PHYSICS

BOOKS - A2Z PHYSICS (HINGLISH)

MAGNETISM AND MATTER

Magnet And Its Properties

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

A. North pole

B. South pole

C. Dipole

D. Quadrupole

Answer: C

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2. The magnetic moment of a 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. $8.0 Am^2$

Answer: A

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3. 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. $1.2 Am^2$

Answer: A

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

A. Magnetic meridian

B. Geometric merdian

C. Angle of dip

D. none of these

Answer: A

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5. 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

Answer: C

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6. Weber/m^2 is equal to

A. Volt

B. Henry

C. Tesla

D. All of these

Answer: C

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7. A magnetic needle is placed on a cork floating in a still lake in the northern hemisphere. Does the needle togather with the cork move towards the north of the lake

A. Yes

B. No

C. May be or may not be move

D. Nothing can be said

Answer: B

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8. A magnet of magnetic moment M and pole strength m is divided in two equal parts, then magnetic moment of each part will be

A. M

B. $M/2$

C. $M/4$

D. $2M$

Answer: B

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9. If a magnet of pole strength m is divided into four parts such that the length and width of each part is half that of initial one, then the pole strength of each part will be

A. $m/4$

B. $m/2$

C. $m/8$

D. $4m$

Answer: B

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10. A long magnetic needle of length 2L, magnetic moment M amd pole strength m units is broken into two pieces at the middle. The magnetic moment amd pole strength of each piece will be

A. $\frac{M}{2}, \frac{m}{2}$

B. $M, \frac{m}{2}$

C. $\frac{M}{2}, m$

D. M, m

Answer: C

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11. Two identical thin bar magnets, each of length L and pole strength m are placed at right angles to each other, with the N pole of one touching the S-pole of the other. Find the magnetic moment of the system.

A. ml

B. $2ml$

C. $\sqrt{2}ml$

D. $\frac{1}{2}ml$

Answer: C

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

A. $2M$

B. $\sqrt{2}M$

C. $0.5M$

D. M

Answer: B

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13. Three identical bar magnets each of magnetic moment M are placed in the form of an equilateral triangle as shown.

A. Zero

B. $2M$

C. $M\sqrt{3}$

D. $\frac{3M}{2}$

Answer: B

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14. A uniform megnetic field, parallel to the plane of the paper exixted in space intially directed from left to right. When a bar of soft iron is placed in the field parallel to it, the lines of force passing through it will be represented by

A. Figure (A)

B. Figure (B)

C. Figure (C)

D. Figure (D).

Answer: B

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15. Magnetic field intensity is defined as

A. Magnetic moment per unit volume

B. Magnetic induction force acting acting on a unit magneticpole

C. Number of lines of lines of force crossing per unit area

D. Number of lines of force crossing per volume

Answer: B

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16. An iron rod of length L and magnetic moment M is bent in the form of a semicircle. Now its magnetic moment will be

A. M

B. $\frac{2M}{\pi}$

C. $\frac{M}{\pi}$

D. $M\pi$

Answer: B

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17. A magnetised wire of moment M is bent into an arc of a circle subtending an angle of 60^(@) at the centre. The new magnetic moment is

A. $(2M / \pi)$

B. (M / π)

C. $(3\sqrt{3}M / \pi)$

D. $(3M / \pi)$

Answer: D

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18. A cylindrical rod magnet has a length of 5 cm and a diameter of 1 cm. It has a uniform magnetization of $5.30 \times 10^3 Amp/m^3$. What is it's magnetic dipole moment?

A. $1 \times 10^{-2} J/T$

B. $2.08 \times 10^{-2} J/T$

C. $3.08 \times 10^{-2} J/T$

D. $1.52 \times 10^{-2} J/T$

Answer: B

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19. A bar magnet having centre O has a length of $4cm$. Point P_1 is in the broad side-on and P_2 is in the end side-on position with $OP_1 = OP_2 = 10 metres$. The ratio of magnetic intensities H at P_1 and P_2 is

A. $H_1 : H_2 = 16 : 100$

B. $H_1 : H_2 = 1 : 2$

C. $H_1 : H_2 = 2 : 1$

D. $H_1 : H_2 = 100 : 16$

Answer: B

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

A. $\frac{m}{d}$

B. $\frac{m}{d^2}$

C. md

D. md^2

Answer: B

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21. The magnetic field due to a short magnet at a point in its axis at distance X cm from the middle of the magnet is

A. 100 Gauss

B. 400 Gauss

C. 50 Gauss

D. 200 Gauss

Answer: A

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22. Two like magnetic poles of strenth 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

Answer: B

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23. Point A and B are situated along the extended axis of $2cm$ long bar magnet at a distance x and $2xcm$ respectively. From the pole nearer to the points, the ratio of the magnetic field at A and B will be

A. 4:1 exactly

B. 4:1 approx.

C. 8:1 exactly

D. 8:1 approx.

Answer: D

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24. The distance of two points on the axis of a magnet from its centre is $10cm$ and $20cm$ repectively. The ratio of magnatic intensity at these points is $12.5:1$. The length of the megnet will be

A. 5cm

B. 25cm

C. 10cm

D. 20cm

Answer: C

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25. Ratio of magnetic intensities for an axial point and a point on broad side-on position at equal distance d from the centre of magnet will be or The magnetic field at a distance d from a short bar magnet in longitudinal and transverse positions are in the ratio

A. $1:01$

B. $2:03$

C. $2:01$

D. $3:02$

Answer: C

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26. The magnetic field at a point x on the axis of a small bar magnet is equal to the field at a point y on the equator of the same magnet.

The ratio of the distances of x and y from the centre of the magnet is

A. 2^{-3}

B. $2^{-1/3}$

C. 2^{3}

D. $2^{1/3}$

Answer: D

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27. Points A and B are situated perpendicular to the axis of a $2cm$ long bar magnet at large distances X and $3X$ from its centre on opposite sides. The retio of the magnetic fields at A and B wil be approximately equal to

A. $1:09$

B. $2:09$

C. $27:1$

D. $9:1$

Answer: C

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28. Two small magnets are placed horizontally perpendicular to magnetic meridian. Their north poles are at $30cm$ east and $20cm$ west from a compass needle. Compare the magnetic moments of the magnets, if compass needle remains undeflected.

A. 4:5

B. 16:25

C. 64:125

D. $2 : \sqrt{5}$

Answer: C

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29. Two small bar marnets are placed in a line with like poles facing each other at a certain distance d apart. If the length of each magnet is neglifible 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

Answer: D

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30. Force between two unit pole strength placed at a distance of one metre is

A. $1N$

B. $\frac{10^{-7}}{4\pi}N$

C. $10^{-7}N$

D. $4\pi \times 10^{-7}N$

Answer: C

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31. The small magnets each of magnetic moment $10A - m^2$ are placed end-on position 0.1 m apart from their centres. The force acting between them is

A. $0.6 \times 10^7 N$

B. $0.06 \times 10^7 N$

C. $0.6N$

D. $0.06N$

Answer: C

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32. The dipole moment of a short bar magnet is $1.25A - m^2$. The magnetic field on its axis at a distance of 0.5 metre from the centre of the magnet is

A. 1.0×10^{-4} Newton / amp-meter

B. 4×10^{-2} Newton / amp-meter

C. 2×10^{-6} Newton / amp-meter

D. 6.64×10^{-8} Newton / amp-meter

Answer: C

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33. Force between two identical bar magnets whose centres are r metre apart is $4.8N$, 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. $0.3N$

Answer: D

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34. The magnetic field to a small magnetic dipole of magnetic moment M, at distance r from the centre on the equatorial line is given by (in M.K.S. system)

A. $\frac{\mu_0}{4\pi} \times \frac{M}{r^2}$

B. $\frac{\mu_0}{4\pi} \times \frac{M}{r^3}$

C. $\frac{\mu_0}{4\pi} \times \frac{2M}{r^2}$

D. $\frac{\mu_0}{4\pi} \times \frac{2M}{r^3}$

Answer: B

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35. The incorrect statement regarding the lines of force of the magnetic field B is

A. Magnetic intensity is a measure of line of forcepassing Through unit area held normal to it

B. magnetic lines of force from a close curve

C. Inside a magnet, its magnetic lines of force move from North Pole of a magnet towards its south pole

D. Due to a magnet magnetic lines of force never cut each other

Answer: C

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36. A straight wire carring current I is turned into a circular loop. If the magnitude of magnetic moment associated with it in M.K.S. unit is M, the length of wire will be

A. $4\pi i M$

B. $\sqrt{\dfrac{4\pi M}{i}}$

C. $\sqrt{\dfrac{4\pi i}{M}}$

D. $\dfrac{M\pi}{4i}$

Answer: B

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37. If a piece of metal was thought to be magnet, which one of the following observations would offer conclusive evidence?

A. It attracts a known magnet

B. It repels a known magnet

C. Neither (a) nor (b)

D. It attracts a steel screw driver

Answer: B

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38. The magnetic potential at a point on the axial line of a bar magnet of dipole moment M is V. What is the magnetic potential due to a bar magnet of dipole moment $\frac{M}{4}$ at the same point ?

A. $4V$

B. $2V$

C. $\frac{V}{2}$

D. $\frac{V}{4}$

Answer: D

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39. A small bar magnet has a magnetic moment $1.2 A - m^2$. The magnetic field at a distance $0.1 m$ on its axis will be:

$(\mu_0 = 4\pi \times 10^{-7} T - m / A)$

A. $1.2 \times 10^{-4} T$

B. $2.4 \times 10^{-4} T$

C. $2.4 \times 10^{4} T$

D. $1.2 \times 10^4 T$

Answer: B

40. A bar magnet of length 3cm has points A and B along its axis at distance of $24cm$ and $48cm$ on the opposite sides. Ratio of magnetic field at these points will be

A. 8

B. $1/2\sqrt{2}$

C. 3

D. 4

Answer: A

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41. Two identical short bar magnets, each having magnetic moment of $10Am^2$, are arranged such that their axial lines are perpendicular to each other and their centres be along the same straigh line in a horizonetal plane. If the distance between their centres is $0.2m$, the resultant magnetic induction at a point midway between them is

$(\mu_0 = 4\pi \times 10^{-7} Hm^{-1})$

A. $\sqrt{2} \times 10^{-7}$ Tesla

B. $\sqrt{5} \times 10^{-7}$ Tesla

C. $\sqrt{2} \times 10^{-3}$ Tesla

D. $\sqrt{5} \times 10^{-3}$ Tesla

Answer: D

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42. Two identcal magnetic dipole of magnetic moment $1.0A - m^2$ each, placed at a separation of 2 m with their axis perpendicular to each other. The resultant magnetic field at a point midway between the dipole is

A. $5 \times 10^{-7}T$

B. $\sqrt{5} \times 10^{-7}T$

C. $10^{-7}T$

D. None of these

Answer: B

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43. Two identical bar magnets with a length 10cm and weigth 50 gm-weigth are arranged freely with their like poles facing in a inverted vertical glass tube. The upper magnet hangs in the air above the lower one so that the distance between the nearest pole of the magnet is 3 mm. Pole strength of the poles of each magnet will be

A. $6.64 amp \times m$

B. $2 amp \times m$

C. $10.25 amp \times m$

D. None of these

Answer: A

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44. The distance between the poles of a horse shoe magnet is 0.1 m and its pole strength is 0.01 amp-m. The induction of magnetic field at a point midway between the poles will be

A. $2 \times 10^{-5} T$

B. $4 \times 10^{-6} T$

C. $8 \times 10^{-7} T$

D. Zero

Answer: C

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45. Due to a small magnet intensity at a distance x in the end on position is 9 Gauss. What will be the intensity at a distance $\frac{x}{2}$ on broad side on position?

