Move towards +*ve* *x* -axis

(d) Move towards –*ve* *x-*axis

1. **A current carrying loop is placed in a uniform magnetic field in four different orientations, I,II, III & IV arrange them in the decreasing order of potential Energy**



*B*

*B*



I. II.

*B*



*B*



III. IV.

(a) I > III > II > IV (b) I > II >III > IV (c) I > IV > II > III (d) III > IV > I > II

1. **A metallic block carrying current *I* is subjected to a uniform magnetic induction  as shown in the figure. The moving charges experience a force  given by ........... which results in the lowering of the potential of the face ........ Assume the speed of the carriers to be *v***

*B*

→

*Y*

*G*

*X*

*I*

*B*

*A*

*E*

*H*

*F*

*D*

*C*

*Z*

(a) , *ABCD*

(b) , *EFGH*

(c) , *ABCD*

(d) , *EFGH*

1. **Two insulated rings, one of slightly smaller diameter than the other are suspended along their common diameter as shown. Initially the planes of the rings are mutually perpendicular. When a steady current is set up in each of them**

(a) The two rings rotate into a common plane

(b) The inner ring oscillates about its initial position

(c) The inner ring stays stationary while the outer one moves into the plane of the inner ring

(d) The outer ring stays stationary while the inner one moves into the plane of the outer ring

1. **Two particles each of mass *m* and charge *q* are attached to the two ends of a light rigid rod of length 2*R*. The rod is rotated at constant angular speed about a perpendicular axis passing through its centre. The ratio of the magnitudes of the magnetic moment of the system and its angular momentum about the centre of the rod is**

(a)  (b)  (c)  (d) 

1. **Two very long, straight and parallel wires carry steady currents *I* and *I* respectively. The distance between the wires is *d*. At a certain instant of time, a point charge *q* is at a point equidistant from the two wires in the plane of the wires. Its instantaneous velocity *v* is perpendicular to this plane. The magnitude of the force due to the magnetic field acting on the charge at this instant is**

(a)  (b)  (c)  (d) 0

1. **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 , then the magnitude of the magnetic moment of the ring is**

(a)  (b)  (c)  (d) 

1. **What will be the resultant magnetic field at origin due to four infinite length wires. If each wire produces magnetic field '*B*' at origin**

*x*

1

*Y*

*X*

4

3

2

*i*

*i*

*i*

*i*

*x*

(a) 4 *B* (b) 

(c)  (d) Zero

1. **Two thick wires and two thin wires, all of the same materials and same length form a square in the three different ways *P*, *Q* and *R* as shown in fig with current connection shown, the magnetic field at the centre of the square is zero in cases**

*P*

*Q*

*R*

(a) In *P* only (b) In *P* and *Q* only (c) In *Q* and *R* only (d) *P* and *R* only

1. **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 , The particle is deflected by an angle  in crossing the field**

(a) 

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

*q*

*d*

*B*



*p*

→

(b) 

(c) 

(d) 

1. **Same current *i* = 2*A* is flowing in a wire frame as shown in figure. The frame is a combination of two equilateral triangles *ACD* and *CDE* of side 1*m*. It is placed in uniform magnetic field *B* = 4*T* acting perpendicular to the plane of frame. The magnitude of magnetic force acting on the frame is**

(a) 24 *N*

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

*C*

*D*

*E*

*A*

(b) Zero

(c) 16 *N*

(d) 8 *N*

1. **A uniform conducting wire *ABC* has a mass of 10*g.* A current of 2*A* flows through it. The wire is kept in a uniform magnetic field The acceleration of the wire will be**

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

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×

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×

×

×

×

×

×

×

×

×

×

×

×

×

*C*

*A*

*B*A

4 *cm*

5 *cm*

*z*

*O*

*y*

*x*

(a) Zero

(b)  along *y*-axis

(c)  along *y*-axis

(d)  along - axis

1. **In the given figure net magnetic field at *O* will be**

(0,0)

*O*

*i*

(*a*, 0)

*i*

(2*a*,0)

(*3a*,0)

*i*

(a) 

(b) 

(c) 

(d) 

1. **In the following figure a wire bent in the form of a regular polygon of *n* sides is inscribed in a circle of radius *a*. Net magnetic field at centre will be**

(a) 

(b) 

*θ*

*θ*

*θ = π/n*

*i*

(c) 

(d) 

1. **A proton accelerated by a potential difference  moves though a transverse magnetic field of  as shown in figure. The angle through which the proton deviates from the initial direction of its motion is**

×

*θ*

*v*

*B*

→

*+e*

*d =* 10 *cm*

×

×

×

×

×

×

×

×

×

×

(a) 

(b) 

(c) 

(d) 

1. ***AB*  and *CD* are long straight conductor, distance *d* apart, carrying *a* current *I*. The magnetic field at the midpoint of *BC* is**

*B*

*C*

*D*

*A*

*I*

*I*

*d*

*j*

*^*

*k*

*^*

*i*

*^*

*I*

(a) 

(b) 

(c) 

(d) 