QUESTIONS FROM COMPETITIVE EXAMS

5.1 Introduction

(MHT-CET 2001)

1. If magnetic length of magnet is 10 cm, then the geometric length is
a) 12 cm b) 10 cm c) 8 cm d) 14 cm

(MHT-CET 2002)

2. Angle of dip is zero at
a) poles b) equator
c) between poles and equator d) none of these

3. A bar magnet having magnetic moment M, is bent into a semicircle. The new moment of magnet will be
a) M b) 2M c) $2M/\pi$ d) $M/2\pi$

(MHT-CET 2003)

4. Magnetic field B_1 due to a bar magnet at a point P on axial line is equal to magnetic field B_2 due to the same magnet at point Q on equatorial line. What is the ratio of distances of points P and Q from centre ?
a) $2^{-1/3}$ b) 2 c) $2^{1/3}$ d) 1/2

5. A wire of length l, carrying current I, is bent in the form of circle of radius r, then magnetic moment at centre of loop is
a) $Il^2/2\pi$ b) $Il^2/4\pi$ c) I d) l

(MHT-CET 2004)

6. Potential due to magnetic dipole at distance r from centre of the dipole on axis of dipole is V. What will be potential at distance 2r from centre on the axis of dipole ?
a) V/2 b) V/4 c) 2V d) 4V

(MHT-ECET 2005)

7. A bar magnet produces magnetic induction of 4×10^{-5} T at a point 10 cm from centre on the axis of magnet. The magnetic moment is
a) 0.2 Am^2 b) 0.002 Am^2 c) 2 Am^2 d) 0.02 Am^2

(MHT-CET 2006)

8. Direction of magnetic field at equatorial point is
a) parallel to $\vec{M}$ b) perpendicular to $\vec{M}$
c) making an angle of 45° with $\vec{M}$ d) antiparallel to $\vec{M}$

9. If magnetic length of magnetic dipole is 10 cm, then geometric length is
a) 12 cm b) 10 cm c) 8 cm d) 14 cm

(MHT-CET 2007)

10. Consider a point on the equatorial axis of a short bar magnet. The direction of magnetic field at that point is
a) antiparallel to magnetic moment
b) parallel to magnetic moment
c) perpendicular to magnetic moment
d) arbitrary depending on the distance of the point from centre of the magnet

(MHT-CET 2007)

11. Magnetic moment of a rod of length L is M. If the rod is bent into a semicircle, then the magnetic moment of the rod is

a) 4 M b) M/4 c) $2M/\pi$ d) 2 M

(MHT-CET 2008)

12. A wire of length 'L' m carring a current 'i' A is bent in the form of a circle. The magnitude of magnetic moment is

a) $\frac{iL}{4\pi}$ b) $\frac{i^2L}{4\pi}$ c) $\frac{iL^2}{4\pi}$ d) $\frac{iL^2}{4}$

(MHT-CET 2010)

13. If a magnet is cut into four equal parts such that their lengths and breadths are equal, then pole strength of each part is

a) m b) $\frac{m}{2}$ c) $\frac{m}{4}$ d) $\frac{m}{8}$

14. At a point on the right bisector of a magnetic dipole, the magnetic

a) potential varies as $\frac{1}{r^2}$

b) potential is zero at all points on the right bisector

c) field varies as r^2

d) field is perpendicular to the axis of dipole

(MHT-CET 2011)

15. A circular coil of radius r is formed by wire of length L. If current I is flowing through it then the magnetic moment is proportional to

a) L^2 b) L c) L^3 d) $L^{1/2}$

16. A wire of length L is bent in the form of square and circle. The ratio of their magnetic moments at their centres is

a) $\pi/4$ b) $\pi/6$ c) $\pi/2$ d) π

(MHT-CET 2012)

17. Wire of length '*l*' is converted into a square and circular coil. If same current is passed in both, then the ratio of their magnetic moments is

a) $(\pi/2)$ b) $(\pi/3)$ c) $(\pi/8)$ d) $(\pi/4)$

(MH-CET 2015)

18. A coil carrying current 'I' has radius 'r' and number of turns 'n'. It is rewound so that radius of new coil is $\frac{r}{4}$ and it carries current 'I'. The ratio of magnetic moment of new coil to that of original coil is

a) 1 b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) $\frac{1}{8}$

(MH-CET 2018)