A. 9 Gauss

B. 4 Gauss

C. 36 Gauss

D. 4.5 Gauss

Answer: C

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46. The pole strength of a bar magnet is 48 ampere-metre and the distance between its poles is $25cm$. The moment of the couple by which it can be placed at an angle of 30° with the uniform magnetic intensity of flux density $0.15\text{newton}/\text{ampere-metre}$ will be

A. 12newton-metre

B. $18\mathrm{newton\text{-}metre}$

C. $0.9\mathrm{newton\text{-}metre}$

D. none of these

Answer: C

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47. A magnet of magnetic moment 20 C.G.S. units is freely suspended in a uniform magnetic field of intensity 0.3 C.G.S. units. The amount of work done in deflecting it by an angle of 30° in C.G.S. unit is

A. 6

B. $3\sqrt{3}$

C. $3(2-\sqrt{3})$

D. 3

Answer: C

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48. The figure below shows the north and south poles of permanent magnet in which n turn coil of area of cross-section A is resting, such that for a current I passed through the coil, the plane of the coil makes an angle with respect to the direction of magnetic field B. If the plane of the magnetic field and the coil are horizontal and vertical respectively, the torque on the coil will be

A. $\tau = niAB\cos\theta$

B. $\tau = niAB\sin\theta$

C. $\tau = niAB$

D. None of the above, since the magnetic field is radial

Answer: A

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49. A magnet of magnetic moment M is situated with its axis along the direction of a magnetic field of strength B. The work done in rotating it by an angle of 180° will be

A. $-MB$

B. $+MB$

C. 0

D. $+2MB$

Answer: D

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50. A bar magnet of length $10 cm$ and having the pole strength equal to 10^{-3} weber is kept in a magnetic field having magnetic induction (B) equal to $4\pi \times 10^{-3}$ Tesla. It makes an angle of 30° with the direction of magnetic induction. The value of the torque acting on the magnet is

$\left(\mu_0 = 4\pi \times 10^{-7} weber / amp \times m\right)$

A. $2\pi \times 10^{-7} N \times m$

B. $2\pi \times 10^{-5} N \times m$

C. $0.5 N \times m$

D. $0.5 \times 10^2 N \times m$

Answer: A

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

A. $\sqrt{3}W$

B. W

C. $\frac{\sqrt{3}}{2}W$

D. $2W$

Answer: A

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52. A small bar magnet of moment M is placed in a uniform field H. If magnet makes an angle of 30° with field, the torque acting on the magnet is

A. MH

B. $\frac{MH}{2}$

C. $\frac{MH}{3}$

D. $\frac{MH}{4}$

Answer: B

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53. Rate of charges of torque τ with deflection theta` is maximum for a magnet susended freely in a uniform magnetic field of induction

B, when

A. $\theta = 0^\circ$

B. $\theta = 45^\circ$

C. $\theta = 60^\circ$

D. $\theta = 90^\circ$

Answer: A

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54. A magnet of magnetic moment M is rotated through 360° in a magnetic field H, the work done will be

A. MH

B. $2MH$

C. $2\pi MH$

D. Zero

Answer: D

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55. 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

Answer: B

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56. A bar magnet having a magnetic moment of $1.0 \times 10^4 JT^{-1}$ is free to rotate in a horizontal plane. A horizontal magnetic field $B = 4 \times 10^{-5} T$ exists in the space. Find the work done in rotating the magnet slowly from a direction parallel to the field to a direction 60° from the field.

A. $0.2J$

B. $2.0J$

C. $4.18J$

D. $2 \times 10^2 J$

Answer: A

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57. A magnet when placed perpendicular to a uniform field of strength $10^{-4} Wb/m^2$ experiences a mximum couple of moment $4 \times 10^{-5} N/m.$ What is its magnetic moment?

A. $0.4A \times m^2$

B. $0.2A \times m^2$

C. $0.16A \times m^2$

D. $0.04A \times m^2$

Answer: A

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58. If a magnet of length $10cm$ and pole strength $40A - m$ is placed at an angle of

45° in an uniform induction field of intensity $2 \times 10^{-4} T$, the couple acting on it is

A. $0.5656 \times 10^{-4} N - m$

B. $0.5656 \times 10^{-3} N - m$

C. $0.656 \times 10^{-4} N - m$

D. $0.656 \times 10^{-5} N - m$

Answer: B

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

A. MH

B. $2MH$

C. $3MH$

D. $4aMH$

Answer: A

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60. A bar magnet of magnetic moment $200A-m^2$ is suspended in a magnetic field of intensity $0.25N/A-m$. The couple required to deflect it through 30° is

A. $50N-m$

B. $25N-m$

C. $20N-m$

D. $15N-m$

Answer: B

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61. A magnet of magnetic moment $50\hat{\imath}\,A-m^2$ is placed along the x-axis in a magnetic field $\vec{B}=\left(0.5\hat{\imath}+3.0\hat{\jmath}\right)T$. The torque acting on the magnet is

A. $175\hat{k}N-m$

B. $150\hat{k}N-m$

C. $75\hat{k}N-m$

D. $25\sqrt{37}\hat{k}N-m$

Answer: B

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62. A magnet of length $0.1m$ and pole strength 10^{-4} A.m. is kept in a magnetic field of $30Wb/m^2$ at an angle 30°. The couple acting on it is $\ldots \times 10^{-4} Nm$.

A. 7.5

B. 3.0

C. 1.5

D. 6.0

Answer: C

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63. 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°

B. 45°

C. 60°

D. 90°

Answer: C

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64. A bar magnet of magnetic moment $3.0A - m^2$ is placed in a uniform magnetic induction field of $2 \times 10^{-5}T$. If each pole of the magnet experiences a force of $6 \times 10^{-4} N$,

the length of the magnet is

A. $0.5m$

B. $0.3m$

C. $0.2m$

D. $0.1m$

Answer: D

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65. A bar magnet when placed at an angle of 30° to the direction of magnetic field field induction of $5 \times 10^{-2} T$, experiences a moment of couple $25 \times 10^{-6} N-m$. If the length of the magnet is 5cm its pole strength is

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

B. $5 \times 10^{-2} A-m$

C. $2 A-m$

D. $5 A-m$

Answer: A

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66. The work done in rotating a magnet of magnetic moment $2A - m^2$ in a magnetic field to opposite direction to the magnetic field, is

A. Zero

B. $2 \times 10^{-2} J$

C. $10^{-2} J$

D. $10J$

Answer: B

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

A. $0.23 \text{Joule}/\text{Tesla}$

B. $0.40 \text{Joule} / \text{Tesla}$

C. $0.80 \text{Joule} / \text{Tesla}$

D. zero

Answer: B

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68. 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° with respect to the $N-S$ direction

D. Along the North-South $(N-S)$ direction

Answer: A

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

A. $0.1J$

B. $0.2J$

C. $1J$

D. $2J$

Answer: B

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70. Two short magnets placed along the same axis with their like poles facing each other repel each other with a force which varies inversely as

A. Square of the distance

B. Cube of the distance

C. Distance

D. Fourth power of the distance

Answer: D

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71. The angle of dip is the angle

A. Between the vertical component of earth's magnetic field and magnetc meridian

B. Between the vertical component of earth's magnetic field and geographical meridian

C. Between the earth's magnetic field direction and horizontal direction

D. Between the magnetic meridian and the geographical meridian

Answer: C

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72. The angle of dip at a place on the earth gives

A. The horizontal component of the earth's magnetic field

B. The location of the geographic meridian

C. The vertical component of the earth's field

D. The direction of the earth's magnetic field

Answer: B

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73. At the magnetic north pole of the earth, the value of horizontal component of earth's magnetic field and angle of dip are, respectively

A. Zero, maximum

B. Maximum, minimum

C. Maximum, maximum

D. Minimum, minimum

Answer: A

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74. A line passing through places having zero value of magnetic dip is called

A. Isoclinic line

B. Agonic line

C. Isogonic line

D. Aclinic line

Answer: D

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75. The angle of dip at the magnetic equator is

A. 0°

B. 45°

C. 30°

D. 90°

Answer: A

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76. 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

Answer: D

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77. The angle between the earth's magnetic and the earth's geographical axes is

A. Zero

B. 17°

C. 23°

D. None of these

Answer: B

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78. 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

Answer: A

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79. At which place, earth's magnetism become horizontal?

A. Magnetic pole

B. Geographical pole

C. Magnetic meridian

D. Magnetic eqator

Answer: B

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80. Intensity of magnetic field due to earth at a point inside a hollow steel box is

A. Less than outside

B. More than outside

C. same

D. Zero

Answer: D

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

A. Zero

B. 45°

C. 90°

D. 180°

Answer: C

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82. The angle between the magnetic meridian and geographical meridian is called

A. Angle of dip

B. Angle of declination

C. Magnetic moment

D. Power of magnetic field

Answer: B

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83. The lines of forces due to earth's horizontal component of magnetic field are

A. Parallel straight lines

B. Concentric circles

C. Elliptical

D. Parabolic

Answer: A

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84. The magnetic field due to the earth is closely equivalent to that due to

A. A large magnet of length equal to the diameter of the earth

B. A magnetic dipole placed at the centre of the earth

C. A large coil carrying current

D. Neither of the above

Answer: A

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85. When the N-pole of a bar magnet points towards the south and S-pole towards the north, the null points are at the

A. Magnetic axis

B. Magnetic centre

C. Perpendicular divider of magnetic axis

D. N and S poles

Answer: A

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86. Lines which represent places of constant angle of dip are called

A. Isobaric lines

B. Isogonic lines

C. Isoclinic lines

D. isodynamic lines

Answer: C

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87. A compass needle will show which of the following directions at the earth's magnetic pole?

A. Vertical

B. No praticular direction

C. Bent at 45° to the vertical

D. Horizontal

Answer: A

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88. Due to the earth's magnetic field, charged cosmic ray particles

A. Require greater kinetic energy to reach the equatorthan the poles

B. to reach the equator than the poles

C. Can never reach the equator

D. Can never reach the poles

Answer: C

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89. The vertical component of the earth's magnetic field is zero at a place where the angle of dip is

A. 0°

B. 45°

C. 60°

D. 90°

Answer: A

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

A. B_0

B. $\sqrt{2}B_0$

C. $2B_0$

D. B_0^2

Answer: B

Watch Video Solution

91. The value of angle of dip is zero at the magnetic equator because on it

A. V and H are equal

B. The value of V and H is zero

C. The value of V is zero

D. The value of H is zero

Answer: C

Watch Video Solution

92. At a place, the horizontal and vertical intensities of earth's magnetic field is 0.30 Gauss and 0.173 Gauss respectively. The angle of dip at this place is

A. 30°

B. 90°

C. 60°

D. 45°

Answer: A

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93. The angle of dip at a place is 60°. At this place the total intensity of earth's magnetic field is 0.64 units. The horizontal intensity of earth's magnetic field at this place is

A. 1.28 units

B. 0.64 units

C. 0.16 units

D. 0.32 units

Answer: D

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94. 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 is

A. $\sqrt{3}$

B. 1

C. $\frac{1}{\sqrt{3}}$

D. $\frac{1}{2}$

Answer: C

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95. The correct relation is

(Where B_H= Horizontal component of earth's magnetic field, B_V= Vertical component of earth's magnetic field and B= Total intensity of earth's magnetic field)

A. $B = \frac{B_V}{B_H}$

B. $B = B_V \times B_H$

C. $|B| = \sqrt{B_H^2 + B_V^2}$

D. $B = B_H + B_V$

Answer: C

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96. The vertical component of earth's magnetic field is zero at or The earth's magnetic field always has a vertical component except at the

A. Magnetic poles

B. Geographical poles

C. Every place

D. Magnetic equator

Answer: D

Watch Video Solution

97. A compass needle whose magnetic moment is $60 Am^2$ pointing geographic north at a certain place where horizontal component of earth's magnetic field is $40 \mu Wb/m^2$ experiences a torque of $1 \cdot 2 \times 10^{-3} Nm.$ What is the declination of the place?

A. 30°

B. 45°

C. 60°

D. 25°

Answer: A

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98. 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 or south-east

D. North-west or south-west

Answer: B

Watch Video Solution

99. A very small magnet is placed in the magnetic meridian with its south pole pointing north. The null point is obtained 20 cm away from the centre of the magnet. If the earth's magnetic field (horizontal component) at this point be 0.3 Gauss, the magnetic moment of the magnet is

A. $8.0 \times 10^2 e. m. u.$

B. $1.2 \times 10^3 e. m. u.$

C. $2.4 \times 10^3 e. m. u.$

D. $3.6 \times 10^3 e. m. u.$

Answer: B

Watch Video Solution

100. At a certain place, the horizontal component of earth's magnetic field is $\sqrt{3}$ times the vertical component. The angle of dip at that place is

A. 60°

B. 45°

C. 90°

D. 30°

Answer: D

Watch Video Solution

Watch Video Solution

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

A. 30°

B. 90°

C. 45°

D. 0°

Answer: C

Watch Video Solution

102. If the angle of dip at two places are 30° and 45° respectively, then the ratio of horizontal components of earth's magnetic field at the two places will be

A. $\sqrt{3}:\sqrt{2}$

B. $1:\sqrt{2}$

C. $1:\sqrt{3}$

D. $1:2$

Answer: A

Watch Video Solution

103. At a place the earth's horizontal component of magnetic field is $0.36 \times 10^{-4} \text{Weber} / m^2$. If the angle of dip at that place is 60°, then the vertical component of earth's field at that place in Weber / m^2 will be approxmately

A. 0.12×10^{-4}

B. 0.24×10^{-4}

C. 0.40×10^{-4}

D. 0.62×10^{-4}

Answer: D

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104. The angle of dip at a place is 40.6° and the intensity of the vertical component of the earth's magnetic field $V = 6 \times 10^{-5}$ Tesla.

