Magnetism

Magnets

1. **If a bar magnet of magnetic moment *M* is freely suspended in a uniform magnetic field of strength *B*, the work done in rotating the magnet through an angle θ is**

   (a) $MB(1-\sin\theta)$ (b) $MB\sin\theta$

   (c) $MB\cos\theta$ (d) $MB(1-\cos\theta)$

2. **Two small bar magnets are placed in a line with like poles facing each other at a certain distance *d* apart. If the length of each magnet is negligible as compared to *d*, the force between them will be inversely proportional to**

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

3. **The magnetic induction in air at a distance *d* from an isolated point pole of strength *m* unit will be**

   (a) $\frac{m}{d}$ (b) $\frac{m}{d^2}$ (c) md (d) md^2

4. **A magnetic needle lying parallel to a magnetic field requires *W* units of work to turn it through 60°. The torque required to maintain the needle in this position will be**

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

5. **What happens to the force between magnetic poles when their pole strength and the distance between them are both doubled**

   (a) Force increases to two times the previous value

   (b) No change

   (c) Force decreases to half the previous value

   (d) Force increases to four times the previous value

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6. **The work done in turning a magnet of magnetic moment 'M' by an angle of 90° from the meridian is 'n' times the corresponding work done to turn it through an angle of 60°, where 'n' is given by**

   (a) 1/2 (b) 2

   (c) 1/4 (d) 1

7. **Force between two identical bar magnets whose centers are r meter apart is 4.8 N, when their axes are in the same line. If separation is increased to $2r$, the force between them is reduced to**

   (a) $2.4N$ (b) $1.2N$

   (c) $0.6N$ (d) $0.3N$

8. **Unit of magnetic moment is**

   (a) Wb/m (b) $Wb.m^2$

   (c) $A.m$ (d) $A.m^2$

9. **A short bar magnet placed with its axis at 30° with a uniform external magnetic field of 0.16 *Tesla* experiences a torque of magnitude 0.032 *Joule*. The magnetic moment of the bar magnet will be**

   (a) 0.23 *Joule/Tesla* (b) 0.40 *Joule/Tesla*

   (c) 0.80 *Joule/Tesla* (d) Zero

10. **Bar magnet of magnetic moment $\vec{M}$ is placed in a magnetic field of induction $\vec{B}$. The torque exerted on it is**

    (a) $\vec{M}.\vec{B}$ (b) $-\vec{M}.\vec{B}$ (c) $\vec{M}\times\vec{B}$ (d) $\vec{B}\times\vec{M}$

11. **For protecting a sensitive equipment from the external magnetic field, it should be**

    (a) Placed inside an aluminium cane

    (b) Placed inside an iron cane

    (c) Wrapped with insulation around it when passing current through it

    (d) Surrounded with fine copper sheet

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12. Two magnets, each of magnetic moment '*M*' are placed so as to form a cross at right angles to each other. The magnetic moment of the system will be

(a) 2 *M* (b) $\sqrt{2}\,M$

(c) 0.5 *M* (d) *M*

13. Two like magnetic poles of strength 10 and 40 SI units are separated by a distance 30 *cm*. The intensity of magnetic field is zero on the line joining them

(a) At a point 10 *cm* from the stronger pole

(b) At a point 20 *cm* from the stronger pole

(c) At the mid-point

(d) At infinity

14. If a magnet of length 10 *cm* and pole strength 40 *A-m* is placed at an angle of 45^o in an uniform induction field of intensity 2×10^{-4} *T*, the couple acting on it is

(a) 0.5656×10^{-4} *N-m* (b) 0.5656×10^{-3} *N-m*

(c) 0.656×10^{-4} *N-m* (d) 0.656×10^{-5} *N-m*

15. The intensity of magnetic field is *H* and moment of magnet is *M*. The maximum potential energy is

(a) *MH* (b) 2 *MH* (c) 3 *MH* (d) 4 *MH*

16. A bar magnet of magnetic moment 200 $A\text{-}m^2$ is suspended in a magnetic field of intensity 0.25 *N/A-m*. The couple required to deflect it through 30^o is

(a)50 *N-m* (b) 25 *N-m* (c)20 *N-m* (d) 15 *N-m*

17. Two similar bar magnets *P* and *Q*, each of magnetic moment *M*, are taken, If *P* is cut along its axial line and *Q* is cut along its equatorial line, all the four pieces obtained have

