1. (c) At *P* : 

*i*2

*D*

*O*

*B*

*C*

*A*

*i*1

*a*

*B*1

*B*2

*P*





1. (c)  (but )

1*A*

*i*2

300o

**1**

**2**

60o

*i*1

*O*



So, 



1. (c) Magnetic field at any point lying on the current carrying straight conductor is zero.

Here *H1* = Magnetic field at *M* due to current in *PQ.*

*H2*= Magnetic field at M due to *QR*

+ magnetic field at *M* due to *QS*

+ magnetic field at *M* due to *PQ*

 ⇒

1. (c, d) 

So or 

1. (c) Number of turns per unit width 

Consider an elemental ring of radius *x* and with thickness *dx* Number of turns in the ring 

*dx*

*a*

*b*

*x*

Magnetic field at the centre due to the ring element



Field at the centre





1. (d) The magnetic field at  due to the loop is equal to the vector sum of the magnetic fields produced by loops *ABCDA* and *AFEBA* as shown in the figure.

Magnetic field due to loop *ABCDA* will be along  and due to loop *AFEBA*, along . Magnitude of magnetic field due to both the loops will be equal.

Therefore, direction of resultant magnetic field at *P* will be .

*C*

*D*

*A*

*B*

*P*(*a,*0, *a*)

*E*

*F*







1. (c) The given situation can be drawn as follows

60°

*mg*

60°

60°

*mg* cos60°

*Fm*

*Fm* cos60°

*mg* cos60°

*B*

 



1. (a) When connected in parallel the current will be in the same direction and when connected in series the current will be in the opposite direction.

Parallel

Series

1. (b) If the radius of circle is *r,* then 

Area 

Magnetic moment 

1. (d) Initially for circular coil and 

 ..... (i)

Finally for square coil  ..... (ii)

*i*

*r*

*L/*4

Solving equation (i) and (ii) 

1. (c) The effective current and .

Magnetic moment 

Angular moment ⇒ 

1. (b) On applying Fleming’s left hand rule.
2. (b) Current carrying conductors will attract each other, while electron beams will repel each other.
3. (c) Length of the component *dl* which is parallel to wire (1) is **, so force on it.



1. (b) Net force on a current carrying loop in uniform magnetic field is zero. Hence the loop can’t translate. So, options (c) and (d) are wrong.

*i*

*Y*

*X*

*Fm*

→

⊗

From Fleming's left hand rule we can see that if magnetic field is perpendicular to paper inwards and current in the loop is clockwise (as shown) the magnetic force  on each element of the loop is radially outwards, or the loops will have a tendency to expand.

1. (c) ; where Angle between normal to the plane of the coil and direction of magnetic field.
2. (a) As the block is of metal, the charge carriers are electrons, so for current along positive *x-*axis, the electrons are moving along negative *x-*axis, *i.e.* 

and as the magnetic field is along the *y-*axis, *i.e*. 

so  for this case yield 

*y*

*x*

*z*

*E*

*G*

*D*

*C*

*d*

*H*

*F*

*e*–

*v*

→

*B*

→

*F*

→

*A*

*i*

*B*

*i.e.*,  [As ]

As force on electrons is towards the face *ABCD,* the electrons will accumulate on it an hence it will acquire lower potential.

1. (a)
2. (a) 



⇒ 

1. (d) According to gives information following figure can be drawn, which shows that direction of magnetic field is along the direction of motion of charge so net force on it is zero.

*v*

*d*

*d*/2

*d*/2

*q*

1. (b) also 
2. (c) Direction of magnetic field (*B*1, *B*2, *B*3 and *B*4) at origin due to wires 1, 2, 3 and 4 are shown in the following figure.

. So net magnetic field at origin *O*



**4**

**3**

*i*

*i*

*i*

*i*

*O*

**1**

**2**

*B*4

*B*1

*B*3

*B*2

1. (d) In *P* and *R* loops, currents are divided in same proportion because the branches have equal resistance. Hence magnetic field produced at centre due to each segment is of equal magnitude but of opposite direction, so net field is zero.

*B* = 0

*B* ≠ 0

*B* = 0

1. (a) From figure it is clear that

*θ*

*v*

*θ*

*r*

*q*

*d*

 also 



1. (a) 

∴ Net force on frame   (*F* = *ilB*)

= 24 *N*

1. (b) The given curved wire can be treated as a straight wire as shown

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

×

*A*

*C*

3*cm*

4*cm*

5*cm*

Force acting on the wire *AC*, 

=  along *y-*axis.

So acceleration of wire 

*O*

**5**

**3**

*X*

**4**

**2**

**1**

*a/*2

**

*Y*

*Z*

*Y*

*Z*

*X*

(*B*2–*B*4)

(*B*3 *B*5)

1. (b)

Magnetic field at 0 due to

Part (1) : 

Part (2):  (along –*Z-*axis)

Part (3):  (along – *Y-*axis)

Part (4): 🞊 (along +*Z*-axis)

Part (5):  (along – *Y*-axis)

 (along – *Z-*axis)

 (along – *Y-*axis)

Hence net magnetic field



1. (b) Magnetic field at the centre due to one side

****where 

*θ*

*θ*

*r*

*O*

*a*

So 

Hence net magnetic field

.

1. (b) According to following figure 

*θ*

*θ*

*r*

*d*

also 







1. (b) The field at the midpoint of *BC* due to *AB* is  and the same is due to *CD*. Therefore the total field is 