PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT 1960 PHYSICS (HINGLISH)

MAGNETISM

Exercise

1. 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

Watch Video Solution

2. What are the SI units of magnetic field induction or magnetic flux density?

A. Tesla

B. $Weber/metre^2$

C. Newton/ampere - metre

D. All of the above

Answer: D

Watch Video Solution

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

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

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

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

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

Answer: C

Watch Video Solution

4. A magnet of magnetic moment M amd pole strenth 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

Watch Video Solution

5. 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

Watch Video Solution

6. If a magnet of pole strenth 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

Watch Video Solution

7. 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. 5 cm

B. 25 cm

C. 10 cm

D. 20 cm

Answer: C

Watch Video Solution

8. 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. 1:1

B. 2:3

C. 2:1

D. 3:2

Answer: C

Watch Video Solution

9. 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 $0.15 \mathrm{newton} / \mathrm{ampere\text{-}metre}$ will be

A. 12 Newton × metre

B. 18 Newton × metre

C. 0.9 Newton × metre

D. None of the above

Answer: C

Watch Video Solution

10. 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

Watch Video Solution

11. 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

Watch Video Solution

12. 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

Watch Video Solution

13. 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

Watch Video Solution

14. 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

Watch Video Solution

15. 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

Watch Video Solution

16. 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. $r = niAB\cos\theta$

B. $r = niAB\sin\theta$

C. $r = niAB$

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

Answer: A

Watch Video Solution

17. 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. $1:9$

B. $2:9$

C. $27:1$

D. $9:1$

Answer: C

Watch Video Solution

18. Two shrt magnets with their axes horizontal and perpendicular to the magnetic meridian are placed with their centres $40cm$ east and $50cm$ west of magnetic needle. If the needle remains undeflected, the rato of their magnetic moment $M_1 : M_2$ is

A. $4:5$

B. $16:25$

C. $64:125$

D. $2:\sqrt{5}$

Answer: C

Watch Video Solution

19. 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

Watch Video Solution

20. 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

Watch Video Solution

21. 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

Watch Video Solution

22. A bar magnet of length $10cm$ 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. $0.5 \times 10^{2} N \times m$

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

Answer: A

Watch Video Solution

23. Magnetic field intensity is defined as

A. Magnetic moment per unit volume

B. Magnetic induction force acting on a unit magnetic pole

C. Number of lines of force crossing per unit area

D. Number of lines of force crossing per unit volume

Answer: B

Watch Video Solution

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

A. $Weber/m$

B. $Weber/m$

C. $Weber - m$

D. $Weber - m$

Answer: A

Watch Video Solution

25. A magnetic needle is kept in a non uniform magnetic field . It experiences

A. A force and a torque

B. A force but not a torque

C. A torque but not a force

D. Neither a torque nor a force

Answer: A

Watch Video Solution

26. 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

Watch Video Solution

27. 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

28. 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

Watch Video Solution

29. 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

Watch Video Solution

30. How is magnetic force between two poles affected when strength of each pole is doubled and distance between them is halved?

A. Force increases to two times the previous value

B. No change

C. Force decreases to half the previous value

D. Force increases to four times the previous value

Answer: B

Watch Video Solution

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

A. 1 N

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

C. $10^{-7} N$

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

Answer: C

Watch Video Solution

32. 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

Watch Video Solution

33. 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

Watch Video Solution

34. The rate of change of torque $'\tau'$ with deflection θ is maximum for a magnet suspended freely in a uniform magnetic field of induction B when θ is equal to

A. $\theta = 0^o$

B. $\theta = 45^o$

C. $\theta = 60^o$

D. $\theta = 90^o$

Answer: A

Watch Video Solution

35. 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

Watch Video Solution

36. 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

Watch Video Solution

37. 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. 2.4 N

B. 1.2 N

C. 0.6 N

D. 0.3 N

Answer: D

Watch Video Solution

38. 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

Watch Video Solution

39. A permanent magnet –

A. Attracts all substances

B. Attracts only magnetic substances

C. Attracts magnetic substances and repels all non-magnetic substances

D. Attracts non-magnetic substances and repels magnetic substances

Answer: B

Watch Video Solution

40. The S.I. unit of magnetic permeability is

A. Am^{-1}

B. Am

C. Henry m^{-1}

D. No unit, it is a dimensionless number

Answer: C

Watch Video Solution

41. 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. $0.23 \text{Joule} / Tesla$