The total intensity of the earth's magnetic field (I) at this place is

A. $7 \times 10^{-5} Tesla$

B. $6 \times 10^{-5} Tesla$

C. $5 \times 10^{-5} Tesla$

D. $9.2 \times 10^{-5} Tesla$

Answer: D

Watch Video Solution

105. In two separate experiment the neutral point due to two small magnets are at a distance of r and 2r in broad side-on position. The ratio of their magnetic moments will be

A. $4:1$

B. $1:2$

C. $2:1$

D. $1:8$

Answer: D

Watch Video Solution

106. The earth's magnetic field at a certain place has a horizontal component 0.3 Gauss and the total strength 0.5 Gauss. The angle of dip is

A. $\tan^{-1}\left(\frac{3}{4}\right)$

B. $\sin^{-1}\left(\frac{3}{4}\right)$

C. $\tan^{-1}\left(\frac{4}{3}\right)$

D. $\sin^{-1}\left(\frac{3}{5}\right)$

Answer: C

Watch Video Solution

107. The value of the horizontal component of the earth's magnetic field and and angle of dip are $1.8 \times 10^{-5} Weder / m^2$ and 30° respectively at some place. The total intensity of earth's magnetic field at that place will be

A. $2.08 \times 10^{-5} \text{Weber} / m^2$

B. $3.67 \times 10^{-5} \text{Weber} / m^2$

C. 3.18×10^{-5} Weber $/ m^2$

D. 5.0×10^{-5} Weber $/ m^2$

Answer: A

Watch Video Solution

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

A. B_0

B. B_0^2

C. $2B_0$

D. $\sqrt{2}B_0$

Answer: D

Watch Video Solution

109. A short magnet of moment $6.75Am^2$ produces a neutal point on its axis. If horizontal component of earth's magnetic field is $5 \times 10^{-5} \mathrm{Wb} / m^{2}$, then the distance of the neutal point should be

A. $10 cm$

B. $20 cm$

C. $30 cm$

D. $40 cm$

Answer: C

Watch Video Solution

110. Two bar magnet with magnetic moment $2M$ and M are fastened togather at right angles to each other at their centres to from a cross system, which can rotate freely about a vertical axis through the centre. The crossed system sets in earth's magnetic field with magnet having magnetic moment $2M$ making and angle θ with the magnetic merdian such that

A. $\theta = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

B. $\theta = \tan^{-1}(\sqrt{3})$

C. $\theta = \tan^{-1}\left(\frac{1}{2}\right)$

D. $\theta = \tan^{-1}\left(\frac{3}{4}\right)$

Answer: C

Watch Video Solution

111. Which of these relations is correct for magnetism?

A. $I^2 = V^2 + H^2$

B. I=V+H

C. $V = I^2 + H^2$

D. $V^2 = I + H$

Answer: A

Watch Video Solution

112. 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

Answer: A

Watch Video Solution

113. The real angle of dip, if a magnet is suspended at an angle of 30° to the magnetic meridian and the dip needle makes an angle of 45° with horizontal, is:

A. $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

B. $\tan^{-1}(\sqrt{3})$

C. $\tan^{-1}\left(\frac{\sqrt{3}}{\sqrt{2}}\right)$

D. $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$

Answer: A

Watch Video Solution

114. The values of the apparent angles of dip in two planes at right angles to each other are

30° and 45°. Then the true value of the angle of dip at the place is

A. $\tan^{-1} 1$

B. $\tan^{-1} 2$

C. $\cot^{-1} 2$

D. $\cot^{-1} 1$

Answer: C

Watch Video Solution

115. A dip circle lies initially in the magnetic meridian. If it is now rotated through angle θ in the horizontal plane, then tangent of the angle of dip is changed in the ratio:

A. $1 : \cos\theta$

B. $\cos\theta : 1$

C. $1 : \sin\theta$

D. $\sin\theta : 1$

Answer: A

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116. 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 is

A. $\sqrt{3}$

B. 1

C. $\frac{1}{\sqrt{3}}$

D. $\frac{1}{2}$

Answer: C

Watch Video Solution

117. A current carryingcoil 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. $\operatorname{cosec}^{-1}\left(\frac{H}{H_0}\right)$

D. $\cot^{-1}\left(\frac{H_0}{H}\right)$

Answer: A

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118. A magnetic needle suspended in a vertical plane at 30° from the magnetic meridian makes an angle of 45° with the horizontal. Find the true angle of dip.

A. $\tan^{-1}(\sqrt{3}/2)$

B. $\tan^{-1}(\sqrt{3})$

C. $\tan^{-1}\left(\sqrt{3/2}\right)$

D. $\tan^{-1}(2/\sqrt{3})$

Answer: A

Watch Video Solution

119. A dip needle lies initially in the magnetic merdian when it shows an angle of dip θ at a place. The dip circle is rotated through an angle x in the horizontal plane and then it shows an angle of dip θ'. Then $\frac{\tan\theta'}{\tan\theta}$ is

A. $\frac{1}{\cos x}$

B. $\frac{1}{\sin x}$

C. $\frac{1}{\tan x}$

D. $\cos x$

Answer: A

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120. A dip circle is adjusted so that its needle moves freely in the magnetic meridian. In this position, the angle of dip ia 40°. Now the dip circle is rotated so that the plane in which the needle moves makes an angle of 30° with the magnetic meridian. In this position the needle will dip by an angle

A. 40°

B. 30°

C. More than 40°

D. Less than 40°

Answer: C

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Magnetic Equipments

1. Which of the following statement is not the true?

A. While taking reading of tangent galvanometer, the plane of the coil must be set at right angle to the earth's magnetic meridian

B. A short magnet is used in a tangent galvanometer since a long magnet would be heavy and may not easily move

C. Measurements with the tangent galvanometer will be more accurate when the deflection is around 45°

D. A tangent galvanometer can not be used in the polar region

Answer: A

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2. The strength of the magnetic field in which the magnet of a vibration magnetometer is oscillating is increased 4 times its original value. The frequency of oscillation would then become

A. Twice its original value

B. Four times its original value

C. Half its original value

D. One-fourth its original value

Answer: A

Watch Video Solution

3. The bob of a simple pendulim is replaced by a magnet. The oscillations are set along the length of the magnet. A copper coil is added so that one pole of the magnet passes in and out of coil. The coil is sort-circuited. Then which one of the following happens?

A. Period decreases

B. Period does not change

C. Oscillations are damped

D. Amplitide increases

Answer: C

Watch Video Solution

4. The period of oscillation of a vibration magnetometer depends on which of the following factors?

where I is the moment of inertia of the magnet about the axis of suspension, M is the magnetic moment of the magnet and H is the external magnetic field

A. I and M only

B. M and H only

C. I and H only

D. I, M and H only

Answer: D

Watch Video Solution

5. Two normal uniform magnetic field contain a magnetic needle making an angle 60° with F. Then the ratio of $\frac{F}{H}$ is

A. $1:2$

B. $2:1$

C. $\sqrt{3}:1$

D. $1:\sqrt{3}$

Answer: D

Watch Video Solution

6. A short magnetic needle is pivoted in a uniform magnetic field of strength $\sqrt{3}T$ is applied to the needle in a perpendicular direction, the needle deflects through an angle θ, where θ is

A. 30°

B. 45°

C. 90°

D. 60°

Answer: D

Watch Video Solution

7. A magnetic needle suspended by a silk thread is vibrating in the earth's magnetic field. If the temperature of the needle is increased by $500^\circ C$, then

A. The time period decreases

B. The time period remains unchanged

C. The time period increases

D. The needle stops vibrating

Answer: C

Watch Video Solution

8. The time period of a freely suspended magnet is 2 sec. If it is briken in length into two equal parts and one part is suspended in the same way, then its time period will be

A. $4 \sec$

B. $2 \sec$

C. $\sqrt{2} \sec$

D. $1 \sec$

Answer: D

Watch Video Solution

9. The time period of oscillation of a bar magnet suspended horizontaliy along the magnetic meridian is T_0. If this magnet is replaced by another magnet of the same size and pole strength but with double the mass, the new time period will be

A. $\frac{T_0}{2}$

B. $\frac{T_0}{\sqrt{2}}$

C. $\sqrt{2}T_0$

D. $2T_0$

Answer: C

Watch Video Solution

10. Two short magnet having magnetic moment in the ratio $27 : 8$, when placed on the opposite sides of a deflection magnetometer, produce no deflection. If the distance of the weaker magnet is $0.12m$ from the centre of deflection magnetometer, the distance of the stronger magnet from the centre is

A. $0.06m$

B. $0.08m$

C. $0.12m$

D. $0.18m$

Answer: D

Watch Video Solution

11. The time period of oscillation of a freely suspended bar magnet with usual notations is given by

A. $T = 2\pi\sqrt{\frac{I}{MB_H}}$

B. $T = 2\pi\sqrt{\frac{MB_H}{I}}$

C. $T = \sqrt{\frac{I}{MB_H}}$

D. $T = 2\pi\sqrt{\frac{B_H}{MI}}$

Answer: A

Watch Video Solution

12. Keeping dissimilar poles of two magnets of equal pole strength and lrngth same side, their time period will be

A. Zero

B. One second

C. Infinity

D. Any value

Answer: C

Watch Video Solution

13. Time period in vibration magnetometer will be infinity at

A. Magnetic equator

B. Magnetic poles

C. Equator

D. At all places

Answer: B

Watch Video Solution

14. The perio of oscillation of a magnet in vibration magnetometer is 2 sec. The period of oscillation of a magnet whosr magnetic moment is four times that of the first magnet is

A. $1\,\mathrm{sec}$

B. $4\,\mathrm{sec}$

C. $8\,\mathrm{sec}$

D. $0.5\,\mathrm{sec}$

Answer: A

Watch Video Solution

15. A magnetic needle is made to vibrate in uniform field H, then its time period is T. If it vibrates in the field of intensity $4H$, its time period will be

A. $2T$

B. $T/2$

C. $2/T$

D. T

Answer: B

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16. The time period of oscillation of a magnet in a vibration magnetometer is 1.5 seconds. The time period of oscillation of another of another magnet similar in size, shap and mass but having one-fourth magnetic moment than that of first magnet, oscillating at same place will be

A. $0.75 \sec$

B. $1.5 \sec$

C. $3 \sec$

D. $6 \sec$

Answer: C

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17. The time period of a thin bar magnet in earth's magnetic field is T. If the magnet is cut into two equal parts perpendicular to its lengh, the time period of each part in the same field will be

A. $\frac{T}{2}$

B. T

C. $\sqrt{2}T$

D. $2T$

Answer: A

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18. A magnet freely suspended in a vibration magnetometer makes 10 oscillations per minute at a place A and 20 oscillations per minute at a place B. If the horizontal component of earth's magnetic field at A is $36 \times 10^{-6} T$, then its value at B is

A. $36 \times 10^{-6} T$

B. $72 \times 10^{-6} T$

C. $144 \times 10^{-6} T$

D. $288 \times 10^{-6} T$

Answer: C

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19. The period of oscillations of a magnet is 2 sec. When it is remagnetised so that the pole strength is 4 times its period will be

A. $4 \sec$

B. $2 \sec$

C. $1 \sec$

D. $1/2 \sec$

Answer: C

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20. When two magnetic moments are compared using equal distance method the deflections produced are 45° and 30°. If the length of magnets are in the ratio 1:2, the ratio of their pole strengths is

A. $3:1$

B. $3:2$

C. $\sqrt{3} : 1$

D. $2\sqrt{3} : 1$

Answer: D

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21. In sum and difference method in vibration magnetometer, the time period is more if

A. Similar poles of both magnets are on same sides

B. Popposite poles of both magnets are on same sides

C. Both magnets are perpendicular to each other

D. Nothing can be said

Answer: B

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22. 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. $\sqrt{2} \sec$

Answer: D

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23. Two magnets of same size and mass make respectively 10 and 15 oscillations per minute at certain place. The ratio of their magnetic moment is

A. $4:9$

B. $9:4$

C. $2:3$

D. $3:2$

Answer: A

Watch Video Solution

24. Time period for a magnet is T. If it is divided in four equal parts along its axis and perpendicular to its axis as shown then time period for each part will be

A. $4T$

B. $T/4$

C. $T/2$

D. T

Answer: C

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25. Moment of inertia of a megnetic needle is $40gm-cm^2$ has time period 3 seconds in earth's horizontal field $=3.6\times10^{-5}weber/m^2$. Its magnetic moment will be

A. $0.5A \times m^2$

B. $5A \times m^2$

C. $0.250A \times m^2$

D. $5 \times 10^2 A \times m^2$

Answer: A

Watch Video Solution

26. Two bar magnets of the same mass, length and breadth but magnetic moment M amd 2M respectively, when placed in same position, time period is 3 sec. What will be the time period when they are placed in different positio?

