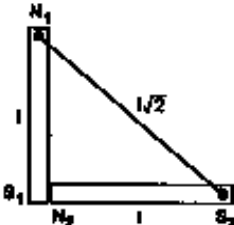


MAGNETISM

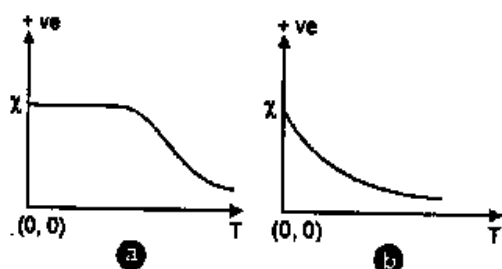
1. The ratio of magnetic fields due to a smaller bar magnet in the end on position to broad side on position is :
 (a) $\frac{1}{4}$ (b) $\frac{1}{2}$
 (c) 1 (d) 2
2. Magnetic field produced by electrons in atoms and molecules is due to their :
 (a) spin motion only
 (b) orbital motion only
 (c) spin and orbital motion both
 (d) neither spin nor orbital motion
3. If μ_0 is absolute permeability of vacuum and μ_r is relative magnetic permeability of another medium, then permeability μ of the medium is :
 (a) $\mu_0 \mu_r$ (b) $\frac{\mu_0}{\mu_r}$
 (c) $\frac{\mu_r}{\mu_0}$ (d) $\frac{1}{\mu_0 \mu_r}$
4. A steel wire of length l has a magnetic moment M . It is then bent into a semicircular arc. The new magnetic moment is :
 (a) M (b) $2\frac{M}{\pi}$
 (c) $\frac{M}{l}$ (d) $M \propto l$
5. Two identical thin bar magnets each of length l and pole strength m are placed at right angles to each other, with north pole of one touching south pole of the other, then the magnetic moment of the system is :


- (a) 1 ml (b) 2 ml
 (c) $\sqrt{2}$ ml (d) $\frac{ml}{2}$
6. Potential energy of a bar magnet of magnetic moment M placed in a magnetic field of induction B such that it makes an angle θ with the direction of B is :
 (a) $MB \sin \theta$ (b) $-MB \cos \theta$
 (c) $MB (1 - \cos \theta)$ (d) $MB (1 + \cos \theta)$
7. A current of 3 A is flowing in a plane circular coil of radius 4 cm and number of turns 20. The coil is placed in a uniform magnetic field of magnetic induction 0.5 T. Then the dipole moment of the coil is :
 (a) 3000 A m² (b) 0.3 A m²
 (c) 300 A m² (d) 75 A m²
8. A current carrying loop is placed in a uniform magnetic field. The torque acting on it does not depend upon :
 (a) area of loop (b) shape of loop
 (c) value of current (d) magnetic field
9. The points A and B are situated perpendicular to the axis of 2 cm long bar magnet at large distances x and $3x$ from the centre on opposite sides. The ratio of magnetic fields at A and B will be approximately equal to :
 (a) 27 : 1 (b) 1 : 27
 (c) 9 : 1 (d) 1 : 9
10. A compass needle is placed at the magnetic pole. It
 (a) points N-S
 (b) points EW
 (c) become vertical
 (d) may stay in any direction

