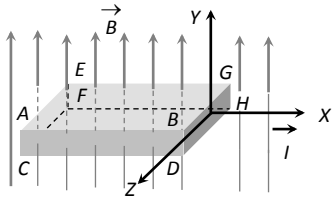
DPP
DAILY PRACTICE PROBLEMS

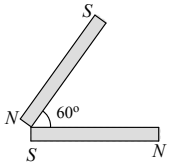
Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 7**

Topic :- MOVING CHARGES AND MAGNETISM

1. An electron ($q = 1.6 \times 10^{-19}$ C) is moving at right angle to the uniform magnetic field 3.534×10^{-5} T. The time taken by the electron to complete a circular orbit is
   a) 2μs b) 4μs c) 3μs d) 1μs
2. Two long conductors, separated by a distance d carry currents I_1 and I_2 in the same direction. They exert a force F on each other. Now the current in one of them is increased to two times and its direction is reversed. The distance is also increased to 3 d. The new value of the force between them is
   a) $-2F$ b) $F/3$ c) $-2F/3$ d) $-F/3$
3. A pulsar is a neutron star having magnetic field is 10^{12} G at its surface. The maximum magnetic force experienced by an electron moving with velocity 0.9 c is
   a) 43.2 N b) 4.32×10^{-3} N c) 4.32×10^{3} N d) zero
4. A particle is moving in a uniform magnetic field, then
   a) Its momentum changes but total energy remains the same
   b) Both momentum and total energy remain the same
   c) Both will change
   d) Total energy changes but momentum remains the same
5. A metallic block carrying current I is subjected to a uniform magnetic induction $\vec{B}$ as shown in the figure. The moving charges experience a force F given by ..... which results in the lowering of the potential of the face ..... Assume the speed of the carriers to be v



   a) $eVB\hat{k}, ABCD$ b) $eVB\hat{k}, EFGH$ c) $-eVB\hat{k}, ABCD$ d) $-eVB\hat{k}, EFGH$
6. Two magnets of equal magnetic moments M each are placed as shown in figure. The resultant magnetic moment is



   a) M b) $\sqrt{3}M$ c) $\sqrt{2}M$ d) $M/2$

7. Two very long, straight, parallel wires carry steady current i $and - i$ resepectively. 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 magnitude of the force due to the magnetic field acting on the charge at this instant is

a) $\frac{\mu_0 iqv}{2\pi d}$ b) $\frac{\mu_0 iqv}{\pi d}$ c) $\frac{2\mu_0\, iqv}{\pi d}$ d) zero

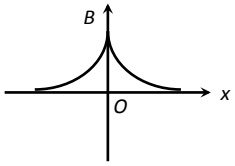
8. When a magnetic field is applied in a direction perpendicular to the direction of cathode rays, then their

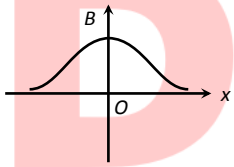
a) Energy decreases
b) Energy increases
c) Momentum increases
d) Momentum and energy remain unchanged

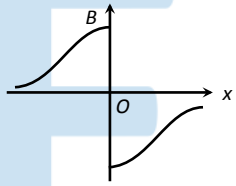
9. A charged particle is projected in a plane perpendicular to a uniform magnetic field. The area bounded by the path described by the particle is proportional to

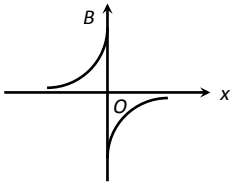
a) The velocity b) The momentum c) The kinetic energy d) None of these

10. A circular coil is in y-z plane with centre at origin. The coil is carrying a constant current. Assuming direction of magnetic field at $x = -25\ cm$ to be positive direction of magnetic field, which of the following graphs shows variation of magnetic field along x-axis

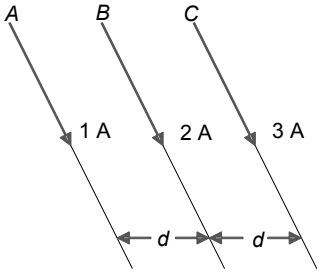
a) 

b) 

c) 