A. $\sqrt{3}\,\mathrm{sec}$

B. $3\sqrt{3}\,\mathrm{sec}$

C. $3\,\mathrm{sec}$

D. $6\,\mathrm{sec}$

Answer: B

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27. A magnet is suspended in such a way that it oscillates in the horizontal plane. It makes 20 oscillations per minute at a place where dip angle is 30° and 15 oscillations minute at a place where dip angle is 60°. The ratio of total earth's magnetic field at the two places is

A. $3\sqrt{3}:8$

B. $16:9\sqrt{3}$

C. $4:9$

D. $2\sqrt{3}:9$

Answer: B

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28. A bar magnet A of magnetic moment M_A is found to oscillate at a frequency twice that of magnet B of magnetic moment M_B when placed in a vibrating magneto-meter. We may say that

A. $M_{=}2M_B$

B. $M_A = 8M_B$

C. $M_A = 4M_B$

D. $M_B = 8M_A$

Answer: C

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29. Two magnets A and B are identical in mass, length and breadth but have different magnetic moments. In a vibration magnetometer, if the time period of B is twice the time period of A. The ratio of the magnetic moment M_A / M_B of the magnets will be

A. $1/2$

B. 2

C. 4

D. $1/4$

Answer: C

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30. A magnet of magnetic moment M oscillating freely in earth's horizontal magnetic field makes n oscillations per minute. If the magnetic moment is quadrupled and the earth's field is doubled, the number of oscillations mode per minute would be

A. $\frac{n}{2\sqrt{2}}$

B. $\frac{n}{\sqrt{2}}$

C. $2\sqrt{2n}$

D. $\sqrt{2n}$

Answer: C

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31. A magnetic needle suspended horizontally by an unspun silk fibre, oscillates in the horizontal plane because of the restoring force originating mainly from

A. The torsion of the silk fibre

B. The force of gravity

C. The horizontal component of earth's magnetic field

D. All the above factors

Answer: C

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32. At places A and B using vibrating magnetometre, a magnet vibrates in a horizontal plane and its respective periodic time are 2 sec and 3 sec and at these places the earth's horizontal components are H_A and H_B respectively. Then the ratio between H_A and H_B will be

A. $9 : 4$

B. $3 : 2$

C. $4 : 9$

D. $2 : 3$

Answer: A

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33. The time period of a bar magnet suspended horizontally in the earth's magnetic field and allowed to oscillate

A. Is directly proportional to the square root of its mass

B. Is directly proportional to its pole strength

C. Is inversely proportional to its magnetic moment

D. Decreases if the length increases but pole strength remains same

Answer: A

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34. A small bar magnet A oscillates in a horizontal plane with a period T at a place where the angle of dip is 60°. When the same needle is made to oscillate in a vertical plane coinciding with the magnetic merdian, its period will be

A. $\frac{T}{\sqrt{2}}$

B. T

C. $\sqrt{2}T$

D. $2T$

Answer: A

Watch Video Solution

35. A vibrations magnetometer consists of two indentical bar magnet placed one over the other that they are perpendicular and bisect each other. The time period of oscillation in a horizontal magnetic field is $2^{5/4}$ s. One of the magnets is removed and if the other magnet oscillates in the same field, then the time period in second is :

A. $2^{1/4}$

B. $2^{1/2}$

C. 2

D. $2^{5/4}$

Answer: C

Watch Video Solution

36. A bar magnet is oscillating in the earth's magnetic field with a time period T. If the mass is quadrupled, then its time period will be:

A. $T/2$

B. T

C. $2T$

D. $4T$

Answer: C

Watch Video Solution

37. Magnets A and B are geometrically similar but the magnetic moment of A is twice that of B. If T_1 and T_2 be the time periods of the oscillation when their like poles and unlike poles are kept togather respectively, then $\frac{T_1}{T_2}$ will be

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{\sqrt{3}}$

D. $\sqrt{3}$

Answer: C

Watch Video Solution

38. The time period of a freely suspended magnet is 4 seconds. If it is broken in length into two equal parts and one part is suspended in the same way, then its time period will be

A. $4\,\mathrm{sec}$

B. $2\,\mathrm{sec}$

C. $0.5\,\mathrm{sec}$

D. $0.25\,\mathrm{sec}$

Answer: B

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39. Two tangent galvanometers having coils of the same radius are connected in series. A current flowing in them produces deflections of 60° and 45° respectively. The ratio of the number of turns in the coils is

A. $4/3$

B. $(\sqrt{3}+1)/1$

C. $(\sqrt{3}+1)/(\sqrt{3}-1)$

D. $\sqrt{3}/1$

Answer: D

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40. Using a bar magnet P, a vibration magnetometer has time period 2 sec. When a bar Q (identical to P in mass and size) is placed on top of P, the time period is unchanged. Which of the following statements is true?

A. Q is of non-magnetic material

B. Q is a bar magnet identical to P, and its north pole placed on top of P's north pole

C. Q is of unmagnetized ferromagnetic material

D. Nothing can be said about Q's properties

Answer: B

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41. A certain amount of current when flowing in a properly set tangent galvanoment, produces a deflection of 45°. If the current be reduced by a factor of $\sqrt{3}$, the deflection would

A. Decrease by 30°

B. Decrease by 15°

C. Increase by 15°

D. Increase by 30°

Answer: B

Watch Video Solution

42. When $\sqrt{3}$ ampere current is passed in a tangent galvanometer, there is a deflection of 30° in it. The deflection obtained when 3 amperes current is passed, is

A. 30°

B. 45°

C. 60°

D. 75°

Answer: B

Watch Video Solution

43. The period of oscillations of a magnetic needle in a magnetic field is 1.0 sec. If the length of the needle is halved by cutting it, the time perood will be

A. 1.0 sec

B. 0.5 sec

C. 0.25 sec

D. $2.0 \sec$

Answer: B

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44. The magnet of a vibration magnetometer is heated so as to reduce its magnetic moment by 19%. By doing this the period time of the magnetometer will

A. Increase by 19%

B. Decrease by 19%

C. Increase by 11%

D. Decrease by 21%

Answer: C

Watch Video Solution

45. A magnet makes 40 oscillations per minute at a place having magnetic field intensity of $0.1 \times 10^{-5} T$. At another place, it takes 2.5 sec to complete one vibrating. The value of earth's horizontal field at that place is

A. $0.25 \times 10^{-6} T$

B. $0.36 \times 10^{-6} T$

C. $0.66 \times 10^{-8} T$

D. $1.2 \times 10^{-6} T$

Answer: B

Watch Video Solution

46. A tangent galvanometer has a coil of 25 turns and radius of 15 cm. The horizontal component of the earth's magnetic field is $3 \times 10^{-5} T$. The current required to producea defection of 45° in it, is

A. $0.29 A$

B. $1.2 A$

C. $3.6 \times 10^{-5} A$

D. $0.14 A$

Answer: A

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47. The time period of a vibration magnetometer is T_0. Its magnet is replaced by another magnet whose moment of inertia is 3 times and magnetic moment is $1/3$ of the initial magnet. The time period now will

A. $3T_0$

B. T_0

C. $T_0/\sqrt{3}$

D. $T_0 / 3$

Answer: A

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48. The magnetic needle of a tangent galvanometer is deflected at an angle 30° due to a magnet. The hoeizontal component of earth's magnetic field $0.34 \times 10^{-4} T$ is along the plane of the coil. The magnetic intensity is

A. $1.96 \times 10^{-4} T$

B. $1.96 \times 10^{-5} T$

C. $1.96 \times 10^{4} T$

D. $1.96 \times 10^{5} T$

Answer: B

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49. In a tangent galvanometer a current of $0.1A$ produces a deflection of 30°. The current required to produce a deflection of 60° is

A. $0.2A$

B. $0.3A$

C. $0.4A$

D. $0.5A$

Answer: B

Watch Video Solution

50. A thin rectangular magnet suspended freely has a period of oscillation equal to T. Now it is broken into two equal halves (each having half of the original length) and one piece is made to oscillate freely in the same field. If its period of oscillation is T', then ratio $\frac{T'}{T}$ is

A. $\frac{1}{4}$

B. $\frac{1}{2\sqrt{2}}$

C. $\frac{1}{2}$

D. 2

Answer: C

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51. The sensitivity of a tangent galvanometer is increased if

A. Number of turn decreases

B. Number of turn increases

C. Field increases

D. None of the above

Answer: B

Watch Video Solution

52. When 2 amperes current is passed through a tangent galvanometer, it gives a deflection of 30°. For 60° deflection, the current must be

A. $1amp$

B. $2\sqrt{3}amp$

C. $4amp$

D. $6amp$

Answer: D

Watch Video Solution

53. Two short magnets have equal to pole strength but one is twice as long as the other. The shorter magnet is placed 20 cm in tan A position from the compass needle. The longer magnet must be placed on the other side of the magnetometer for no deflection at a distance equal to:

A. $20cm$

B. $20 \times (2)^{1/3}cm$

C. $20 \times (2)^{4/3}cm$

D. $20 \times (2)^{2/3} cm$

Answer: B

Watch Video Solution

54. A bar magnet is oscillating in the earth's magnetic field with a time period T. If the mass is increased four times, then its time period will be:

A. $4T$

B. $2T$

C. T

D. $T/2$

Answer: B

Watch Video Solution

55. The error in measuring the curent with tangent galvanometer is minimum when the deflection is about

A. 0°

B. 30°

C. 45°

D. 60°

Answer: C

Watch Video Solution

56. A magnet oscillating in a horizontal plane has a time period of 2 seconds at a place where the angle of dip is 30° and 3 seconds at another place where the angle of dip is 60°.