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

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

D. zero

Answer: B

Watch Video Solution

42. 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

Watch Video Solution

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

A. Magnetic intensity is a measure of lines of force passing through unit area held normal to it

B. Magnetic lines of force form 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

Watch Video Solution

44. 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. $4\pi M$

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

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

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

Answer: B

Watch Video Solution

45. A bar magnet of magnetic moment $\overrightarrow{M}$ is placed in a magnetic field of induction $\overrightarrow{B}$. The torque exerted on it is

A. $\overrightarrow{M} . \overrightarrow{B}$

B. $-\overrightarrow{M} . \overrightarrow{B}$

C. $\overrightarrow{M} \times \overrightarrow{B}$

D. $\overrightarrow{B} \times \overrightarrow{M}$

Answer: C

Watch Video Solution

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

A. Placed inside an aluminium cane

B. Placed inside an iron cane

C. Wrapped with insulation around it when passing current through it

D. Surrounded with fine copper sheet

Answer: B

Watch Video Solution

47. 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

Watch Video Solution

48. The magnet can be completely demagnetized by

A. Breaking the magnet into small pieces

B. Heating it slightly

C. Droping it into ice cold water

D. A reverse field of appropriate strength

Answer: D

Watch Video Solution

49. A current loop placed in a magnetic field behaves like a

A. Magnetic dipole

B. Magnetic substance

C. Magnetic pole

D. All are true

Answer: A

Watch Video Solution

50. 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

Watch Video Solution

51. Weber / m^2 is equal to

A. Volt

B. Hency

C. Tesla

D. All of these

Answer: C

Watch Video Solution

52. 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

Watch Video Solution

53. 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

Watch Video Solution

54. 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 $2\times10^{-4}T$, the couple acting on it is

A. $0.5656\times10^{-4}N-m$

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

Watch Video Solution

55. 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. 4MH

Answer: A

Watch Video Solution

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

A. 50 N-m

B. 25 N-m

C. 20 N-m

D. 15 N-m

Answer: B

Watch Video Solution

57. 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

58. A magnet of magnetic moment $50\hat{i}A - m^2$ is placed along the x-axis in a magnetic field $\overrightarrow{B} = \left(0.5\hat{i} + 3.0\hat{j}\right)T$. 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

Watch Video Solution

59. 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

Watch Video Solution

60. There is no. couple acting when two bar magnets are placed co-axially separated by a distance because

A. There are no forces on the poles

B. The forces are parallel and their lines of action do not coincide (

C. The forces are perpendicular to each other

D. The forces act along the same line

Answer: D

Watch Video Solution

61. 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. 0.5 m

B. 0.3 m

C. 0.2 m

D. 0.1 m

Answer: D

Watch Video Solution

62. 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

Watch Video Solution

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

A. Intersect at the neutral point

B. Intersect near the poles of the magnet

C. Intersect on the equatorial axis of the magnet

D. Do not intersect at all

Answer: D

Watch Video Solution

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

A. North pole

B. South pole

C. Dipole

D. Quadrupole

Answer: C

Watch Video Solution

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

A.

B.

C.

D.

Answer: D

Watch Video Solution

66. the magnetic lines of force inside a bar magnet

A. Are from south-pole to north-pole of the magnet

B. Are from north-pole to south-pole of the magnet

C. Do not exist

D. Depend upon the area of cross-section of the bar magnet

Answer: A

Watch Video Solution

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

A. Magnetic meridian

B. Geometric meridian

C. Angle of dip

D. None of these

Answer: A

Watch Video Solution

68. 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. 10 J

Answer: B

Watch Video Solution

69. 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

Watch Video Solution

70. A bar magnet of length 3cm has points A and B along its axis at distance of $24 cm$ and $48 cm$ 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

Watch Video Solution

71. 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. 0.1 J

B. 0.2 J

C. 1 J

D. 2 J

Answer: B

Watch Video Solution

72. The magnetic moment of a length 10 cm amd pole strenth 4.0 Am will be

A. $0.4Am^2$

B. $1.6Am^2$

C. $20Am^2$

D. $8.0Am^2$

Answer: A

Watch Video Solution

73. The effective length of a magnet is 31.4 cm and its pole strenth is 0.5 Am. The magnetic moment, if it is bent in the form of a semicircile will be

