DPP
DAILY PRACTICE PROBLEMS

Class : XIIth | | **Subject : PHYSICS**
Date : | | **DPP No. : 4**

Topic :- MOVING CHARGES AND MAGNETISM

1. A long solenoid is formed by winding 20 $turns/cm$. The current necessary to produce a magnetic field of 20 $millitesla$ inside the solenoid will be approximately $\left(\frac{\mu_0}{4\pi} = 10^{-7}\, tesla - metre/ampere\right)$

   a) 8.0 A b) 4.0 A c) 2.0 A d) 1.0 A

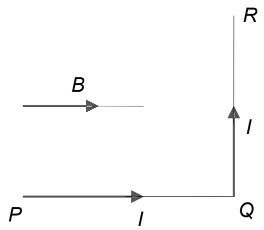
2. When the current flowing in a circular coil is doubled and the number of turns of the coil in it is halved, the magnetic field at its centre will become

   a) Four times b) Same c) Half d) Double

3. A long hollow copper tube carries a current I. Then which of the following will be true?

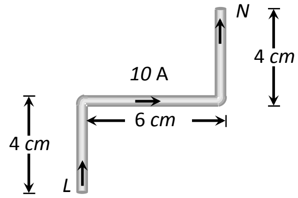
   a) The magnetic field B will be zero at all points inside the tube
   b) The magnetic field B will be zero only at points on the axis of the tube
   c) The magnetic field B will be maximum at points on the axis of the tube
   d) The magnetic field will be zero at any point outside the tube

4. A wire PQR is bent as shown in figure and is placed in a region of uniform magnetic field B. The length of $PQ = QR = l$. A current I ampere flows through the wire as shown. The magnitude of the force on PQ and QR will be



   a) $BIl, 0$ b) $2BIl, 0$ c) $0, BIl$ d) $0, 0$

5. A current carrying wire LN is bent in the form shown below. If wire carries a current of 10 A and it is placed in a magnetic field of 5T which acts perpendicular to the paper outward then it will experience a force



   a) Zero b) 5 N c) 30 N d) 20 N

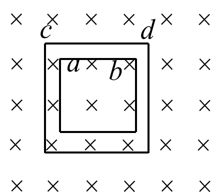
6. A closely wound flat circular coil of 25 turns of wire has diameter of 10 cm and carries a current of 4 $ampere$. Determine the flux density at the centre of a coil

a) $1.679 \times 10^{-5} tesla$ b) $2.028 \times 10^{-4} tesla$ c) $1.257 \times 10^{-3} tesla$ d) $1.512 \times 10^{-6} tesla$

7. A current of i ampere 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) $\frac{\mu_0 2i}{4\pi r}$ T d) $\frac{\mu_0 i_0}{2r}$ T

8. The figure shows certain wire segments joined together to form a coplanar loop. The loop is placed in a perpendicular magnetic field in the direction going into the plane of the figure. The magnitude of the field increases with time. I_1 and I_2 are the currents in segment **ab** and **cd**. Then,



a) $I_1 > I_2$ b) $I_1 < I_2$

c) I_1 is in the direction **ba** and I_2 is in the direction **cd** d) I_1 is in the direction **ab** and I_2 is in the direction **dc**

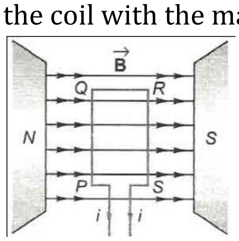
9. An electron is revolving round a proton, producing a magnetic field of 16 $weber/m^2$ in a circular orbit of radius 1Å. It's angular velocity will be

a) $10^{17} rad/sec$ b) $1/2\pi \times 10^{12} rad/sec$ c) $2\pi \times 10^{12} rad/sec$ d) $4\pi \times 10^{12} rad/sec$

10. If the direction of the initial velocity of the charged particle is neither along nor perpendicular to that of the magnetic field, then the orbit will be

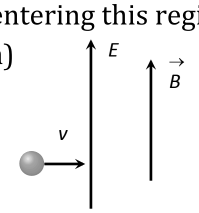
a) A straight line b) An ellipses c) A circle d) A helix