The retio of resultant magnetic field at the

two places is

A. $\frac{4\sqrt{3}}{7}$

B. $\frac{4}{9\sqrt{3}}$

C. $\frac{4}{4\sqrt{3}}$

D. $\frac{9}{\sqrt{3}}$

Answer: C

Watch Video Solution

57. Two identical bar magnets are placed on above the other such that they are mutually perpendicular and bisect each other. The time period of this combination in a horizontal magnetic field is T. The time period of esch magnet in the same field is

A. $\sqrt{2}T$

B. $2^{\frac{1}{4}}T$

C. $2^{-\frac{1}{4}}T$

D. $2^{-\frac{1}{2}}T$

Answer: C

Watch Video Solution

58. The radius of the coil of a Tangent galvanometer, which has 10 turns, is 0.1 m. The current required to produce a deflection of $60^{\circ}\left(B_H=4\times10^{-5}T\right)$ is

A. $3A$

B. $1.1A$

C. $2.1A$

D. $1.5A$

Answer: B

Watch Video Solution

Magnetic Materials

1. The permanent magnet is made fron which one of the following substances?

A. Diamagnetic

B. Paramagnetic

C. Ferromagnetic

D. Electromagnetic

Answer: C

Watch Video Solution

2. Which of the folowing is diamagnetism?

A. Aluminium

B. Quartz

C. Nickel

D. Bismuth

Answer: D

Watch Video Solution

3. If a ferromagnetic material is inserted in a current carring solenoid, the magnetic field of solenoid

A. Largely increases

B. Slightly increases

C. Largely decreases

D. Slightly decreases

Answer: A

Watch Video Solution

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

A. Diamagnetic material do not have permanent magnetic moment

B. Diamagnetism is explanined in terms of electromagnetic induction

C. Diamagnetic material have a small positive susceptibility

D. The magnetic moment of individual electrons neutralize each other

Answer: C

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5. Susceptibility of ferromagnetic substance is

A. > 1

B. < 1

C. 0

D. 1

Answer: A

Watch Video Solution

6. When a ferromagnetic material is heated to temperature above its Curie tamperature, the material

A. Is permanently magnetized

B. Remains ferromagnetic

C. Behaves like a diamagnetic material

D. Behaves like a paramagnetic material

Answer: D

Watch Video Solution

7. An example of a diamagnetic substance is

A. Aluminium

B. Copper

C. Iron

D. Nickel

Answer: B

Watch Video Solution

8. Magnets cannot be made from which of the following substances?

A. Iron

B. Nickel

C. Copper

D. All of the above

Answer: C

Watch Video Solution

9. Which of the following is most suitable for the core of electromagnets?

A. Soft iron

B. Steel

C. Copper-nickel alloy

D. Air

Answer: A

Watch Video Solution

10. Demagnetization of magnets can be done by

A. Rough handling

B. Heating

C. Magnetising in the opposite direction

D. All of the above

Answer: D

Watch Video Solution

11. A ferromagnetic material is heated above its curie temperature. Which one is a correct statement?

A. Ferromagnetic domains are perfectly arranged

B. Ferromagnetic domains become random

C. Ferromagnetic domains are not influenced

D. Ferromagnetic material changes itself into dianagnetic material

Answer: B

Watch Video Solution

12. If a diamagnetic substance is brought near north or south pole of a bar magnet, it is

A. Attracted by the poles

B. Repelled by the poles

C. Repelled by the north pole and attracted by the south pole

D. Attracted by the north pole and repelled by the south pole

Answer: B

Watch Video Solution

13. The material of permanent magnet has

A. High retentivity, low coercivity

B. Low retentivity, high coercivity

C. Low retentivity, low coercivity

D. High retentivity, high coercivity

Answer: D

Watch Video Solution

14. 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

Answer: C

Watch Video Solution

15. Which one of the following is a non-magneticsubstance?

A. Iron

B. Nickel

C. Cobalt

D. Brass

Answer: D

Watch Video Solution

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

A. Diamagnetic

B. Paramagnetic

C. Ferromagnetic

D. Antiferromagnetic

Answer: B

Watch Video Solution

17. Temperature above which a ferromagnetic substance becomes paremagnetic is called

A. Critical temperature

B. Boyle's temperature

C. Debye's temperature

D. Curie teperature

Answer: D

Watch Video Solution

18. 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 temperature

Answer: B

Watch Video Solution

19. Curie's 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. $\chi \propto T$

Answer: C

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20. The variation of magnetic susceptibility (χ) with temperature for a diamagnetic substance is best represented by

A. 

B.

C.

D.

Answer: B

Watch Video Solution

21. The variation of magnetic susceptibility (χ) with magnetising field for a paramagnetic substance is

A.

B.

C.

D.

Answer: A

Watch Video Solution

22. The variation of magnetic susceptibility (χ) with absolute temperature T for a ferromagnetic material is

A.

B.

C.

D.

Answer: A

23. The $\chi - (1/T)$ graph for an alloy of paramagnetic nature is shown in Fig. The curie constance is, then

A. $57K$

B. $2.8 \times 10^{-3}K$

C. $570K$

D. $17.5 \times 10^{-3}K$

Answer: A

Watch Video Solution

24. Which of the following is true?

A. Diamagnetism is temperature dependent

B. Paramagnetic is temperature dependent

C. Paramagnetic is temperature independent

D. None of these

Answer: B

Watch Video Solution

25. A superconductor exhibits perfect

A. Ferrimagnetism

B. Ferromagnetism

C. Paramagnetism

D. Diamagnetism

Answer: D

Watch Video Solution

26. Identify the paramagnetic substance

A. Iron

B. Aluminium

C. Nickel

D. Hydrogen

Answer: B

Watch Video Solution

27. 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

Answer: C

Watch Video Solution

28. When a magnetic substance is heated, then it

A. Becomes a strong magnet

B. losses its magnetism

C. Does not effect the magnetism

D. Either (a) or (c)

Answer: B

Watch Video Solution

29. The only property possessed by ferromagnetic substance is

A. Hysteresis

B. Susceptibility

C. directional property

D. Attracting magnetic substances

Answer: A

Watch Video Solution

30. Substance in which the magnetic moment of a single atom is not zero, is know as

A. Diamagnetism

B. Ferromagnetism

C. Paramagnetism

D. Ferrimagnetism

Answer: C

Watch Video Solution

31. Diamagnetic subtance are

A. Feebly attracted by magnets

B. Strongly attracted by magnets

C. Feebly repelled by magnets

D. Strongly repelled by magnets

Answer: C

Watch Video Solution

32. The given figure represents a material which is

A. Paramagnetic

B. Diamagnetic

C. Ferromagnetic

D. None of these

Answer: B

33. 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

Answer: C

Watch Video Solution

34. The magnetic susceptibility is

A. $\chi = \frac{I}{H}$

B. `chi=B/H

C. $\chi = \frac{M}{V}$

D. $\chi = \frac{M}{H}$

Answer: A

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35. The unit for molar susceptibility is

A. m^3

B. $kg - m^{-3}$

C. $kg^{-1}m^3$

D. No units

Answer: A

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

A. 5500×10^{7}

B. 5500×10^{-7}

C. 5501

D. 5499

Answer: D

Watch Video Solution

37. The susceptibility of magnesium at $300K$ is 1.2×10^{-5}. At what temperature will the susceptibility increase to 1.8×10^{-5}?

A. $450K$

B. $200K$

C. $375K$

D. None of these

Answer: B

Watch Video Solution

38. Magnetic permeability is maximum for

A. Diamagnetic substance

B. Paramagnetic substance

C. Ferromagnetic substance

D. All of these

Answer: C

Watch Video Solution

39. If a diamagnetic solution is poured into a U-tube and one aem 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. Remains as such

Answer: B

Watch Video Solution

40. The relative permeability is represented by μ_r and the susceptibility is denoted by χ for a magnetic substace. Then for for a paramagnetic subatance

A. $\mu_r < 1, \chi < 0$

B. $\mu_r < 1, \chi > 0$

C. $\mu_r > 1, \chi < 0$

D. $\mu_r > 1, \chi > 0$

Answer: D

Watch Video Solution

41. The relative permeability (μ_r) of a ferromagnetic substance varies with tamperature (T) according to the curve

A. A

B. B

C. C

D. D

Answer: C

Watch Video Solution

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

A. $\dfrac{eJ}{m}$

B. $\dfrac{eJ}{2m}$

C. $eJ2m$

D. $\frac{2m}{eJ}$

Answer: B

Watch Video Solution

43. 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. $B = \mu_0(H + M)$

Answer: D

Watch Video Solution

44. When a piece of a ferromagnetic sobstance 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

Answer: D

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45. The basic magnetization curve for a ferromagnetic material is shown in figure. Then, the value of relative permeability is highest for the point

A. P

B. Q

C. R

D. S

Answer: B

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46. If the magnetic dipole of moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material are donated by μ_d, μ_p and 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. $\mu_{\neq} 0$ and $\mu_p = 0$

Answer: C

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47. 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 above

Answer: B

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48. Which of the following statement is incorrect about hysteresis?

A. This effect is common to all ferromagnetic substance

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

Answer: C

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49. For substance hysteresis $(B-H)$ curve are as shown in figure. For making temporary magnet which of the following is the best?

A.

B.

C.

D.

Answer: D

50. The figure illustrate how B, the flux density inside a sample of unmagnetised ferromagnetic material varies with B_0, the magnetic flux density in which the sample is kept. For the samle to be suitable for making a permanent magnet

A. OQ should be large, OR should be small

B. OQ and OR should both be large

C. OQ should be small, OR should be large

D. OQ and OR should both be small

Answer: B

Watch Video Solution

Problems Based On Mixed Concepts

1. The dip at a place is delta. For measuring it, the axis of the dip needle is perpendicular to the magnetic meridian. If the axis of the dip needle makes angle θ with the magnetic meridian, the apparent dip will be given $\tan \delta_1$ which is equal to:

A. $\tan \delta \cos \theta$

B. $\tan \delta \sec \theta$

C. $\tan \delta \sin \theta$

D. $\tan \delta \cos ec\theta$

Answer: B

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2. A magnet of length $14cm$ and magnetic moment μ is broken into two parts of length 6 cm and 8 cm. They are put at right angles to each other with the opposite poles togather. The magnetic dipole moment of the combination is:

A. $\mu / 1.4$

B. μ

C. 1.4μ

D. 2.8μ

Answer: A

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3. A thin magnetic needle oscillates in the horizontal plane with a time period of 2.0 sec. If the needle is broken into 4 equal parts perpendicular to its length, then the time period of each part will be:

A. $0.5s$

B. $1.0s$

C. $1.5s$

D. $2.0s$

Answer: A

Watch Video Solution

4. A wire of length l is bent in the form a circular coil of some turns. A current I flows through the coil. The coil is placed in a uniform magnetic field B. The maximum torqur on the coil can be

A. $\frac{iBl^2}{4\pi}$

B. $\frac{iBl^2}{\pi}$

C. $\frac{iBl^2}{2\pi}$

D. $\frac{2iBl^2}{\pi}$

Answer: A

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5. A small coil C with $N = 200$ turns is mounted on one end of a balance beam and introduced between the poles of an electromagnet as shown in figure. The cross sectional area of coil is $A = 1.0 cm^2$, length of arm OA of the balance beam is $l = 30 cm$. When there is no current in the coil the balance is in equilibrium. On passing a current $I = 22 mA$ through the coil the equilibrium is restored by putting the additional counter weight of mass $\Delta m = 60 mg$ on the balance pan. Find the magnetic induction at the spot where coil is located.

A. $0.4 T$

B. $0.3T$

C. $0.2T$

D. $0.1T$

Answer: A

Watch Video Solution

6. A short bar magnet with its north pole facing north forms a neutral point at P in the horizontal plane. If the magnet is rotated by 90° in the horizontal plane, the net magnetic induction at P is (Horizontal component of earth's magnetic field $= B_H$)

A. 0

B. $2B_H$

C. $\frac{\sqrt{5}}{2}B_H$

D. $\sqrt{5}B_H$

Answer: D

Watch Video Solution

7. Shown a short magnet executing small oscillations in vibration magnetometers in earth's magnetic field having horizontal component $24 \mu T$. The period of oscillation is $0.1 s$. When the key K is closed, an upward current of $18 A$ is established as shown. The new time period is

A. $0.1 s$

B. $0.2 s$

C. $0.3 s$

D. $0.4s$

Answer: B

Watch Video Solution

8. An iron rod of $0 \cdot 2cm^2$ cross-sectional area is subjected to a magnetising field of $1200Am^{-1}$. The suscaptibility of iron is 599. Find the permeability and the magnetic flux produced.

A. $0.904Wb$

B. $1.81 \times 10^{-5} Wb$

C. $0.904 \times 10^{-5} Wb$

D. $5.43 \times 10^{-5} Wb$

Answer: B

Watch Video Solution

9. The plane of dip circle is set in the geographic meridian and the apparent dip is θ_1. It is then set in a vertical plane perpendicular to the geographic meridian.

Now, the apparent dip is θ_2. The angle of declination θ at that place is

A. $\tan\alpha = \sqrt{\tan\theta_1 \tan\theta_2}$

B. $\tan\alpha = \sqrt{(\tan\theta_1)(\tan\theta_2)}$

C. $\tan\alpha = \dfrac{\tan\theta_1}{\tan\theta_2}$

D. $\tan\alpha = \dfrac{\tan\theta_2}{\tan\theta_1}$

Answer: C

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10. A vibrations magnetometer consists of two indentical bar magnet placed one over the other that they are perpendicular and bisect each other. The time period of oscillation in a horizontal magnetic field is $2^{5/4}$ s. One of the magnets is removed and if the other magnet oscillates in the same field, then the time period in second is :

A. $2^{1/4}$

B. $2^{1/2}$

C. 2

D. $2^{3/4}$

Answer: C

Watch Video Solution

11. In a vibration magnetometer, the time period of a bar magnet oscillating in horizontal componnt of earth's magnetic field is $2\,\text{sec}$. When a magnet is brought near and parallel to it, the time period reduces to $1\,\text{sec}$.