A. $0.1 Am^2$

B. $0.01 Am^2$

C. $0.2 Am^2$

D. $1.2 Am^2$

Answer: A

Watch Video Solution

74. 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. 4 V

B. 2 V

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

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

Answer: D

Watch Video Solution

75. A small bar magnet has a magnetic moment $1.2A - m^2$. The magnetic field at a distance $0.1m$ 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

Watch Video Solution

76. 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

Watch Video Solution

77. 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

Watch Video Solution

Watch Video Solution

78. 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

79. 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

Watch Video Solution

80. 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

Watch Video Solution

81. 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

Watch Video Solution

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

A. Zero

B. 45

C. 90

D. 180

Answer: C

Watch Video Solution

83. 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

84. 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

85. The angle between the magnetic merdian and geographical merdian is called

A. Angle of dip

B. Angle of declination

C. Magnetic moment

D. Power of magnetic field

Answer: B

Watch Video Solution

86. 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

Watch Video Solution

87. 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

88. 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

89. At a place the earth's horizontal component of magnetic field is 0.36×10^{-4} 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

Watch Video Solution

90. 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

91. The angle of dip is the angle

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

Watch Video Solution

92. 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

93. The angle of dip at the magnetic equator is

A. 0^o

B. 45^o

C. 30^o

D. 90^o

Answer: A

Watch Video Solution

94. 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

Watch Video Solution

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

A. Zero

B. 17^o

C. 23^o

D. None of these

Answer: B

Watch Video Solution

96. The lines joining the places of the same horizontal intensity are known as

A. Isogonic lines

B. Aclinic lines

C. Isoclinic lines

D. Isodynamic lines

Answer: D

Watch Video Solution

97. Ratio between total intensity of magnetic field at equator to poles is

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:4$

Answer: A

Watch Video Solution

98. 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

Watch Video Solution

99. 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

Watch Video Solution

Watch Video Solution

100. 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 unit

Answer: D

Watch Video Solution

101. The magnetic compass is not useful for navigation near the magnetic poles because

A. The magnetic field near the poles is zero

B. The magnetic field near the poles is almost vertical

C. At low temperature, the compass needle looses its magnetic properties

D. Neither of the above

Answer: B

Watch Video Solution

102. 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: D

Watch Video Solution

103. 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

Watch Video Solution

104. 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

Watch Video Solution

105. A dip circle is at right angles to the magnetic meridian. What will be the apparent dip ?

A. 0°

B. 30°

C. 60°

D. 90°

Answer: D

Watch Video Solution

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

A. North and south

B. East and west

C. North-east and south-west

D. North-west and south-east

Answer: B

Watch Video Solution

107. 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

108. 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

Watch Video Solution

109. 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. $\tan^{-1}, \frac{3}{4}$

B. $\sin^{-1}, \frac{3}{4}$

C. $\tan^{-1}, \frac{4}{3}$

D. $\sin^{-1}, \frac{4}{3}$

Answer: C

Watch Video Solution

Watch Video Solution

110. 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. $2.08 \times 10^{-5} Weber / m^2$

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

C. $3.18 \times 10^{-5} Weber / m^2$

D. $5.0 \times 10^{-5} Weber / m^2$

Answer: A

Watch Video Solution

111. 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

Watch Video Solution

112. 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

Watch Video Solution

113. The vartical 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

Watch Video Solution

114. 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. $B\frac{2}{0}$

C. $2B_0$

D. $\sqrt{2}B_0$

Answer: D

Watch Video Solution

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

A. Vertical

B. No particular direction

C. Bent at 45° to the vertical

D. Horizontal

Answer: A

Watch Video Solution

116. A short magnet of moment $6.75 Am^2$ 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

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

A. Require greater kinetic energy to reach the equator than the poles

B. Require less kinetic energy to reach the equator than the poles

C. Can never reach the equator

D. Can never reach the poles

Answer: C

Watch Video Solution

118. 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

119. At a certain place the horizontal component of the earth's magnetic field is B_0

and the angle of dip is 45°. The toyal intensity of the field at that place will be