(a) Equal pole strength (b) Magnetic moment $\frac{M}{4}$

(c) Magnetic moment $\frac{M}{2}$ (d) Magnetic moment *M*

18. A magnet of magnetic moment $50\,\hat{i}\ A\text{-}m^2$ is placed along the *x*-axis in a magnetic field $\vec{B}=(0.5\,\hat{i}+3.0\hat{j})T.$ The torque acting on the magnet is

(a) $175\ \hat{k}\ N\text{-}m$ (b) $150\ \hat{k}\ N\text{-}m$

(c) $75\ \hat{k}\ N\text{-}m$ (d) $25\sqrt{37}\ \hat{k}\ N\text{-}m$

19. A bar magnet is held perpendicular to a uniform magnetic field. If the couple acting on the magnet is to be halved by rotating it, then the angle by which it is to be rotated is

(a) 30^o (b) 45^o

(c) 60^o (d) 90^o

20. There is no couple acting when two bar magnets are placed coaxially separated by a distance because

(a) There are no forces on the poles

(b) The forces are parallel and their lines of action do not coincide

(c) The forces are perpendicular to each other

(d) The forces act along the same line

21. A bar magnet of magnetic moment 3.0 $A\text{-}m^2$ is placed in a uniform magnetic induction field of $2\times10^{-5}\ T$. If each pole of the magnet experiences a force of $6\times10^{-4}\ N$, the length of the magnet is

(a) 0.5 *m* (b) 0.3 *m*

(c) 0.2 *m* (d) 0.1 *m*

22. A bar magnet when placed at an angle of 30^o to the direction of magnetic field induction of $5\times10^{-2}\ T$, experiences a moment of couple $25\times10^{-6}\ N\text{-}m$. If the length of the magnet is 5 *cm* its pole strength is

(a) $2\times10^{-2}\ A\text{-}m$ (b) $5\times10^{-2}\ A\text{-}m$

(c) $2\ A\text{-}m$ (d) $5\ A\text{-}m$

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23. Two lines of force due to a bar magnet

(a) Intersect at the neutral point

(b) Intersect near the poles of the magnet

(c) Intersect on the equatorial axis of the magnet

(d) Do not intersect at all

24. The ultimate individual unit of magnetism in any magnet is called

(a) North pole (b) South pole

(c) Dipole (d) Quadrupole

25. The magnetic lines of force inside a bar magnet

(a) Are from south-pole to north-pole of the magnet

(b) Are from north-pole to south-pole of the magnet

(c) Do not exist

(d) Depend upon the area of cross-section of the bar magnet

26. If a magnet is hanged with its magnetic axis then it stops in

(a) Magnetic meridian (b) Geometric meridian

(c) Angle of dip (d) None of these

27. The work done in rotating a magnet of magnetic moment 2 A-m^2 in a magnetic field of 5×10^{-3} T from the direction along the magnetic field to opposite direction to the magnetic field, is

(a) Zero (b) 2×10^{-2} J (c) 10^{-2} J (d) 10 J

28. The torque on a bar magnet due to the earth's magnetic field is maximum when the axis of the magnet is

(a) Perpendicular to the field of the earth

(b) Parallel to the vertical component of the earth's field

(c) At an angle of 33^o with respect to the N-S direction

(d) Along the North-South (N-S) direction

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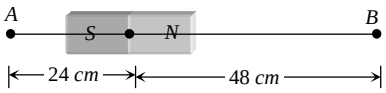
29. Magnetic dipole moment is a

(a) Scalar quantity (b) Vector quantity

(c) Constant quantity (d) None of these

30. A bar magnet of length 3 *cm* has points *A* and *B* along its axis at distances of 24 *cm* and 48 *cm* on the opposite sides. Ratio of magnetic fields at these points will be



(a) 8 (b) $1/2\sqrt{2}$

(c) 3 (d) 4

31. A magnet of magnetic moment $2\ J\ T^{-1}$ is aligned in the direction of magnetic field of 0.1 T. What is the net work done to bring the magnet normal to the magnetic field

(a) 0.1 J (b) 0.2 *J*

(c) 1 *J* (d) 2 *J*

32. The magnetic moment of a magnet of length 10 *cm* and pole strength 4.0 *Am* will be

(a) $0.4\ Am^2$ (b) $1.6\ Am^2$

(c) $20\ Am^2$ (d) $8.0\ Am^2$

33. The effective length of a magnet is 31.4 *cm* and its pole strength is 0.5 *Am*. The magnetic moment, if it is bent in the form of a semicircle will be