The ratio H / F of the horizontal component H and the field F due to magnet will be

A. 3

B. $1 / 3$

C. $\sqrt{3}$

D. $1 / \sqrt{3}$

Answer: B

Watch Video Solution

12. Two magnet of equal mass are joined at right angles to each other as shown the magnet 1 has a magnetic moment 3 times that of magnet 2. This arrangment is pivoted so that it is free to rotate in the horizontal plane. In equilibrium what angle will the magnet 1 subtend with the magnetic meridian?

A. $\tan^{-1}\left(\frac{1}{2}\right)$

B. $\tan^{-1}\left(\frac{1}{3}\right)$

C. $\tan^{-1}(1)$

D. 0°

Answer: B

Watch Video Solution

13. The dipole moment of each molecule of a paramagnetic gas is $1.5 \times 10^{-23} amp \times m^2$. The temperature of gas is 27° and the number of molecules per unit volume in it is $2 \times 10^{26} m^{-3}$. The maximum possible intensity of magnetisation in the gas will be

A. $3 \times 10^{3} amp/m$

B. $4 \times 10^{-3} amp/m$

C. $5 \times 10^{5} amp/m$

D. $6 \times 10^{-4} amp/m$

Answer: A

Watch Video Solution

14. Two magnets A and B are identical and these are arranged as shown in the figure. Their length is negligible in comparison to the separation between them. A magnetic needle is placed between the magnets at point P which gets deflected through an angle θ under the influence of magnets. The ratio of distance d_1 and d_2 will be

A. $(2\tan\theta)^{1/3}$

B. $(2\tan\theta)^{-1/3}$

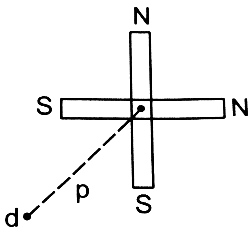
C. $(2\cot\theta)^{1/3}$

D. $(2\cot\theta)^{-1/3}$

Answer: C

Watch Video Solution

15. Two short magnets of equal dipole moments M are fastened perpendicularly at their centres (figure). The magnitude of the magnetic field at a distance d from the centre on the bisector of the right angle is



A. $\frac{\mu_0}{4\pi}\frac{M}{d^3}$

B. $\frac{\mu_0}{4\pi} \frac{M\sqrt{2}}{d^3}$

C. $\frac{\mu_0}{4\pi} \frac{2\sqrt{2}M}{d^3}$

D. $\frac{\mu_0}{4\pi} \frac{2M}{d^3}$

Answer: C

Watch Video Solution

16. If θ_1 and θ_2 be the apparent angles of dip observed in two vertical planes at right angles to each other, then the true angle of dip θ is given by

A. $\cos^2\varphi = \cos^2\varphi_1 + \cos^2\varphi_2$

B. $\sec^2\varphi = \sec^2\varphi_1 + \sec^2\varphi_2$

C. $\tan^2\varphi = \tan^2\varphi_1 + \tan^2\varphi_2$

D. $\cot^2\varphi = \cot^2\varphi_1 + \cot^2\varphi_2$

Answer: D

Watch Video Solution

17. Each atom of an iron bar $(5cm \times 1cm \times 1cm)$ has a magnetic moment $1.8 \times 10^{-23} Am^2$ Knowing that the density of iron is $7.78 \times 10^3 kg^{-3} m$ atomic weight is 56 and Avogadro's number is 6.02×10^{23} the magnetic moment of bar in the state of magnetic saturation will be

A. $4.75 Am^2$

B. $5.75 Am^2$

C. $75.4 Am^2$

D. $75.4 Am^2$

Answer: C

Watch Video Solution

18. An iron rod of volume $10^{-4} m^3$ and relative permeability 1000 is placed inside a long solenoid wound with $5 \mathrm{turns} / \mathrm{cm}$. If a current of $0.5A$ is passed through the solenoid, then the magnetic moment of the rod is

A. $10AM^2$

B. $15AM^2$

C. $20AM^2$

D. $25AM^2$

Answer: D

Watch Video Solution

19. A bar magnet has coercivity $4 \times 10^3 Am^{-1}$. It is desired to demagnetise it by inserting it inside a solenoid $12cm$ long and having 60 turns. The current that should be sent through the solenoid is

A. $2A$

B. $4A$

C. $6A$

D. $8A$

Answer: D

Watch Video Solution

20. A magnet is suspended in the magnetic meridian with an untwisted wire. The upper end of wire is rotated through 180° to deflect the magnet by 30° from magnetic meridian. When this magnet is replaced by another magnet, the upper end of wire is rotated through 270° to deflect the magnet 30° from magnetic meridian. The ratio of magnetic moment of magnets is

A. $1:5$

B. $1:8$

C. $5:8$

D. $8:5$

Answer: C

Watch Video Solution

21. A dip needle vibrates in the vertical plane perpendicular to the magnetic meridian. The time period of vibration is found to be 2 sec. The same needle is then allowed to vibrate in the horizontal plane and the time period is again found to be 2 seconds. Then the angle of dip is

A. 0°

B. 30°

C. 45°

D. 90°

Answer: C

Watch Video Solution

22. A short magnet oscillates in an oscillation magnetometer with a time period of 0.10s where the earth's horizontal magnetic field is $24\mu T$. A downward current of $18A$ is established in a vertical wire placed 20cm east of the magnet. Find the new time period.

A. $0.1s$

B. $0.089s$

C. $0.076s$

D. $0.057s$

Answer: C

Watch Video Solution

23. The magnetic moment produced in a substance of $1 gm is 6 \times 10^{-7}$ ampere, metre^2.

If its density is $5gm/cm^3$, then the intensity of magnetisation in A/m will be

A. 8.3×10^6

B. 3.0

C. 1.2×10^{-7}

D. 3×10^{-6}

Answer: B

Watch Video Solution

24. The needle of a deflection galvanometer shows a deflection of 60° due to a short bar magnet at a certain distance in tan A position. If the distance is doubled, the deflection is

A. $\sin^{-1}\left(\frac{\sqrt{3}}{8}\right)$

B. $\cos^{-1}\left(\frac{\sqrt{3}}{8}\right)$

C. $\tan^{-1}\left(\frac{\sqrt{3}}{8}\right)$

D. $\cot^{-1}\left(\frac{\sqrt{3}}{8}\right)$

Answer: C

Watch Video Solution

25. The area of hysteresis loop of a material is equinalent to 250 joule. When 10 kg material is magnetised by an alternating field of 50 Hz then energy lost in one hour will be if the density of material is $7.5gm/cm^2$

A. $6 \times 10^4 J$

B. $6 \times 10^4 erg$

C. $3 \times 10^2 J$

D. $3 \times 10^2 erg$

Answer: A

Watch Video Solution

26. A tangent galvanometer shown a deflection of 45° when $10 mA$ of current is passed through it. If the horizontal component of the earth's magnetic field is $B_H = 3.6 \times 10^{-5} T$ and radius of the coil is $10 cm$, find the number of turns in the coil.

A. $5700 turns$

B. $57 turns$

C. $570 turns$

D. $5.7 turns$

Answer: C

Watch Video Solution

27. A magnet is parallel to a uniform magnetic field. If it is rotated by 60°, the work done is 0.8 J. How much work is done in moving it 30° further

A. $0.8 \times 10^7 ergs$

B. $0.4J$

C. $8J$

D. $0.8ergs$

Answer: A

Watch Video Solution

28. The magnet of vibration magnetometer is heated so as to reduce its magnetic moment by 36%. By doing this the periodic time of the magnetometer will

A. Increases by 36%

B. Increases by 25%

C. Decreases by 25%

D. Decreases by 64%

Answer: B

Watch Video Solution

29. The ratio of magnetic moment of two bar magnet is $13:5$. These magnets are held togather in a vibration magnetometer are allowed to oscillate in earth's magnetic field with like poles togather 15 oscillations per minute are made. What will be the frequency of oscillation of system if unlike poles are togather?

A. $10 \text{oscillations} / \text{min}$

B. $15 \text{oscillations} / \text{min}$

C. $12 \text{oscillations} / \text{min}$

D. $\frac{75}{13} \text{oscillation} / \text{min}$

Answer: A

Watch Video Solution

30. Two short magnets of magnetic moment $1000 Am^2$ are placed as shown at the corners of a square of side $10 cm$. The net magnetic induction at P is

A. $0.1 T$

B. $0.2T$

C. $0.3T$

D. $0.4T$

Answer: A

Watch Video Solution

31. The length of a magnet is large compared to its width and breadth. The time period of its oscillation in a vibration magnetometer is T. The magnet is cut along its length into six parts and these parts are then placed togather as shown in the figure. The time period of this combination will be

A. T

B. $\frac{T}{\sqrt{3}}$

C. $\frac{T}{2\sqrt{3}}$

D. Zero

Answer: C

Watch Video Solution

32. A magnet is suspended in such a way that it oscillates in the horizontal plane. It makes 20 oscillations per minute at a place where dip angle is 30° and 15 oscillations minute at a place where dip angle is 60°. The ratio of total earth's magnetic field at the two places is

A. $3\sqrt{3}: 8$

B. $16: 27$

C. $4: 9$

D. $2\sqrt{3}: 9$

Answer: B

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33. A thin iron ring with mean diameter, $d = 50cm$. supports a winding consisting of 800 turns, with current 3A. The ring has a cross-cut of width 2.0 mm. The permeability of iron is (graph between B and H is given):

A. 10^3

B. 2×10^3

C. 3×10^3

D. 4×10^3

Answer: D

Watch Video Solution

34. Two tangent galvanometer have redii $7.5cm$ and $10cm$, number of turns are 15 and 10 and resistances are 8Ω and 12Ω. They are joined in parallel in circuit. If deflection in one is 60° the deflection in second galvanometer is :

A. 45°

B. 30°

C. 40°

D. 35°

Answer: B

Watch Video Solution

35. A thin magnetic iron rod of length 30 cm is suspended in a uniform magnetic field. Its time period of oscillation is 4s. It is broken into three equal parts. The time period in second of oscillation of one part. When suspended in the same magnetic field, is

A. $\frac{1}{\sqrt{3}}$

B. $\frac{2}{\sqrt{3}}$

C. $\sqrt{3}$

D. $\frac{4}{\sqrt{3}}$

Answer: A

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36. A compass needle placed at a distance r from a short magnet in tan A position showns a deflection of 60°. If the distance is increased to $r(3)^{1/3}$, then the deflection of the compass needle is:

A. 30°

B. $60^{\circ} \times (3)^{1/3}$

C. $60^{\circ} \times (3)^{2/3}$

D. $60^{\circ} \times (3)^{3/3}$

Answer: A

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37. The magnetic needle of an oscillation magnetometer makes 10 oscillations per minut under the action of earth's magnetic field along. When a bar magnet is placed at some distance along the axis of the needle it makes 14 oscillations per minute. If the bar magnet is turned so that its poles interchange their position, then the new frequency of oscillation of the needle is:

A. 10 vibrations per minute

B. 14 vibrations per minute

C. 4 vibrations per minute

D. 2 vibration per minute

Answer: D

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Section B - Assertion Reasoning

1. Assertion: Basic difference between an electric line and magnetic line of force is that former is discontinuous and the latter is continuous or endless.

Reason: No electric lines of force exist inside a charged body but magnetic lines do exist inside a magnet.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: A

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2. Assertion: Magnetic moment of an atoms is due to both, the orbital motion and spin motion of every electron.

Reason: A charged partical produces a magnetic field.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: C

Watch Video Solution

3. Assertion: When radius of circular loop carrying current is doubled, its magnetic moment becomes four times.

Rrason: Magnetic moment depends on area of the loop.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: B

Watch Video Solution

4. Assertion: A compass needle when placed on the magnetic north pole of the earth rotates in vertical direction.

Reason: The earth has only horizontal

component of its magnetic field at the north poles.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: D

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5. Assertion: The tangent galvanometer can be made more sensitive by increasing the number of turns of its coil.

Reason: Current through galvanometer is proportional to the number of turns of coil.

A. If both assertion and reason are true and reason is the correct explanation of

assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: B

Watch Video Solution

6. Assertion: The ferromagnetic substance do not obey Curie's law.

Reason: At Curie point a ferromagnetic substance start behaving as a paramagnetic subsrance.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: B

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7. Assertion: Soft iron is used as transformer core.