A. $B_{.}$

B. $\sqrt{2}B_0$

C. $2B_{.}$

D. $B\frac{2}{0}$

Answer: B

Watch Video Solution

120. 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. he value of H is zero

Answer: C

Watch Video Solution

121. Which of these relations is correct for magnetism?

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

B. $I = V + H$

C. $V = I^3 + H^2$

D. $V^2 = I + H$

Answer: A

Watch Video Solution

122. 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

123. 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

Watch Video Solution

124. 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

Watch Video Solution

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

A. Magnetic pole

B. Geographical pole

C. Magnetic meridian

D. Magnetic equator

Answer: D

Watch Video Solution

126. Isogonic lines are the lines joining places of........................ .

A. Zero angle of dip

B. Zero angle of declination

C. Same angle of declination

D. Same angle of dip

Answer: C

Watch Video Solution

127. 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. $\cos ec^{-1}\left(\frac{H}{H_0}\right)$

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

Answer: A

Watch Video Solution

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

A. $V > > H$

B. $V < < H$

C. $V = H$

D. $V = H = 0$

Answer: A

Watch Video Solution

129. The time period of a freely suspended magnetic needle does not depend upon

A. Length of the magnet

B. Pole strength of the magnet

C. Horizontal component of earth's magnetic field

D. Length of the suspension thread

Answer: D

Watch Video Solution

130. 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 the above

Answer: C

Watch Video Solution

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

A. $T = 2\pi\sqrt{\frac{1}{MB_H}}$

B. $T = 2\pi\sqrt{\frac{MB_H}{1}}$

C. $T = \sqrt{\frac{1}{MB_H}}$

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

Answer: A

Watch Video Solution

132. 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. Opposite poles of both magnets are on same sides

C. Both magnets are perpendicular to each other

D. Nothing can be said

Answer: B

Watch Video Solution

133. 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. $\frac{1}{2}\text{sec}$

D. $\sqrt{2}\,\text{sec}$

Answer: D

Watch Video Solution

Watch Video Solution

134. Vibration magnetometer is used for comparing

A. Magnetic fields

B. Earth's field

C. Magnetic moments

D. All of the above

Answer: D

Watch Video Solution

135. 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

136. 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

Watch Video Solution

137. 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

138. 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

139. Twists of suspension fibre should be removed in vibration magnetometer so that

A. Time period be less

B. Time period be more

C. Magnet may vibrate freely

D. Cannot be said with certainty

Answer: B

Watch Video Solution

140. 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 sec

B. 4 sec

C. 8 sec

D. 0.5 sec

Answer: A

Watch Video Solution

141. Moment of inertia of a megnetic needle is $40gm - cm^2$ has time period 3 seconds in earth's horizontal field

$= 3.6 \times 10^{-5} weber / m^2$. 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