(a) $0.1\ Am^2$ (b) $0.01\ Am^2$

(c) $0.2\ Am^2$ (d) $1.2\ Am^2$

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Magnets

Key

1)	d	2)	d	3)	b	4)	a	5)	b	6)	b	7)	d	8)	d	9)	b
10)	c	11)	b	12)	b	13)	b	14)	b	15)	a	16)	b	17)	c	18)	b
19)	c	20)	a	21)	d	22)	a	23)	d	24)	c	25)	a	26)	a	27)	b
28)	a	29)	b	30)	a	31)	b	32)	a	33)	a						

Solutions

2. $F = \frac{\mu_0}{4\pi}\left(\frac{6MM'}{d^4}\right)$

3. $B = \frac{m}{d^2}$ in C.G.S. system.

4. $W = MB(\cos\theta_1 - \cos\theta_2) = MB(\cos 0^o - \cos 60^o) = MB\left(1 - \frac{1}{2}\right) = \frac{MB}{2}$

And $\tau = MB\sin\theta = MB\sin 60^o = MB\frac{\sqrt{3}}{2}$

$\therefore \tau = \left(\frac{MB}{2}\right)\sqrt{3} \Rightarrow \tau = \sqrt{3}\,W$

5. $F \propto \frac{m_1 m_2}{r^2}$

6. $W_1 = MB(\cos 0^o - \cos 90^o) = MB(1-0) = MB$

$W_2 = MB(\cos 0^o - \cos 60^o) = MB\left(1 - \frac{1}{2}\right) = \frac{MB}{2}$

$\therefore W_1 = 2W_2 \Rightarrow n = 2$

7. $F \propto \frac{1}{r^4}$

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$$F = \frac{4.8}{2^4} = \frac{4.8}{16} = 0.3\ N$$

9. $\tau = MB_H \sin\theta \Rightarrow 0.032 = M \times 0.16 \times \sin 30^o$

$\Rightarrow M = 0.4\ J/tesla$

12. $M_{net} = \sqrt{M^2 + M^2} = \sqrt{2}M$

13. $\frac{\mu_0}{4\pi} \cdot \frac{10}{x^2} = \frac{\mu_0}{4\pi} \cdot \frac{40}{(30-x)^2} \Rightarrow x = 10\,cm$

14. $\tau = MB\sin\theta = (mL)B\sin\theta$

$= (40 \times 10 \times 10^{-2}) \times 2 \times 10^{-4} \times \sin 45°$

$= 0.565 \times 10^{-3}\ N - m$

15. $U = -MB\cos\theta$

$\Rightarrow U_{\max} = MH(\text{at}\ \theta = 180^o)$

16. $\tau = MB\sin\theta$

$\tau = 200 \times 0.25 \times \sin 30° = 25\ N \times m.$

18. $\vec{\tau} = \vec{M} \times \vec{B} \Rightarrow \vec{\tau} = 50\hat{i} \times (0.5\hat{i} + 3\hat{j}) = 150(\hat{i} \times \hat{j}) = 150\,\hat{k}N \times m.$

19. $\tau = MB\sin\theta \Rightarrow \tau \propto \sin\theta$

$\Rightarrow \frac{\tau_1}{\tau_2} = \frac{\sin\theta_1}{\sin\theta_2} \Rightarrow \frac{\tau}{\tau/2} = \frac{\sin 90}{\sin\theta_2}$

$\Rightarrow \sin\theta_2 = \frac{1}{2} \Rightarrow \theta_2 = 30^o$

21. $F = mB \Rightarrow F = \frac{M}{L} \times B$

$\Rightarrow 6 \times 10^{-4} = \frac{3}{L} \times 2 \times 10^{-5} \Rightarrow L = 0.1\ m.$

22. $\tau = MB\sin\theta \Rightarrow \tau = (mL)B\sin\theta$

$\Rightarrow 25 \times 10^{-6} = (m \times 5 \times 10^{-2}) \times 5 \times 10^{-2} \times \sin 30$

$\Rightarrow m = 2 \times 10^{-2}\ A - m$.