Reason: Soft iron has narrow hysteresis loop.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: A

Watch Video Solution

8. Assertion: Magnetism is relativistic.

Reason: When we move along with the charge so that there is no motion relative to us, we find no magnetic field associated with the charge.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: A

Watch Video Solution

9. Assertion: The earth's magnetic field does not affect the working of a moving coil galvanometer.

Reason: Earth's magnetic field is very weak.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: A

Watch Video Solution

10. Assertion: A paramagnetic sample display greater magnetisation (for the same magnetising field) when cooled.

Reason: The magnetisation does not depend on temperature.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: C

Watch Video Solution

11. Assertion: When a magnet is brought near iron nails, only translatory force act on it.

Reason: The field due to magnet is generally uniform

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: D

Watch Video Solution

12. Assertion: When a magnetic dipole is placed in a non-uniform magnetic field, only a torque acts on the dipole.

Reason: Force would also acts on dipole if magnetic field were uniform.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: D

Watch Video Solution

13. Assertion: Reduction factor (K) of a tangent galvanometer helps in reduction to current.

Reason: Reduction factor increases with increase of current.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: C

Watch Video Solution

14. Assertion: The permeability of a ferromagnetic material is independent of the magnetic field.

Reason: Permeability of a material is a constant quantity.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: D

Watch Video Solution

15. Assertion: Magnetic moment of helium atom is zero.

Reason: All the electron are electron are paired in helium atom orbitals.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: A

Watch Video Solution

16. Assertion: For making permanent magnets, steel preferred over soft iron.

Reason: As retentivity of steel is smaller.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion and reason both are false.

Answer: B

Watch Video Solution

AIPMTNEET Questions

1. The direction of the null point 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

Answer: A

Watch Video Solution

2. A bar has a magnetic moment equal to $5 \times 10^{-5} weber \times m$. It is suspended in a magnetic field which has a magnetic induction

(B) equal to $8\pi \times 10^{-4}$ tesla. The magnet vibrates with a period of vibration equal to 15 sec. The moment of intertia of the magnet is

A. $22.5kg \times m^2$

B. $11.25 \times kg \times m^2$

C. $5.62 \times kg \times m^2$

D. $7.16 \times 10^{-7}kgm^2$

Answer: D

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3. Two magnets are held together in a vibration magnetometer and are allowed to oscillate in the earth's magnetic field with like poles togather, 12 oscillations per minute are made but for unlike poles togather only 4 oscillations per minute are axecuted. The ratio of their magnetic miments is

A. $3:1$

B. $1:3$

C. $3:5$

D. $5:4$

Answer: D

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4. A bar magnet is oscillating in the earth's magnetic field with a period T. What happens to its period and motion if its mass is quadrupled

A. Motion remains S.H.M. with time period =2T

B. Motion remains S.H.M. with time period =

$4T$

C. Motion remains S.H.M. and period remains nearly constant

D. Motion remains S.H.M. with time period =

$\frac{T}{2}$

Answer: A

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5. 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 nine of the above directions

Answer: C

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6. A coil in the shape of an equilateral triangle of side l is suspended between the pole pieces of permanent magnet. Such that $\overrightarrow{B}$ is in plane of the coil. If due to a current I in the triangle, a torque τ acts on it, the side l of the triangel is:

A. $\frac{2}{\sqrt{3}}\left(\frac{\tau}{Bi}\right)^{1/2}$

B. $\frac{2}{\sqrt{3}}\left(\frac{\tau}{Bi}\right)$

C. $2\left(\frac{\tau}{\sqrt{3}Bi}\right)^{1/2}$

D. $\frac{1}{\sqrt{3}}\frac{\tau}{Bi}$

Answer: C

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7. If the magnetic dipole of moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material are donated by μ_d, μ_p and μ_f respectively, then:

A. $\mu_d \neq 0$ and $\mu_f \neq 0$

B. $\mu_p \neq 0$ and $\mu_f \neq 0$

C. $\mu_d \neq 0$ and $\mu_p \neq 0$

D. $\mu_{\neq} 0$ and $\mu_p \neq 0$

Answer: B

Watch Video Solution

8. Two identical bar magnets are placed on above the other such that they are mutually perpendicular and bisect each other. The time period of this combination in a horizontal magnetic field is T. The time period of esch magnet in the same field is

A. $\sqrt{2}T$

B. $2^{\frac{1}{4}}T$

C. $2^{-\frac{1}{4}}T$

D. $2^{-\frac{1}{2}}T$

Answer: C

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9. Curie temperature is the temperature above which

A. a ferromagnetic substance becomes paramagnetic

B. a ferromagnetic substance becomes diamagnetic

C. a ferromagnetic substance becomes paramagnetic

D. a ferromagnetic substance becomes ferromagnetic

Answer: A

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10. Nickel shows ferromagnetic property at room temperature. If the temperature is increased beyond curie temperature, then it will show

A. paramagnetism

B. anti-ferromagnetism

C. no magnetic property

D. diamagnetism

Answer: A

Watch Video Solution

11. Curie temperature is the temperature above which

A. Ferromagnetic material becomes paramagnetic material

B. paramagnetic material becomes diamagnetic material

C. paramagnetic material becomes ferromagnetic material

D. ferromagnetic material becomes diamagnetic material

Answer: A

Watch Video Solution

12. A bar magnet having a magnetic moment of $2 \times 10^4 JT^{-1}$ is free to rotate in a horizontal plane. A horizontal magnetic field $B = 6 \times 10^{-4} T$ exists in the space. The work done in taking the magnet slowly from a direction parallel to the field to a direction 60° from the field is

A. $0.6 J$

B. $12 J$

C. $6 J$

D. $2J$

Answer: C

Watch Video Solution

13. If a diamagnetic substance is brought near north or south pole of a bar magnet, it is

A. repelled by both the pole

B. repelled by the north pole and attracted by the south pole

C. attracted by the north pole and repelled by the south pole

D. attracted by both the poles

Answer: A

Watch Video Solution

14. A vibration magnetometer placed in magnetic meridian has a small bar magnet. The magnet executes oscillations with a time period of 2 sec in earth's horizontal magnetic field of 24 microtesla. When a horizontal field of 18 microtesla is produced opposite to the earth's field by placing a current carrying wire, the new time period of magnet will be

A. $1s$

B. $2s$

C. $3s$

D. $4s$

Answer: D

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15. Electromagnets are made of soft iron because soft iron has

A. low retentivity and high coerive force

B. high retentivity and high coerive force

C. low retentivity and low coerive force

D. high retentivity and low coerive force

Answer: D

Watch Video Solution

16. There are four light-weight-rod sample A, B, C, D separately suspended by threads. A bar magnet is slowly brought near each sample and the following observations are noted

(i) A is feebly repelled

(ii) B is feebly attracted

(iii) C is strongly attracted

(iv) D remains unaffected

Which one of the following is true?

A. C is diamagnetic material

B. D is of a ferromagnetic material

C. A is of a non-magnetic material

D. B is of paramagnetic material

Answer: D

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17. A short bar magnet of magnetic moment $0 \cdot 4JT^{-1}$ is placed in a uniform magnetic field of $0 \cdot 16T$. The magnet is in stable equilibrium when the potential energy is

A. $-0.64J$

B. zero

C. $-0.082J$

D. -$0.064J$

Answer: D

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18. A compose needle which is allowed to move in a horizontal plane is taken to a geomagnetic pole. It

A. will stay in east-west direction only

B. will become rigid showing no movement

C. will stay in any position

D. will stay in north-south direction only

Answer: B

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19. A magnetic needle suspended parallel to a magnetic field requires $\sqrt{3}J$ of work to turn it through 60°. The torque needed to maintain the needle in this postion will be:

A. $2\sqrt{3}J$

B. $3J$

C. $\sqrt{3}J$

D. $\frac{3}{2}J$

Answer: B

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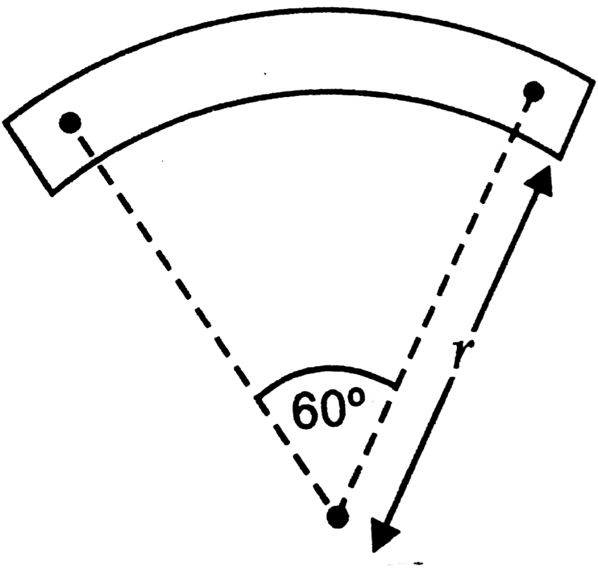
20. A bar magnet of lenth l and magnetic dipole moment 'M' is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be



A. M

B. $\frac{3}{\pi}M$

C. $\frac{2}{\pi}M$

D. $\frac{M}{2}$

Answer: B

Watch Video Solution

21. Following figures show the arrangement of bar magnets in different configurations. Each magnet has magnetic dipole moment (m).

Which configuration has highest value of magnetic dipole moment?

A. 1

B. 2

C. 3

D. 4

Answer: C

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22. The magnetic susceptibility is negative for

A. diamagnetic material only

B. paramagnetic material only

C. ferromagnetic material only

D. paramagnetic and ferromagnetic materials

Answer: A

Watch Video Solution

23. A bar magnet is hung by a thin cotton thread in a uniform horizontal magnetic field and is in equilibrium state. The energy required to rotate it by 60^(@) is W. Now the torrue required to keep the magnet in this new position is

A. $\frac{\sqrt{3}W}{2}$

B. $\frac{2W}{\sqrt{3}}$

C. $\frac{W}{\sqrt{3}}$

D. $\sqrt{3}W$

Answer: D

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24. If θ_1 and θ_2 be the apparent angles of dip observed in two vertical planes at right angles to each other, then the true angle of dip θ is given by

A. $\tan^2\theta = \tan^2\theta_1 + \tan^2\theta_2$

B. $\cot^2\theta = \cot^2\theta_1 - \cot^2\theta_2$

C. $\tan^2\theta = \tan^2\theta_1 - \tan^2\theta_2$

D. $\cot^2\theta = \cot^2\theta_1 + \cot^2\theta_2$

Answer: D

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25. A thin diamagnetic rod is placed vertically between the poles of an electromagnet. When the current in the electromagnetic is switched on, then the diamagnetic rod is pushed up, out of the horizontal magnetic field. Hence the rod gains horizontal potential energy. the work required to do this comes from

A. The induced electric due to the changing magnetic field

B. The current source

C. The lattice structure of the material of the rod

D. The magnetic field

Answer: B

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26. Current senstivity of moving coil galvanometer is $5 \mathrm{div} / mA$ and its voltage senstivity (angular deflection per unit voltage applied) is $20 \mathrm{div} / V$. The resistance of the galvanometer is

A. 40Ω

B. 25Ω

C. 250Ω

D. 500Ω

Answer: C

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AIIMS Questions

1. The magnetic needle of a tangent galvanometer is deflected at an angle 30° due to a magnet. The hoeizontal component of earth's magnetic field $0.34 \times 10^{-4} T$ is along the plane of the coil. The magnetic intensity is

A. $1.96 \times 10^{-4} T$

B. $1.96 \times 10^{-5} T$

C. $1.96 \times 10^{4} T$

D. $1.96 \times 10^{5} T$

Answer: B

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2. A frog can be levitated 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. diamagnetic

B. paramagnetic

C. ferromagnetic

D. antiferromagnetic

Answer: A

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

A. diamagnetic

B. antiferromagnetic

C. ferromagnetic

D. paramagnetic

Answer: D

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4. 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. $B = \mu_0(H + M)$

Answer: D

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5. Which of the following is true?

A. Diamagnetism is temperature dependent

B. Paramagnetic is temperature dependent

C. Paramagnetic is temperature independent

D. None of these

Answer: B

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6. The variation of magnetic susceptibility (χ) with absolute temperature T for a ferromagnetic material is

A. 

B. 

C. 

D. 