19. The ratio of magnetic fields due to a bar magnet at the two axial points P_1 and P_2 which are separated from each other by 10 cm is 25 : 2. Point P_1 is situated at 10 cm from the centre of the magnet. Magnetic length of the bar magnet is (Points P_1 and P_2 are on the same side of magnet and distance of P_2 from the centre is greater than distance of P_1 from the centre of magnet) :

a) 5 cm b) 10 cm c) 15 cm d) 20 cm

5.2 Torque Acting on a Bar Magnet Placed in Uniform Magnet Field

(MHT-CET 2020)

20. A torque of 1.732×10^{-5} Nm is required to hold a magnet at 90° with the horizontal component of earth's magnetic field. The torque required to hold it at 60° will be

a) 0.5×10^{-5} Nm b) 1×10^{-5} Nm

c) 1.5×10^{-5} Nm d) 1.732×10^{-5} Nm

(MHT-CET 2021)

21. Two bar magnets 'P' and 'Q' are kept in uniform magnetic field 'B' with magnetic moments 'M_P' and 'M_Q' respectively. Magnet 'P' is oscillating with frequency twice that of magnet 'Q'. If the moment of inertia of the magnet 'P' is twice that of magnet 'Q' then

a) $M_Q = 2M_P$ b) $M_P = 2M_Q$ c) $M_P = 8M_Q$ d) $M_Q = 8M_P$

5.3 Origin of Magnetism in Materials

OR

5.3 Magnetic Dipole Moment of a Revolving Electron

(MHT-CET 2012)

22. Magnetic moment of an electron of charge e moving in a circular orbit of radius r with speed v is given by

a) (evr) b) (evr/4) c) (evr/2) d) (evr/8)

(MHT-CET 2014)

23. The ratio of magnetic dipole moment of an electron of charge 'e' and mass 'm' in Bohr's orbit in hydrogen atom to its angular momentum is

a) $\frac{e}{m}$ b) $\frac{m}{e}$ c) $\frac{2m}{e}$ d) $\frac{e}{2m}$

(MHT-CET 2019)

24. The angle made by orbital angular momentum of electron with the direction of the orbital magnetic moment is

a) 90° b) 180° c) 60° d) 120°

(MHT-CET 2020)

25. An electron revolving in a circular orbit of radius 'r' with velocity 'v' and frequency 'ν' has orbital magnetic moment 'M'. If the frequency of revolution is doubled then the new magnetic moment will be

a) $\frac{M}{2}$ b) $\frac{M}{4}$ c) 2 M d) M

26. A cylindrical magnetic rod has length 5 cm and diameter 1 cm. It has uniform magnetization $5.3 \times 10^3 \frac{A}{m^3}$. Its net magnetic dipole moment is nearly
a) 2.5×10^{-2} J/T b) 10^{-2} J/T
c) 0.5×10^{-2} J/T d) 2×10^{-2} J/T
(MHT-CET 2021)

27. The electron in the hydrogen atom revolves around the nucleus in an orbit of radius 0.5 Å. If the frequency of revolution of the electron is 10^{10} MHz, the equivalent magnetic moment is ($e = 1.6 \times 10^{-19}$ C, $\pi = 3.14$)
a) 0.8×10^{-23} Am^2 b) 1.1×10^{-22} Am^2 c) 1.256×10^{-28} Am^2 d) 1.256×10^{-23} Am^2

5.4 Magnetisation and Magnetic Intensity

(MHT-CET 2004)

28. 1 tesla is equal to
a) 1 Wb/m b) 1 J/Am c) 1 N/Am d) 1 Am/N
(MHT-CET 2009)

29. The magnetic moment of substance of 1 gm is 6×10^{-7} Am^2. If its density is 5 gm/cm^3 then intensity of magnetisation in A/m will be
a) 8.3×10^6 b) 3.0 c) 1.2×10^{-7} d) 13×10^{-6}
(MH-CET 2016)

30. An iron rod is placed parallel to magnetic field of intensity 2000 A/m. The magnetic flux through the rod is 6×10^{-4} Wb and its cross-sectional area is 3 cm^2. The magnetic permeability of the rod in Wb/A–m is
a) 10^{-1} b) 10^{-2} c) 10^{-3} d) 10^{-4}