27. $W = MB(1 - \cos\theta)$; Where $\theta = 180^o$

$\Rightarrow W = 2MB \Rightarrow W = 2 \times 2 \times 5 \times 10^{-3} = 2 \times 10^{-2}\ J$

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30. $B \propto \frac{1}{d^3} \Rightarrow \frac{B_A}{B_B} = \left(\frac{d_B}{d_A}\right)^3 = \left(\frac{48}{24}\right)^3 = \frac{8}{1}$

31. $W = MB(1-\cos\theta) = 2\times 0.1\times(1-\cos 90^o) = 0.2J$

32. $M = mL = 4\times 10\times 10^{-2} = 0.4 A\times m^2$

33. $M' = \frac{2M}{\pi} = \frac{2mL}{\pi} = \frac{2\times 0.5\times 31.4\times 10^{-2}}{3.14} = 0.1\, amp\times m^2$

Earth's Magnetism

1. At magnetic poles of earth, angle of dip is

(a)Zero (b) 45^o

(c) 90^o (d) 180^o

2. At a place, if the earth's horizontal and vertical components of magnetic fields are equal, then the angle of dip will be

(a) 30° (b) 90°

(c) 45° (d) 0°

3. The line on the earth's surface joining the points where the field is horizontal is

(a)Magnetic meridian (b) Magnetic axis

(c) Magnetic line (d) Magnetic equator

(e) Isogonic line

4. A bar magnet is placed north-south with its north pole due north. The points of zero magnetic field will be in which direction from the centre of the magnet

(a) North and south

(b) East and west

(c) North-east and south-west

(d) North-west and south-east

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5. At a certain place, the horizontal component B_0 and the vertical component V_0 of the earth's magnetic field are equal in magnitude. The total intensity at the place will be

(a) B_0 (b) B_0^2

(c) $2B_0$ (d) $\sqrt{2}B_0$

6. At a certain place the horizontal component of the earth's magnetic field is B_0 and the angle of dip is 45^o. The total intensity of the field at that place will be

(a) B_0 (b) $\sqrt{2}\,B_0$

(c) $2\,B_0$ (d) B_0^2

7. The direction of the null points is on the equatorial line of a bar magnet, when the north pole of the magnet is pointing

(a) North (b) South

(c) East (d) West

8. Magnetic meridian is a

(a) Point (b) Horizontal plane

(c) Vertical plane (d) Line along *N-S*

9. The angle of dip at a certain place is 30^o. If the horizontal component of the earth's magnetic field is *H*, the intensity of the total magnetic field is

(a) $\frac{H}{2}$ (b) $\frac{2H}{\sqrt{3}}$

(c) $H\sqrt{2}$ (d) $H\sqrt{3}$

10. The horizontal component of the earth's magnetic field is 0.22 *Gauss* and total magnetic field is 0.4 *Gauss*. The angle of dip. is

(a) $\tan^{-1}(1)$ (b) $\tan^{-1}(\infty)$

(c) $\tan^{-1}(1.518)$ (d) $\tan^{-1}(\pi)$

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11. A bar magnet is situated on a table along east-west direction in the magnetic field of earth. The number of neutral points, where the magnetic field is zero, are

(a) 2 (b) 0

(c) 1 (d) 4

12. At which place, earth's magnetism become horizontal

(a) Magnetic pole (b)Geographical pole

(c) Magnetic meridian (d)Magnetic equator

13. Isogonic lines on magnetic map will have

(a) Zero angle of dip

(b) Zero angle of declination

(c) Same angle of declination

(d) Same angle of dip

14. A current carrying coil is placed with its axis perpendicular to *N-S* direction. Let horizontal component of earth's magnetic field be H_0 and magnetic field inside the loop is *H*. If a magnet is suspended inside the loop, it makes angle θ with *H*. Then θ =

(a) $\tan^{-1}\left(\frac{H_0}{H}\right)$ (b) $\tan^{-1}\left(\frac{H}{H_0}\right)$

(c) $\text{cosec}^{-1}\left(\frac{H}{H_0}\right)$ (d) $\cot^{-1}\left(\frac{H_0}{H}\right)$

15. Let *V* and *H* be the vertical and horizontal components of earth's magnetic field at any point on earth. Near the north pole

(a) $V >> H$ (b) $V << H$

(c) $V = H$ (d) $V = H = 0$

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Earth's Magnetism

Key

1) c 2) c 3) d 4) b 5) d 6) b 7) a 8) **c** 9) b
10) c 11) b 12) a 13) **c** 14) a 15) a