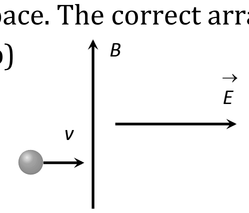
11. A coil $PQRS$ carrying a current i ampere is placed in a powerful horse shoe magnet NS of uniform magnetic field $\vec{B}$ figure. If A is the area of the coil and θ is the inclination of the plane of the coil with the magnetic field in equilibrium, then the deflecting couple will be

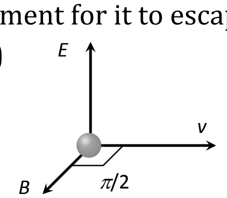


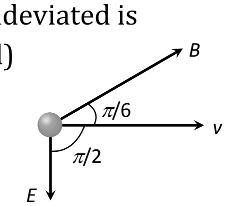
a) $BiA \cot\theta$ b) $BiA \cos\theta$ c) $BiA \operatorname{cosec}\theta$ d) $BiA \sin\theta$

12. A uniform magnetic field B and a uniform electric field E, act in a common region. An electron is entering this region of space. The correct arrangement for it to escape undeviated is

a)


b)


c)


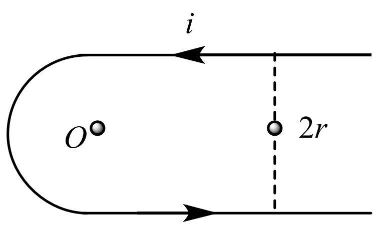
d)


13. A long straight wire carrying a current of 30 A is placed in an external uniform magnetic field of induction 4×10^{-4} T. The magnetic field is acting parallel to the direction of current. The magnitude of the resultant magnetic induction in tesla at a point 2.0 cm away from the wire is

$$(\mu_0 = 4\pi \times 10^{-7}\,\mathrm{H/m})$$

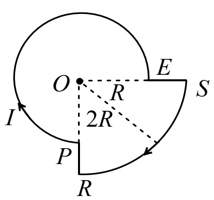
a) 10^{-4} b) 3×10^{-4} c) 5×10^{-4} d) 6×10^{-4}

14. In the figure shown, the magnetic field induction at the point O will be



a) $\frac{\mu_0 i}{2\pi r}$ b) $\left(\frac{\mu_0}{4\pi}\right)\left(\frac{i}{r}\right)(\pi + 2)$ c) $\left(\frac{\mu_0}{4\pi}\right)\left(\frac{i}{r}\right)(\pi + 1)$ d) $\frac{\mu_0}{4\pi}\frac{i}{r}(\pi - 2)$

15. A current I flowing through the loop as shown in figure. The magnetic field at centre O is



a) $\frac{7\,\mu_0 I}{16R}\otimes$ b) $\frac{7\,\mu_0 I}{16R}\odot$ c) $\frac{7\,\mu_0 I}{16R}\odot$ d) $\frac{5\,\mu_0 I}{16R}\odot$

16. 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

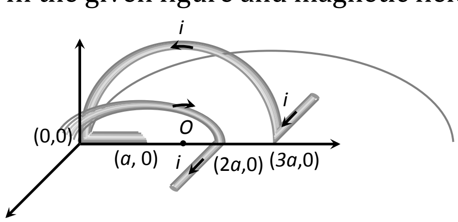
a) Attraction force when in parallel and repulsion force when in series