11. A bar magnet is cut into two equal halves by a plane parallel to the magnetic axis. Of the following physical quantities the one which remains unchanged is :
- Pole strength
 - Magnetic moment
 - Intensity of magnetization
 - Moment of inertia
12. The ratio of magnetic potentials due to magnetic dipole in the end on position to that in broadside on position for the same distance from it is :
- zero
 - ∞
 - 1
 - 2
13. Units of pole strength of a magnet are :
- $A\ m^{-1}$
 - $A\ m^2$
 - $A\ m^{-2}$
 - $A\ m$
14. Magnetic field intensity due to a dipole varies as d^n , where $n =$:
- 2
 - 2
 - 3
 - 3
15. A short bar magnet placed with its axis at 30° , with a uniform external magnetic field of 0.25 T experiences a torque of $4.5 \times 10^{-2}\ N\cdot m$. Magnetic moment of the magnet is :
- $0.36\ J\ T^{-1}$
 - $0.72\ J\ T^{-1}$
 - $0.18\ J\ T^{-1}$
 - zero
16. A closely wound solenoid of 800 turns has area of cross section $2.5\ cm^2$. Magnetic moment associated with it, when it carries a current of 3 A is:
- $0.6\ J\ T^{-1}$
 - $0.06\ J\ T^{-1}$
 - $6\ J\ T^{-1}$
 - None of these
17. The magnetic field strength at a distance d due to an isolated pole of strength m ampmetre is :
- $\frac{\mu_0}{4\pi} \frac{m}{d}$
 - $\frac{\mu_0}{4\pi} \frac{m}{d^3}$
 - $\frac{\mu_0}{4\pi} \frac{m}{(d^2 - l^2)}$
 - $\frac{\mu_0}{4\pi} \frac{m}{d^2}$
18. The magnet of pole strength m and magnetic moment M is cut into two pieces along its axis. Its pole strength and magnetic moment now becomes:
- $\frac{m}{2}, \frac{M}{2}$
 - $m, \frac{M}{2}$
 - $\frac{m}{2}, M$
 - m, M
19. The distance between two magnetic poles is doubled and their pole strength is also doubled. Force between them :
- remains unchanged
 - becomes twice
 - becomes 8 times
 - becomes 4 times
20. A circular coil of radius 4 cm having 20 turns carries a current of 3 (A) It is placed in a magnetic field of intensity 0.5 weber/ m^2 . The magnetic dipole moment of the coil is :
- $0.15\ amp \times m^2$
 - $0.3 \times amp \times m^2$
 - $0.45 \times amp \times m^2$
 - $0.6\ amp \times m^2$
21. The magnetic moment of a magnet is $0.1\ amp \times m^2$. It is suspended in a magnetic field of intensity 3×10^{-4} weber/ m^2 . The couple acting upon it when deflected by 30° from the magnetic field is :
- $1 \times 10^{-5}\ N\ m$
 - $1.5 \times 10^{-5}\ N\ m$
 - $2 \times 10^{-5}\ N\ m$
 - $2.5 \times 10^{-5}\ N\ m$
22. Force acting on a magnetic pole of 7.5×10^{-2} A-m is 1.5 N. Magnetic field at the point is :
- 20 Wb/ m^2
 - 50 Wb/ m^2
 - 112.5 T
 - 2.0 T

23. The line joining a point to the centre of a short magnet makes angles θ with the axis. Potential at a point distant d from the centre of magnet, on this line is :
- (a) $\frac{\mu_0 M \sin \theta}{4\pi d^2}$ (b) $\frac{\mu_0 M \cos \theta}{4\pi d^2}$
 (c) $\frac{\mu_0 M}{4\pi d^3}$ (d) None of these
24. Earth's magnetic field always has a horizontal component except at :
- (a) equator
 (b) magnetic pole
 (c) a latitude of 60°
 (d) an inclination of 60°
25. The lines of force due to earth's horizontal magnetic field are :
- (a) parallel and straight
 (b) concentric circle
 (c) elliptical
 (d) curved lines
26. At a certain place, horizontal component is $\sqrt{3}$ times the vertical component. The angle of dip at this place is :
- (a) 0 (b) $\frac{\pi}{3}$
 (c) $\frac{\pi}{6}$ (d) None
27. The time period of oscillation of a magnet in a vibration magnetometer is 1.5 sec. The time period of oscillation of another magnet similar in size, shape and mass but having $1/4$ magnetic moment than that of the 1st magnet oscillating at the same place will be :
- (a) 0.75 sec (b) 1.5 sec
 (c) 3.0 sec (d) 6.0 sec
28. If a magnet is suspended at angle 30° to the magnetic meridian, the dip needle makes an angle of 45° with the horizontal. The real dip is :
- (a) $\tan^{-1} \sqrt{3} / \sqrt{2}$ (b) $\tan^{-1} (\sqrt{3})$
 (c) $\tan^{-1} (\sqrt{3} / 2)$ (d) $\tan^{-1} (2 / \sqrt{3})$
29. A deflection magnetometer can be used for measuring :
- (a) declination
 (b) dip
 (c) horizontal component
 (d) all of these
30. Time periods of vibration of two bar magnets in sum and difference positions are 4 sec and 6 sec respectively. The ratio of their magnetic moments $\frac{M_1}{M_2}$ is :
- (a) 6 : 4 (b) 30 : 16
 (c) 2.6 : 1 (d) 1.5 : 1
31. For a diamagnetic material :
- (a) $\mu_r > 1$ $\chi_m > 1$ (b) $\mu_r > 1$ $\chi_m < 1$
 (c) $\mu_r < 1$ $\chi_m < 0$ (d) $\mu_r < 1$ $\chi_m > 0$
32. When a small magnetic field H is applied to a magnetic material, the intensity of magnetization is proportional to :
- (a) H (b) H^2
 (c) $H^{1/2}$ (d) H^{-2}
33. Platinum is :
- (a) diamagnetic (b) paramagnetic
 (c) ferromagnetic (d) non magnetic
34. Which of the following is ferromagnetic :
- (a) quartz (b) nickel
 (c) aluminium (d) bismuth
35. Hysteresis is the phenomenon of lagging of :
- (a) I behind B (b) B behind I
 (c) I and B behind H (d) H behind I

