DPP
DAILY PRACTICE PROBLEMS

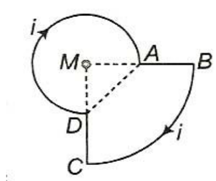
Class : XIIth | **Subject : PHYSICS**
Date : | **DPP No. : 3**

Topic :- MOVING CHARGES AND MAGNETISM

1. A horizontal overhead powerline is at a height of 4 m from the ground and carries a current of 100 A from east to west. The magnetic field directly below it on the ground is $\left(\mu_0 = 4\pi \times 10^{-7}\ \text{TmA}^{-1}\right)$

   a) 2.5×10^{-7} T, southward
   b) 5.0×10^{-6} T, northward
   c) 5.0×10^{-6} T, southward
   d) 2.5×10^{-7} T, northward

2. A current i is flowing through the loop. The direction of the current and the shape of the loop are as shown in the figure.
   The magnetic field at the centre of the loop is $\frac{\mu_0 i}{R}$ times.
   $(MA = R, MB = 2R, \angle DMA = 90°$

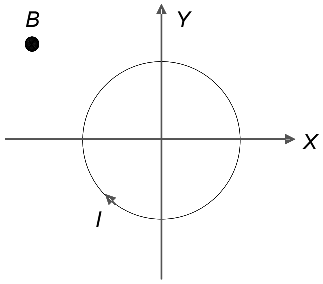


   a) $\frac{5}{16}$, but out of the plane of the paper
   b) $\frac{5}{16}$, but into the plane of the paper
   c) $\frac{7}{16}$, but out of the plane of the paper
   d) $\frac{7}{16}$, but into the plane of the paper

3. A chare q coulomb moves in a circle at n revolutions per second and the radius of the circle is r metre. Then the magnetic field at the centre of the circle is

   a) $\frac{2\pi q}{nr} \times 10^{-7}\ \text{NA}^{-1}\ \text{m}^{-1}$
   b) $\frac{2\pi q}{r} \times 10^{-7}\ \text{NA}^{-1}\ \text{m}^{-1}$
   c) $\frac{2\pi nq}{r} \times 10^{-7}\ \text{NA}^{-1}\ \text{m}^{-1}$
   d) $\frac{2\pi q}{r} \times 10^{-6}\ \text{NA}^{-1}\ \text{m}^{-1}$

4. 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



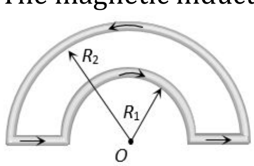
a) Contract
b) Expand
c) Move towards $+$ ve x —axis
d) Move towards $-$ ve x —axis

5. If a current is passed in a spring, it
a) Gets compressed b) Gets expanded c) Oscillates d) Remains unchanged

6. If a particle of charge 10^{-12} C moving along the x-direction with a velocity of 10^5 m/s experience a force of 10^{-10} N in y-direction due to magnetic field, then the minimum value of magnetic field is
a) 6.25×10^3 T in $z -$ direciton
b) 10^{-15} T in $z -$ direction
c) 6.25×10^{-3} T in $z -$ direction
d) 10^{-3} T in $z -$ direciton

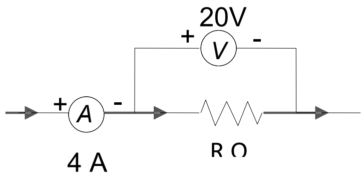
7. A electron moving with kinetic energy 6×10^{-16} J enters a field of magnetic induction 6×10^{-3} Wbm^{-2} at right angle to its motion. The radius of its path is
a) 3.42 cm b) 4.23 cm c) 6.17 cm d) 7.7 cm

8. The magnetic induction at the centre O in the figure shown is



a) $\frac{\mu_0 i}{4}\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ b) $\frac{\mu_0 i}{4}\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$ c) $\frac{\mu_0 i}{4}(R_1-R_2)$ d) $\frac{\mu_0 i}{4}(R_1+R_2)$

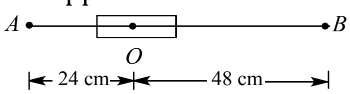
9. A candidate connects a moving coil ammeter A and a moving coil voltmeter V and a resistance R as shown in figure