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

c) Repulsion force in both cases

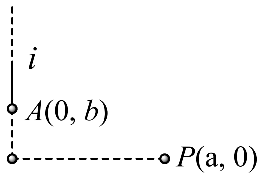
d) Attraction force in both cases

17. In the given figure and magnetic field at O will be



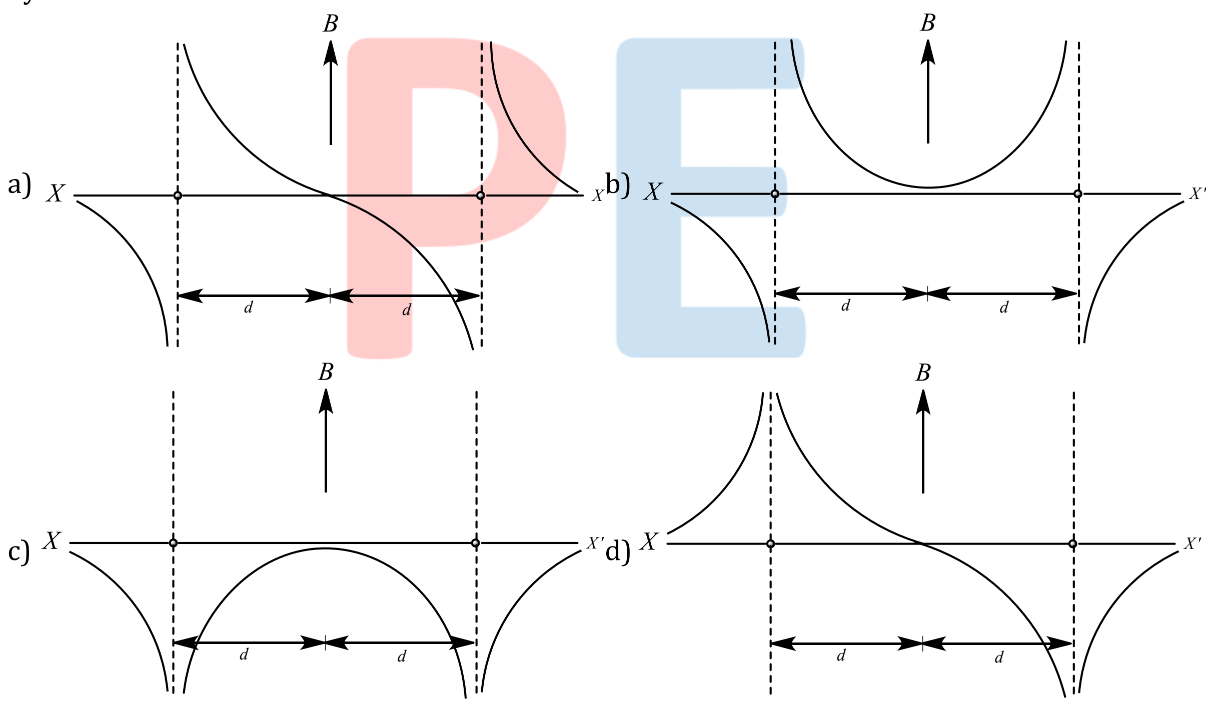
a) $\frac{2\mu_0 i}{3\pi a}\sqrt{4-\pi^2}$ b) $\frac{\mu_0 i}{3\pi a}\sqrt{4+\pi^2}$ c) $\frac{2\mu_0 i}{3\pi a^2}\sqrt{4+\pi^2}$ d) $\frac{\mu_0 i}{3\pi a}\sqrt{4-\pi^2}$

18. An infinitely long wire carrying current i is along Y-axis such that its one end is at point $(0, b)$ while the wire extends upto ∞. The magnitude of magnetic field strength at point $P\ (a, 0)$ is



a) $\frac{\mu_0 i}{4\pi a}\left(1+\frac{b}{\sqrt{a^2+b^2}}\right)$ b) $\frac{\mu_0 i}{4\pi a}\left(1-\frac{b}{\sqrt{a^2+b^2}}\right)$ c) $\frac{\mu_0 i}{4\pi a}\left(1-\frac{a}{\sqrt{a^2+b^2}}\right)$ d) $\frac{\mu_0 i}{4\pi a}\left(\frac{b}{\sqrt{a^2+b^2}}\right)$

19. Two long parallel wires are at a distance $2d$ apart. They carry steady equal current flowing out of the plane of the paper as shown. The variation of the magnetic field along the line XX' is given by



20. A conduction rod of 1 m length and 1 kg mass is suspended by two vertical wires through its ends. An external magnetic field of 2 T is applied normal to the rod. Now the current to be passed through the rod so as to make the tension in the wires zero is
[Take $g = 10\ ms^{-2}$]

a) 0.5 A b) 15 A c) 5 A d) 1.5 A