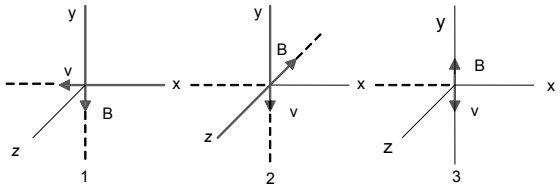
d) 

11. Three long straight wires A, B and C are carrying currents as shown in figure. Then the resultant force on B is directed



a) perpendicular to the plane of paper and outward
b) perpendicular to the plane of paper and inward
c) towards A
d) towards B

12. The figure shows three situations when an electron with velocity $\boldsymbol{v}$ travels through a uniform magnetic field $\boldsymbol{B}$. In each case, what is the direction of magnetic force on the electron?



a) $+$ ve $z-$ axis, $-$ ve $x-$ axis, $+$ ve $y-$ axis
b) $-$ ve $z-$ axis, $-$ ve $x-$ axis and zero
c) $+$ ve $z-$ axis, $+$ ve $y-$ axis and zero
d) $-$ ve $z-$ axis, $+$ ve $y-$ axis and zero

13. There are 50 turns of a wire in every cm length of a long solenoid. If 4 $ampere$ current is flowing in the solenoid, the approximate value of magnetic field along its axis at an internal point and at one end will be respectively
a) $12.6 \times 10^{-3} weber/m^2$, $6.3 \times 10^{-3} weber/m^2$
b) $12.6 \times 10^{-3} weber/m^2$, $25.1 \times 10^{-3} weber/m^2$
c) $25.1 \times 10^{-3} weber/m^2$, $6.3 \times 10^{-3} weber/m^2$
d) $25.1 \times 10^{-5} weber/m^2$, $6.3 \times 10^{-5} weber/m^2$

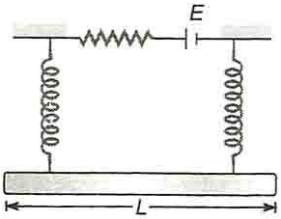
14. The electrons in the beam of television tube move horizontally form south to north. The vertical component of the earth's magnetic field points down. The electron is deflected towards
a) West b) No deflection c) East d) North to south

15. A current i A flows along an infinitely long straight thin walled tube, then the magnetic induction at any point inside the tube is
a) Infinite b) Zero c) $\frac{\mu_0}{4\pi} \cdot \frac{2i}{r}$ T d) $\frac{2i}{r}$ T

16. Two galvanometer A and B require $3mA$ and $5mA$ respectively to produce the same deflection of 10 divisions. Then
a) A is more sensitive than B
b) B is more sensitive than A
c) A and B are equally sensitive
d) Sensitiveness of B is $5/3$ times that of A

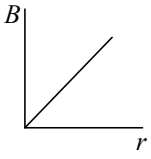
17. Two infinitely long parallel wires carry equal current in same direction. The magnetic field at a mid point in between the two wires is
a) Twice the magnetic field produced due to each of the wires
b) Half of the magnetic field produced due to each of the wires
c) Square of the magnetic field produced due to each of the wires
d) Zero

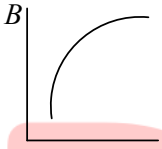
18. A straight rod of mass m and length L is suspended from the identical springs as shown in figure. The spring is stretched a distance x_0 due to the weight of the wire. The circuit has total resistance$R$. When the magnetic field perpendicular to the plane of paper is switched on, springs are observed to extend further by the same distance. The magnetic field strength is

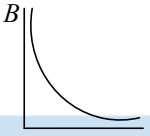


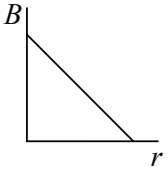
a) $\frac{2mgR}{LE}$ b) $\frac{mgR}{LE}$ c) $\frac{mgR}{2LE}$ d) $\frac{mgR}{E}$

19. Which of the following graph represents the variation of magnetic flux density B with distance r for a straight long wire carrying an electric current?

a) 

b) 

c) 

d) 

20. Magnetic field intensity at the centre of coil of 50 turns, radius 0.5 m and carrying a current of 2 A is

a) $0.5 \times 10^{-5}T$ b) $1.25 \times 10^{-4}T$ c) $3 \times 10^{-5}T$ d) $4 \times 10^{-5}T$