Answer: A

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7. The figure illustrate how B, the flux density inside a sample of unmagnetised ferromagnetic material varies with B_0, the magnetic flux density in which the sample is kept. For the samle to be suitable for making a permanent magnet

A. OQ should be large, OR should be small

B. OQ and OR should both be large

C. OQ should be small, OR should be large

D. OQ and OR should both be small

Answer: B

Watch Video Solution

8. A magnet makes 40 oscillations per minute at a place having magnetic field intensity of $0.1 \times 10^{-5} T$. At another place, it takes 2.5 sec to complete one vibrating. The value of earth's horizontal field at that place is

A. $0.25 \times 10^{-6} T$

B. $0.36 \times 10^{-6} T$

C. $0.66 \times 10^{-8} T$

D. $1.2 \times 10^{-6} T$

Answer: B

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9. A magnet oscillating in a horizontal plane has a time period of 2 seconds at a place where the angle of dip is 30° and 3 seconds at another place where the angle of dip is 60°.

The retio of resultant magnetic field at the two places is

A. $\frac{4\sqrt{3}}{7}$

B. $\frac{4}{9\sqrt{3}}$

C. $\frac{9}{4\sqrt{3}}$

D. $\frac{9}{\sqrt{3}}$

Answer: C

Watch Video Solution

10. When a piece of a ferromagnetic sobstance 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

Answer: D

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11. 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

Answer: C

Watch Video Solution

12. In a deflection magnetometer which is adjusted in the usual way. When a magnet is introduced, the deflection observed is θ and the period of oscillation of the needle in the magnetometer is T. When the magnet is removed, the period of oscillation is T_0. The relation between T and T_0 is

A. $T^2 = \frac{T_0^2}{\cos\theta}$

B. $T = \frac{T_0}{\cos\theta}$

C. $T = T_0 \cos\theta$

D. $T^2 = T_0^2 \cos\theta$

Answer: D

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13. A galvanometer gives full scale deflection of 1 volt when acting like a volmeter when connected in series with $2k\Omega$ resistance. The same galvanometer gives $500 mA$, full scale deflection when acting like a ammeter when connected with shunt resistance of value 0.2Ω in parallel. Find out the resistance of galvanometer.

A. 108Ω

B. 222Ω

C. 250Ω

D. $1.5k\Omega$

Answer: B

Watch Video Solution

14. Assertion: We cannot think of magnetic field configuration with three poles.

Reason: A bar magnet does exert a torque on itself due to its own field.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct

explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: D

Watch Video Solution

15. Assertion: The true geographic north direction is found by using a compass needle.

Reason: The magnetic meridian of the earth is along the axis of rotation of the earth.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: D

Watch Video Solution

16. Assertion: Magnetic resonance imaging (MRI) is a useful diagnostic tool for producing images of various parts of human body.

Reason: Protons of various tissues of the human body play a role in MRI.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: B

Watch Video Solution

17. Assertion: Diamagnetic materials can exhibit magnetism.

Reason: Diamagnetic materials have permanent magnetic dipole moment.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: C

Watch Video Solution

18. Assertion: If a compass needle be kept at magnetic north pole of the earth, the compass needle may stay in way direction.

Reason: Dip needle will stay vertical at the north pole of earth.

A. If both the assertion and reason are true and reason is a true explanation of the

assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: B

Watch Video Solution

19. Assertion: The permeability of a ferromagnetic material is independent of the magnetic field.

Reason: Permeability of a material is a constant quantity.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: D

Watch Video Solution

20. Assertion: A compass needle when placed on the magnetic north pole of the earth rotates in vertical direction.

Reason: The earth has only horizontal component of its magnetic field at the north poles.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: D

Watch Video Solution

21. Assertion: A paramagnetic sample display greater magnetisation (for the same magnetising field) when cooled.

Reason: The magnetisation does not depend on temperature.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct

explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: C

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22. Assertion: The ferromagnetic substance do not obey Curie's law.

Reason: At Curie point a ferromagnetic substance start behaving as a paramagnetic subsrance.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct

explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: B

Watch Video Solution

23. Assertion: A paramagnetic sample display greater magnetisation (for the same magnetising field) when cooled.

Reason: The magnetisation does not depend on temperature.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct

explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If both the assertion and reason are false.

Answer: C

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Section D - Chapter End Test

1. The true value of angle of dip at a place is

60^(@)

, $theapparentdip \in a \in cl \in edatan\angle of$

30^(@)` with magnetic meridian is

A. `tan^(-1)"(1)/2

B. $\tan^{-1}(2)$

C. $\tan^{-1}\left(\frac{2}{3}\right)$

D. None of these

Answer: B

Watch Video Solution

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

A. $\sqrt{3}W$

B. W

C. $\frac{\sqrt{3}}{2}W$

D. $2W$

Answer: A

Watch Video Solution

3. A thin rectangular magnet suspended freely has a period of oscillation equal to T. Now it is broken into two equal halves (each having half of the original length) and one piece is made to oscillate freely in the same field. If its period of oscillation is $T\,'$, then ratio $\frac{T\,'}{T}$ is

A. $\frac{1}{4}$

B. $\frac{1}{2\sqrt{2}}$

C. $\frac{1}{2}$

D. 2

Answer: C

Watch Video Solution

4. The length of a magnet is large compared to its width and breadth. The time period of its oscillation in a vibration magnetometer is $2s$. The magnet is cut along its length into three equal parts and these parts are then placed on each other with their like poles together . The time period of this combination will be

A. $2s$

B. $2/3s$

C. $2\sqrt{3}s$

D. $2/\sqrt{3}s$

Answer: B

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5. Two identical short bar magnets, each having magnetic moment M, are placed a distance of $2d$ apart with axes perpendicular to each other in a horizontal plane. The magnetic induction at a point midway between them is

A. $\frac{\mu_0}{4\pi}(\sqrt{2})\frac{M}{d^3}$

B. $\frac{\mu_0}{4\pi}(\sqrt{3})\frac{M}{d^3}$

C. $\left(\frac{2\mu_0}{\pi}\right)\frac{M}{d^3}$

D. $\frac{\mu_0}{4\pi}(\sqrt{5})\frac{M}{d^3}$

Answer: D

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6. The magnet field lines due to a bar magnet are correctly shown in

A.

B.

C.

D.

Answer: D

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7. A curve between magnetic moment and temperature of magnet is

A.

B.

C.

D.

Answer: C

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8. Which curve may best repreasent the current deflection in a tangent galvanometer?

A. A

B. B

C. C

D. D

Answer: B

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9. The variation of the intensity of magnetisation (I) with respect to the magnetising field (H) in a diamagnetic substance is described by the graph

A. OD

B. OC

C. OB

D. OA

Answer: B

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10. For ferromagnetic material, the relative permeability (mu_(r)), versus magnetic intensity (H) has the following shape

A.

B.

C.

D.

Answer: D

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11. A magnet is suspended horizontal in the earth's magnetic field. When it is displaced and then released it oscillates in a horizontal plane with a period T. If a place of wood of the same moment of inertia (about the axis of rotation) as the magnet is attached to the magnet what would the new period of oscillation of the system become?

A. $\frac{T}{3}$

B. $\frac{T}{2}$

C. $\frac{T}{\sqrt{2}}$

D. $T\sqrt{2}$

Answer: D

12. The field due to a magnet at a distance `R~ from the centre of the magnet is proportional

A. R^2

B. R^3

C. $1/R^2$

D. $1/R^3$

Answer: D

13. A long magnet is cut in two parts in such a way that the ratio of their lengths is 2:1. The retio of pole strengths of both the section is

A. Equal

B. In the ratio of $2:1$

C. In the ratio of $1:2$

D. In the ratio of $4:1$

Answer: A

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14. If the magnetic flux is expressed in weber, then magnetiv induction can be expressed in

A. Weber/m^2

B. Weber/m

C. $\text{Weber}-m$

D. $\text{Weber}-m^2$

Answer: A

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15. Magnetic intensity for an axial point due to a short bar magnet of magnetic moment M is given by

A. $\frac{\mu_0}{4\pi} \times \frac{M}{d^3}$

B. $\frac{\mu_0}{4\pi} \times \frac{M}{d^2}$

C. $\frac{\mu_0}{2\pi} \times \frac{M}{d^3}$

D. $\frac{\mu_0}{2\pi} \times \frac{M}{d^2}$

Answer: C

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16. 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. Ferromagnetic

D. Antiferromagnetic

Answer: A

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17. Magnetic moment of two bar magnets may be compared with the help of

A. Deflection magnetometer

B. Vibration magnetometer

C. Both of the above

D. None of these

Answer: C

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18. At place, the magnitudes of the horizontal component and total intensity of the magnetic field of the earth are 0.3 and 0.6 Oersted respectively. The value of the angle of dip at this place will be

A. 60°

B. 45°

C. 30°

D. 0°

Answer: A

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19. The angle of dip at a certain place is 30°. 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. $H\sqrt{3}$

Answer: B

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20. 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. $\tan^{-1}(\pi)$

Answer: C

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21. Earth's magnetic field always has a horizontal component expert at or Horizontal component of earth's magnetic field remains zero at

A. Equator

B. Magnetic poles

C. A latitude of 60°

D. An altitude of 60°

Answer: B

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22. The magnet of a vibration magnetometer is heated so as to reduce its magnetic moment by 19%. By doing this the period time of the magnetometer will

A. increase by 19%

B. decrease by 19%

C. increase by 11%

D. decrease by 11%

Answer: C

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23. A magnet is suspended in such a way that it oscillates in the horizontal plane. It makes 20 oscillations per minute at a place where dip angle is 30° and 15 oscillations minute at a place where dip angle is 60°. The ratio of total earth's magnetic field at the two places is

A. $3\sqrt{3}:8$

B. $16:9\sqrt{3}$

C. $4:9$

D. $2\sqrt{2}:3$

Answer: B

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24. The plane of dip circle is set in the geographic meridian and the apparent dip is θ_1. It is then set in a vertical plane perpendicular to the geographic meridian. Now, the apparent dip is θ_2. The angle of declination θ at that place is

A. $\tan\alpha = \sqrt{\tan\theta_1 \times \tan\theta_2}$

B. $\tan\alpha = \sqrt{(\tan\theta_1)^2 \times (\tan\theta_2)^2}$

C. $\tan\alpha = \dfrac{\tan\theta_1}{\tan\theta_2}$

D. $\tan\alpha = \dfrac{\tan\theta_2}{\tan\theta_1}$

Answer: C

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25. At 45° to the magnetic meridian the apparent dip is 60°. The true dip is

A. $\tan^{-1}\sqrt{3}$

B. $\tan^{-1}\frac{1}{\sqrt{3}}$

C. $\tan^{-1}\frac{\sqrt{3}}{2}$

D. $\tan^{-1}\sqrt{\frac{1}{6}}$

Answer: C

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26. Two short magnets of magnetic moment $2Am^2$ and $5Am^2$ are placed along two lines drawn at right angle to each other on the sheet of paper as shown in the figure. What is the magnetic field at the point of intersection of their axis?

A. $2.15 \times 10^{-5} T$

B. $215 \times 10^{-5} T$

C. $2.15 \times 10^{-3} T$

D. $21.5 \times 10^{-5} T$

Answer: A

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27. A rectangular toroid has 1000 turns. The ratio of the outer to inner diameter is 1.6 and its height is 5.0 cm. Find the flux through this toroid, if current passing through it is 1.7 A.

A. $8\mu Wb$

B. $6\mu Wb$

C. $8Wb$

D. $6Wb$

Answer: A

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28. Assertion: The poles of magnet cannot be separated by breaking into two pieces.

Reason: The magnetic moment will be reduced to half when a magnet is broken into two equal pieces.

A. If both the assertion and reason are true and reason is the correct explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If the assertion and reason both are false.

Answer: B

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29. Assertion: Electromagnets are made of soft iron.

Reason: Coercivity of soft iron is small.

A. If both the assertion and reason are true and reason is the correct explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If the assertion and reason both are false.

Answer: A

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30. Assertion: To protect any instrument from external magnetic field, it is put inside an iron body.

Reason: Iron is a magnetic substance.

A. If both the assertion and reason are true and reason is the correct explanation of the assertion.

B. If both the assertion and reason are true but the reason is not the correct explanation of assertion.

C. If the assertion is true is true but reason is false.

D. If the assertion and reason both are false.

Answer: A

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