36. The narrowest hysteresis loop is for :
 (a) cobalt steel (b) alnico
 (c) perm alloy (d) stainless steel
37. If relative permeability of iron is 2000 its absolute permeability in S.I. units is :
 (a) $8\pi \times 10^{-4}$ (b) $8\pi \times 10^{-3}$
 (c) $\frac{800}{\pi}$ (d) $5 \times \frac{10^9}{\pi}$
38. In a cassette player, materials used for coating magnetic tapes are :
 (a) cobalt (b) CoFe_2O_4
 (c) NiFe_2O_4 (d) Nickel
39. A dip needle in a plane perpendicular to magnetic meridian will remain :
 (a) vertical
 (b) horizontal
 (c) in any direction
 (d) at an angle of dip to the horizontal
40. The hysteresis cycle for the material of a transformer core is :
 (a) short and wide (b) tall and narrow
 (c) tall and wide (d) short and narrow
41. At a place of latitude 5° , the angle of dip is nearly :
 (a) 5° (b) 10°
 (c) 2.5° (d) 7.5°
42. The variation of magnetic susceptibility (χ) with absolute temperature T for a ferro magnetic is given in figure :



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

43. A dip needle lies initially in the magnetic meridian when it shows an angle of dip θ at a place. The dip circle is rotated through an angle α in the horizontal plane and then it shows an angle of dip θ' . Then $\frac{\tan \theta'}{\tan \theta}$ is :
 (a) $\frac{1}{\cos \alpha}$ (b) $\frac{1}{\sin \alpha}$
 (c) $\frac{1}{\tan \alpha}$ (d) $\cos \alpha$
44. A bar magnet 20 cm in length is placed with its south pole towards geographical north. The neutral points are situated at a distance of 40 cm from the centre of the magnet. If the horizontal component of earth's field = 3.2×10^{-5} weber/metre² then the pole strength of the magnet is :
 (a) 9000 ab-amp \times cm
 (b) 90 ab-amp \times cm
 (c) 450 ab-amp \times cm
 (d) 225 ab-amp \times cm
45. A magnet of magnetic moment M is freely suspended in a constant uniform magnetic field of intensity H . If the magnet is deflected by an angle θ from the direction of H , the work done is :
 (a) $MH \cos \theta$ (b) $MH (1 - \cos \theta)$
 (c) $MH \sin \theta$ (d) $MH (1 - \sin \theta)$
46. At a certain place a magnet makes 30 oscillations per minute. At another place where the magnetic field is double, its time period will be :
 (a) 4 sec (b) 2 sec
 (c) $\frac{1}{2}$ sec (d) $\sqrt{2}$ sec
47. At a certain place, the angle of dip is 30° and the horizontal component of earth's

magnetic field is 0.50 oersted) The earth's total magnetic field (in oersted) is :

- (a) $\sqrt{3}$ (b) 1
(c) $\frac{1}{\sqrt{3}}$ (d) $\frac{1}{2}$

48. At magnetic poles, the angle of dip is :

- (a) 45° (b) 30°
(c) zero (d) 90°

49. The ratio of intensity of magnetization and magnetizing field is called :

- (a) permeability

(b) magnetic induction

(c) magnetic intensity

(d) magnetic susceptibility

50. Isogonic lines on magnetic maps represent lines of:

(a) zero declination

(b) equal declination

(c) equal dip

(d) equal horizontal field

ANSWERS KEY

1	D	11	C	21	B	31	C	41	B
2	C	12	B	22	A	32	A	42	A
3	A	13	A	23	B	33	B	43	A
4	B	14	D	24	B	34	B	44	C
5	C	15	A	25	A	35	C	45	B
6	B	16	A	26	C	36	C	46	D
7	B	17	D	27	C	37	A	47	C
8	B	18	A	28	D	38	B,C	48	D
9	A	19	A	29	C	39	A	49	D
10	C	20	B	30	C	40	B	50	B