Solutions

2. $B_V = H_H \tan\phi$; If $B_V = B_H$, then $\tan\phi = 1$ or $\phi = 45^o$

5. $B = \sqrt{B_0^2 + V_0^2} \qquad \Rightarrow B = \sqrt{2}B_0$

6. $B_H = B\sin\phi \Rightarrow B = \frac{B_H}{\sin\phi} \Rightarrow B = \frac{B_o}{\sin 45^o} = \sqrt{2}B_0$

9. $B_H = B\cos\phi \Rightarrow B = \frac{B_H}{\cos\phi} \Rightarrow B = \frac{B_H}{\cos 30^o} = \frac{2B_H}{\sqrt{3}}$

10. $B_H = B\cos\phi$

$\Rightarrow \cos\phi = \frac{B_H}{B} = \frac{0.22}{0.4}$

$\Rightarrow \tan\phi = \frac{\sqrt{(0.4)^2 - (0.22)^2}}{0.22}$

$\Rightarrow \phi = \tan^{-1}(1.518)$

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Magnetic Materials

1. **Temperature above which a ferromagnetic substance becomes paramagnetic is called**

   (a)Critical temperature (b) Boyle's temperature

   (c) Debye's temperature (d) Curie temperature

2. **Relative permeability of iron is 5500, then its magnetic susceptibility will be**

   (a) 5500×10^{7} (b) 5500×10^{-7}

   (c) 5501 (d) 5499

3. **An example of a diamagnetic substance is**

   (a) Aluminium (b) Copper

   (c) Iron (d) Nickel

4. **The use of study of hysteresis curve for a given material is to estimate the**

   (a) Voltage loss (b) Hysteresis loss

   (c) Current loss (d) All of these

5. **Magnetic permeability is maximum for**

   (a) Diamagnetic substance (b) Paramagnetic substance

   (c) Ferromagnetic substance (d) All of these

6. **If a diamagnetic solution is poured into a *U*-tube and one arm of this *U*-tube placed between the poles of a strong magnet with the meniscus in a line with the field, then the level of the solution will**

   (a) Rise (b) Fall

   (c) Oscillate slowly (d) Remain as such

7. **The relative permeability is represented by μ_r and the susceptibility is denoted by χ for a magnetic substance. Then for a paramagnetic substance**

   (a)$\mu_r < 1, \chi < 0$ (b) $\mu_r < 1, \chi > 0$ (c)$\mu_r > 1, \chi < 0$ (d) $\mu_r > 1, \chi > 0$

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8. Which of the following is true

(a)Diamagnetism is temperature dependent

(b) Para magnetism is temperature dependent

(c) Para magnetism is temperature independent

(d) None of these

9. The magnetic susceptibility does not depend upon the temperature in

(a) Ferrite substances (b) Ferromagnetic substances

(c) Diamagnetic substances (d) Paramagnetic substances

10. Identify the paramagnetic substance

(a) Iron (b) Aluminum

(c) Nickel (d) Hydrogen

11. If a magnetic substance is kept in a magnetic field, then which of the following is thrown out

(a)Paramagnetic (b) Ferromagnetic

(c) Diamagnetic (d) Antiferromagnetic

12. If the angular momentum of an electron is $\vec{J}$ then the magnitude of the magnetic moment will be

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

13. The magnetic susceptibility is negative for

(a) Paramagnetic materials

(b) Diamagnetic materials

(c) Ferromagnetic materials

(d) Paramagnetic and ferromagnetic materials

14. The universal property of all substances is

(a) Diamagnetism (b) Ferromagnetism

(c) Para magnetism (d) All of these

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15. Which of the following statements is incorrect about hysteresis

(a) This effect is common to all ferromagnetic substances

(b) The hysteresis loop area is proportional to the thermal energy developed per unit volume of the material

(c) The hysteresis loop area is independent of the thermal energy developed per unit volume of the material

(d) The shape of the hysteresis loop is characteristic of the material

16. Curies law can be written as

(a) $\chi \propto (T - T_c)$ (b) $\chi \propto \frac{1}{T - T_c}$ (c) $\chi \propto \frac{1}{T}$ (d) $\chi \propto T$

17. A superconductor exhibits perfect

(a) Ferrimagnetism (b) Ferromagnetism

(c) Para magnetism (d) Diamagnetism

18. A small rod of bismuth is suspended freely between the poles of a strong electromagnet. It is found to arrange itself at right angles to the magnetic field. This observation establishes that bismuth is

