DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 5**

Topic :- MOVING CHARGES AND MAGNETISM

1. A current carrying coil is subjected to a uniform magnetic field. The coil will orient so that its plane becomes
   a) Inclined at 45° to the magnetic field
   b) Inclined at any arbitrary angle to the magnetic field
   c) Parallel to the magnetic field
   d) Perpendicular to the magnetic field
2. A straight conductor carrying current I. If the magnetic field at a distance r is 0.4 T, then magnetic field at a distance $2r$ will be
   a) 0.4 T b) 0.1 T c) 0.8 T d) 0.2 T
3. A straight wire of mass 200 g and length 1.5 m carries a current of 2 A. It is suspended in mid-air by a uniform horizontal magnetic field B. The magnitude of B (in tesla) is
   a) 2 b) 1.5 c) 0.55 d) 0.65
4. A proton a mass m and charge $+e$ is moving in a circular orbit in a magnetic field with energy 1 MeV. What should be the energy of $\alpha -$ particle (mass $= 4m$ and charge $= +2e$), so that it can revolve in the path of same radius
   a) 1 MeV b) 4 MeV c) 2 MeV d) 0.5 MeV
5. The magnetic field at the centre of a circular current carrying conductor of radius r is B_c. The magnetic field on its axis at a distance r from the centre is B_a. The value of B_c:B_a will be
   a) $1:\sqrt{2}$ b) $1:2\sqrt{2}$ c) $2\sqrt{2}:1$ d) $\sqrt{2}:1$
6. An electron has a circular path of radius 0.01 m in a perpendicular magnetic induction 10^{-3} T. The speed of the electron is nearly
   a) 1.76×10^4 ms^{-1} b) 1.76×10^6 ms^{-1} c) 3.52×10^6 ms^{-1} d) 7.04×10^6 ms^{-1}
7. A beam of electrons passes undeflected through mutually perpendicular electric and magnetic fields. If the electric field is switched off and the same magnetic field is maintained the electrons move
   a) In an elliptical orbit
   b) In a circular orbit
   c) Along a parabolic path
   d) Along a straight line
8. A straight wire of mass 200 g and length 1.5 m carries a current of 2 A. It is suspended in mid-air by a uniform horizontal magnetic field B. The magnitude of B (in tesla) is
   a) 2 b) 1.5 c) 0.55 d) 0.65
9. The current is flowing in south direction along a power line. The direction of magnetic field above the power line (neglecting earth' field) is
   a) South b) East c) North d) West

10. A long wire A carries a current of 10 amp. Another long wire B, which is parallel to A and separated by $0.1m$ from A, carries a current of 5 amp, in the opposite direction to that in A. What is the magnitude and nature of the force experience per unit length of B $(\mu_0 = 4\pi \times 10^{-7} weber/amp - m)$

a) Repulsive force of $10^{-4} N/m$ b) Attractive force of $10^{-4} N/m$

c) Repulsive force of $2\pi \times 10^{-5} N/m$ d) Attractive force of $2\pi \times 10^{-5} N/m$

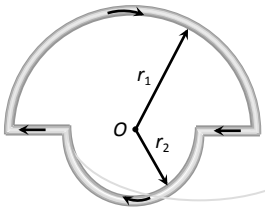
11. A proton, a deutron and a α- particle enter a magnetic field perpendicular to field with same velocity. What is the ratio of the radii of circular paths?

a) 1 : 2 : 2 b) 2 : 1 : 1 c) 1 : 1 : 2 d) 1 : 2 : 1

12. An arc of a circle of radius R subtends an angle $\pi/2$ at the centre. It carries a current i. The magnetic field at the centre will be

a) $\frac{\mu_0 i}{2R}$ b) $\frac{\mu_0 i}{8R}$ c) $\frac{\mu_0 i}{4R}$ d) $\frac{2\mu_0 i}{5R}$

13. In the figure shown there are two semicircles of radii r_1 and r_2 in which a current i is flowing. The magnetic induction at the centre O will be



a) $\frac{\mu_0 i}{r}(r_1 + r_2)$ b) $\frac{\mu_0 i}{4}(r_1 - r_2)$ c) $\frac{\mu_0 i}{4}\left(\frac{r_1 + r_2}{r_1 r_2}\right)$ d) $\frac{\mu_0 i}{4}\left(\frac{r_2 - r_1}{r_1 r_2}\right)$

14. A doubly ionized helium ion and a H_2 ion are accelerated through the same potential. The ratio of the speed of helium and H_2 ion is

a) 2 : 1 b) 1 : 2 c) $1 : \sqrt{2}$ d) $\sqrt{2}$:1

15. The magnetic moment of a current (i) carrying circular coil of radius (r) and number of turns (n) varies as

a) $1/r^2$ b) $1/r$ c) r d) r^2

16. A charged particle enters in a magnetic field whose direction is parallel to velocity of the particle, then the speed of this particle

a) In straight line b) In coiled path c) In circular path d) In ellipse path

17. An electron is revolving around a proton in a circular path of diameter 0.1 nm. It produces a magnetic field 14 T at a proton. Then the angular speed of the electron is

a) 8.8×10^6 rad s^{-1} b) 4.4×10^{16} rad s^{-1} c) 2.2×10^{16} rad s^{-1} d) 1.1×10^{16} rad s^{-1}

18. A proton, a deuteron and an $\alpha -$ particle with the same kinetic energy enter a region of uniform magnetic field moving at right angles to B. What is the ratio of the radii of their circular paths?

a) $1 : \sqrt{2} : \sqrt{2}$ b) $1 : \sqrt{2} : 1$ c) $\sqrt{2} : 1 : 1$ d) $\sqrt{2} : \sqrt{2} : 1$

19. At a specific instant emission of radioactive compound is deflected in a magnetic field. The compound can emit

(i) Electrons (ii) Circle

(iii) He^{2+} (iv) Neutrons

The emission at the instant can be

a) i, ii, iii b) i, ii, iii, iv c) iv d) ii, iii

20. A charge moves in a circle perpendicular to a magnetic field. The time period of revolution is independent of

a) Magnetic field b) Charge

c) Mass of the particle d) Velocity of the particle