If the voltmeter reads 20 V and the ammeter reads 4 A, then R is

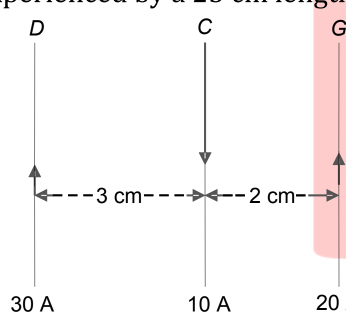
a) Equal to 5 Ω
b) Greater than 5 Ω
c) Less than 5 Ω
d) Greater or less than 5 Ω depending upon its material

10. A bar magnet of length 3 cm has a point A and B along axis at a distance of 24 cm and 48 cm on the opposite ends. Ratio of magnetic fields at these points will be



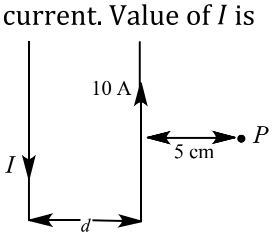
a) 8
b) 3
c) 4
d) $1/2\sqrt{2}$

11. Three long, straight parallel wires, carrying current, are arranged as shown in figure. The force experienced by a 25 cm length of wire C is



a) 10^{-3} N
b) 2.5×10^{-3} N
c) Zero
d) 1.5×10^{-3}

12. Two long parallel conductors carry currents in opposite directions as shown. One conductor carries a current of 10 A and the distance between the wires is $d = 10$ cm. Current I is adjusted, so that the magnetic field at P is zero. P is at a distance of 5 cm to the right of the 10 A current. Value of I is

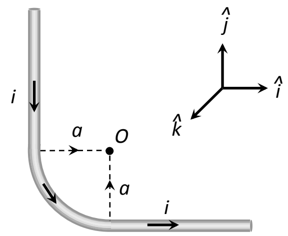


a) 40 A
b) 30 A
c) 20 A
d) 10 A

13. Two thin long parallel wires separated by a distance b are carrying currents of i amp each, the magnitude of the force per unit length exerted by one wire over the other is

a) $\frac{\mu_0 i^2}{b^2}$ b) $\frac{\mu_0 i^2}{2\pi b}$ c) $\frac{\mu_0 i}{2\pi b}$ d) $\frac{\mu_0 i}{2\pi b^2}$

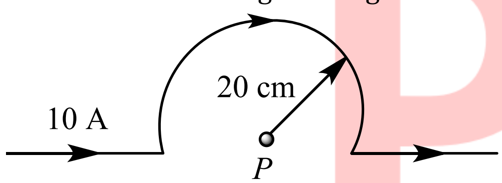
14. The unit vectors $\hat{i}, \hat{j}$ and $\hat{k}$ are as shown below. What will be the magnetic field at O in the following figure



a) $\frac{\mu_0}{4\pi}\frac{i}{a}\left(2-\frac{\pi}{2}\right)\hat{j}$ b) $\frac{\mu_0}{4\pi}\frac{i}{a}\left(2+\frac{\pi}{2}\right)\hat{j}$ c) $\frac{\mu_0}{4\pi}\frac{i}{a}\left(2+\frac{\pi}{2}\right)\hat{i}$ d) $\frac{\mu_0}{4\pi}\frac{i}{a}\left(2+\frac{\pi}{2}\right)\hat{k}$

15. Field inside a solenoid is
a) Directly proportional to its length
b) Directly proportional to current
c) Inversely proportional to total number of turns
d) Inversely proportional to current

16. A current of 10 A is passing through a long wire which has semicircular loop of the radius 20 cm as shown in the figure. Magnetic field produced at the centre of the loop is



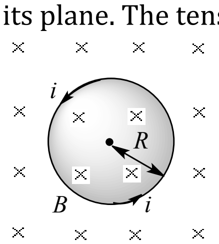
a) 10 πμ tesla b) 5 πμ tesla c) 4 πμ tesla d) 2 πμ tesla

17. The cyclotron frequency of an electron grating in a magnetic field of 1 T is approximately
a) 28 MHz b) 280 MHz c) 2.8 GHz d) 28 GHz

18. What is the shape of magnet used in moving coil galvanometer to make the magnetic fields radial
a) Concave b) Horse shoe magnet c) Convex d) None of these

19. An electron enters a region where magnetic field $(\vec{B})$ and electric field $(\vec{E})$ are mutually perpendicular to one another then
a) It will always move in the direction of $\vec{B}$
b) It will always move in the direction of $\vec{E}$
c) It always possesses circular motion
d) It can go undeflected also

20. A current (i) carrying circular wire of radius R is placed in a magnetic field B perpendicular to its plane. The tension T along the circumference of wire is



a) BiR b) $2\pi BiR$ c) πBiR d) $2BiR$