31. The magnetic field (B) inside a long solenoid having 'n' turns per unit length and carrying current 'I', when iron core is kept in it is :
(μ_0 = permeability of vacuum, χ = magnetic susceptibility)
a) $\mu_0 nI(1-\chi)$ b) $\mu_0 nI\chi$ c) $\mu_0 nI^2(1+\chi)$ d) $\mu_0 nI(1+\chi)$
(MH-CET 2017)

32. A bar magnet has length 3 cm, cross-sectional area 2 cm^2 and magnetic moment 3 Am^2. The intensity of magnetisation of bar magnet is
a) 2×10^5 A/m b) 3×10^5 A/m c) 4×10^5 A/m d) 5×10^5 A/m

33. The magnetic moment of electron due to orbital motion is proportional to (n = principal quantum number)
a) $\frac{1}{n^2}$ b) $\frac{1}{n}$ c) n^2 d) n
(MH-CET 2018)

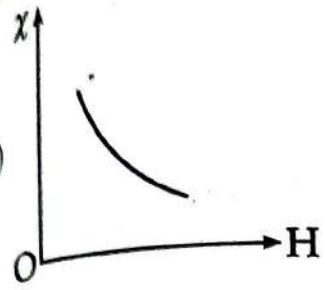
34. Magnetic suceptibilities for a paramagnetic and diamagnetic material are respectively
a) small, positive and small, positive b) large, positive and small, negative
c) small, positive and small, negative d) large, negative and large, positive.
(MHT-CET 2019)

35. The magnetization of bar magnet of length 5 cm, cross sectional area 2 cm^2 and net magnetic moment 1 Am^2 is
a) 2×10^5 A/m b) 3×10^5 A/m c) 1×10^5 A/m d) 4×10^5 A/m

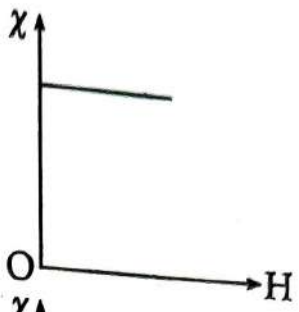
(MHT-CET 2020)

Which graph shows the variation of magnetic susceptibility (χ) with magnetising field (H) for a paramagnetic substance ?

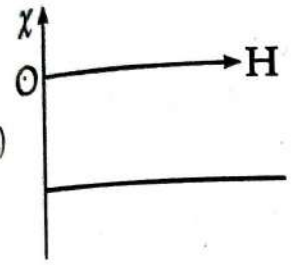
A)



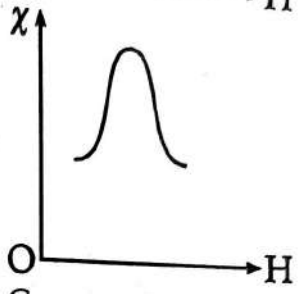
B)



C)



D)



a) A b) D c) C d) B

(MHT-CET 2021)

37. An iron rod is placed parallel to magnetic field intensity 2000 A/m. The magnetic flux through the rod is 6×10^{-4} Wb and its cross-sectional area is 3 cm^2. The magnetic permeability of the rod in Wb/Am is

a) 10^{-2} b) 10^{-4} c) 10^{-1} d) 10^{-3}

(MHT-CET 2022)

38. A magnetic substance in the form of a cube with sides 1 cm has a magnetic dipole moment of 20×10^{-6} J/T and magnetic intensity of 60×10^3 A/m. Its magnetic susceptibility is nearly

a) 4.3×10^{-2} b) 3.3×10^{-2} c) 3.3×10^{-4} d) 2.3×10^{-2}

5.5 Magnetic Properties of Materials

(MHT-CET 2001)

39. If the magnetic material moves from weaker to stronger part of a magnetic field, then it is known as

a) diamagnetic b) paramagnetic c) electromagnetic d) antiferromagnetic

(MHT-ECET 2005)

40. The substance used for making permanent magnet is

a) brass b) nickel c) aluminium d) copper

(MHT-CET 2009)

41. On applying an external magnetic field to a ferromagnetic substance, domains

a) align in the direction of magnetic field
b) align in the opposite direction of magnetic field
c) remain undefled
d) none of these

(MH-CET 2015)

42. For diamagnetic materials, magnetic susceptibility is

a) small and negative b) small and positive
c) large and negative d) large and positive