(a) Diamagnetic (b) Paramagnetic

(c) Ferrimagnetic (d) Antiferromagnetic

19. A diamagnetic material in a magnetic field moves

(a) From weaker to the stronger parts of the field

(b) Perpendicular to the field

(c) From stronger to the weaker parts of the field

(d) In none of the above directions

20. Curie temperature is the temperature above which

(a) A paramagnetic material becomes ferromagnetic

(b) A ferromagnetic material becomes paramagnetic

(c) A paramagnetic material becomes diamagnetic

(d) A ferromagnetic material becomes diamagnetic

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21. A frog can be deviated in a magnetic field produced by a current in a vertical solenoid placed below the frog. This is possible because the body of the frog behaves as

(a) Paramagnetic (b) Diamagnetic

(c) Ferromagnetic (d) Antiferromagnetic

22. Which one of the following is a non-magnetic substance

(a) Iron (b) Nickel

(c) Cobalt (d) Brass

23. Liquid oxygen remains suspended between two pole faces of a magnet because it is

(a) Diamagnetic (b) Paramagnetic

(c) Ferromagnetic (d) Antiferromagnetic

24. Curie-Weiss law is obeyed by iron at a temperature.....

(a) Below Curie temperature (b) Above Curie temperature

(c) At Curie temperature only (d) At all temperatures

25. The materials suitable for making electromagnets should have

(a) High retentivity and high coercivity

(b) Low retentivity and low coercivity

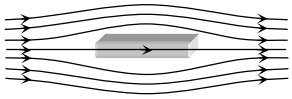
(c) High retentivity and low coercivity

(d) Low retentivity and high coercivity

26. The given figure represents a material which is

(a) Paramagnetic (b) Diamagnetic

(c) Ferromagnetic (d) None of these



27. For an isotropic medium *B*, μ, *H* and *M* are related as (where B, μ_0, H and *M* have their usual meaning in the context of magnetic material

(a) $(B-M)=\mu_0 H$ (b) $M=\mu_0(H+M)$

(c) $H=\mu_0(H+M)$ (d) $B=\mu_0(H+M)$

28. The magnetic susceptibility of any paramagnetic material changes with absolute temperature *T* as

(a) Directly proportional to *T*

(b) Remains constant

(c) Inversely proportional to *T*

(d) Exponentially decaying with *T*

29. When a piece of a ferromagnetic substance is put in a uniform magnetic field, the flux density inside it is four times the flux density away from the piece. The magnetic permeability of the material is

(a)1 (b) 2

(c) 3 (d) 4

30. Which of the following is diamagnetism

(a) Aluminium (b) Quartz

(c) Nickel (d) Bismuth

31. If a ferromagnetic material is inserted in a current carrying solenoid, the magnetic field of solenoid

(a) Largely increases (b) Slightly increases

(c) Largely decreases (d) Slightly decreases

32. In the hysteresis cycle, the value of *H* needed to make the intensity of magnetisation zero is called

(a) Retentivity (b) Coercive force

(c) Lorentz force (d) None of the above

33. If the magnetic dipole moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material denoted by μ_d, μ_p, μ_f respectively then

(a) $\mu_d \neq 0$ and $\mu_f \neq 0$ (b) $\mu_p = 0$ and $\mu_f \neq 0$

(c) $\mu_d = 0$ and $\mu_p \neq 0$ (d) $\mu_d \neq 0$ and $\mu_p = 0$

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34. Among the following properties describing diamagnetism identify the property that is wrongly stated

(a) Diamagnetic material does not have permanent magnetic moment

(b) Diamagnetism is explained in terms of electromagnetic induction

(c) Diamagnetic materials have a small positive susceptibility

(d) The magnetic moment of individual electrons neutralize each other

35. Susceptibility of ferromagnetic substance is

(a) > 1 (b) < 1

(c) 0 (d) 1

Magnetic Materials

Key

1)	d	2)	d	3)	b	4)	b	5)	c	6)	b	7)	d	8)	b	9)	c	
10)	b	11)	c	12)	b	13)	b	14)	a	15)	c	16)	c	17)	d	18)	a	
19)	c	20)	b	21)	b	22)	d	23)	b	24)	b	25)	c	26)	b	27)	d	
28)	c	29)	d	30)	d	31)	a	32)	b	33)	c	34)	c	35)	a			

Solutions

2. $\chi_m = (\mu_r - 1) \Rightarrow \chi_m = (5500 - 1) = 5499$

27. $B = B_0 + B_m = \mu_0 H + \mu_0 M$

29. $\mu_r = \frac{B}{B_0} = 4$