142. Vibration magnetometer before use, should be set

A. In magnetic meridian

B. In geographical meridian

C. Perpendicular to magnetic meridian

D. In any position

Answer: A

Watch Video Solution

143. 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. Decreases

B. Increases

C. Remains unchanged

D. First increases then decreases

Answer: B

Watch Video Solution

144. 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

Watch Video Solution

145. 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 sec

D. 6 sec

Answer: B

Watch Video Solution

146. To compare magnetic moments of two magnets by vibration magnetometer, 'sum and difference method' is better because

A. Determination of moment of inertia is not needed which minimises the errors

B. Less observations are required

C. Comparatively less calculations

D. All the above

Answer: D

Watch Video Solution

147. 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

Watch Video Solution

148. 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

Watch Video Solution

149. 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. $M_A = 2M_S$

B. $M_A = 8M_S$

C. $M_A = 4M_S$

D. $M_A = 8M_S$

Answer: C

Watch Video Solution

150. 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

Watch Video Solution

151. 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. $\sqrt{2}$

Answer: C

Watch Video Solution

152. 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

Watch Video Solution

153. 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

Watch Video Solution

154. 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

Watch Video Solution

155. 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

156. 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

157. Vibration magnetometer works on the principle of

A. Torque acting on the bar magnet

B. Force acting on the bar magnet

C. Both the force and the torque acting on the bar magnet

D. None of these

Answer: A

Watch Video Solution

158. Tangent galvanometer is used to measure

A. Steady currents

B. Current impulses

C. Magnetic moments of bar magnets

D. Earth's magnetic field

Answer: A

Watch Video Solution

159. A tangent galvanometer has a coil with 50 turns and radius equal to 4 cm . A current of 0.1 A is passing through it. The plane of the coil is set parallel to the earth's magnetic meridian. If the value of the earth's horizontal component of the magnetic field is 7×10^{-5} Tesla and $\mu_0 = 4\pi \times 10^{-7} Weber / amp \times m$

then the deflection in the galvanometer needle will be

A. $45^{\cdot}$

B. $48.2^{\cdot}$

C. $50.7^{\cdot}$

D. $52.7^{\cdot}$

Answer: B

Watch Video Solution

160. 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. $22.5 kg \times m^2$

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

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

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

Answer: D

Watch Video Solution

161. 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 sec

B. 2 sec

C. 0.5 sec

D. 0.25 sec

Answer: B

Watch Video Solution

162. Which of the following statement is true about magnetic moments of atoms of different elements

A. All have a magnetic moment

B. None has a magnetic moment

C. All acquire a magnetic moment under external magnetic field and in same direction as the field

D. None of the above statements are accurate

Answer: D

Watch Video Solution

163. The number of turns and radius of cross-section of the coil of a tangent galvanometer are doubled. The reduction factor K will be

A. K

B. 2K

C. 4K

D. $K/4$

Answer: A

Watch Video Solution

164. 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

165. 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

166. 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

Watch Video Solution

167. 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

Watch Video Solution

168. 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

169. 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

170. 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

171. 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. $30^{\cdot}$

B. $45^{\cdot}$

C. $90^{\cdot}$

D. $60^{\cdot}$

Answer: D

Watch Video Solution

172. To measure which of the following, is a tangent galvanometer used

A. Charge

B. Angle

C. Current

D. Magnetic intensity

Answer: C

Watch Video Solution

173. 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

174. 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

Watch Video Solution

Watch Video Solution

175. 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. Amplitude increases

Answer: C

Watch Video Solution

176. 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 only

C. I and H only

D. I , M and H only

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

Answer: D

Watch Video Solution

177. 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

178. Two short magnets having magnetic moments in the ratio $27:8$, when placed on opposite sides of a deflection magnetometer produce no deflection. If the distance of weaker magnet is $0 \cdot 12m$ from the centre of deflection magnometer, what is the distance of stronger magnet from the centre?

A. 0.06 m

B. 0.08 m

C. 0.32 m

D. 0.18 m

Answer: D

Watch Video Solution

179. 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

180. 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. $0.25 \times 10^{\cdot} T$

B. $0.36 \times 10^{\cdot} T$

C. $0.66 \times 10^{\cdot} T$

D. $1.2 \times 10^{\cdot} T$

Answer: B

Watch Video Solution

181. 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. $3.6 \times 10^{\cdot} A$

D.

Answer: A

Watch Video Solution

182. 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. $3T$.

B. T.

C. $T_0 / \sqrt{3}$

D. $T / 3$

Answer: A

Watch Video Solution

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

A. $\odot$

B. $30^{\cdot}$

C. $45^{\cdot}$

D. $60^{\cdot}$

Answer: C

Watch Video Solution

184. Before using tangent galvanometer for the measurement of current, why is the plane of coil of tangent galvanometer set in the magnetic meridian?

A. Magnetic meridian (or vertically north south)

B. Perpendicular to magnetic meridian

C. At angle of 45o to magnetic meridian

D. It does not require any setting

Answer: A

Watch Video Solution

185. 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. $\sqrt{T}$

D. $2T$

Answer: A

Watch Video Solution

186. 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

Watch Video Solution

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

A. 1 amp

B. $2\sqrt{3}amp$

C. 4 amp

D. 6 amp

Answer: D

Watch Video Solution

188. 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 angles 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

Watch Video Solution

189. 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. $1/2\,\mathrm{sec}$

Answer: C

Watch Video Solution

190. 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

Watch Video Solution

191. 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

Watch Video Solution

192. 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

193. 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 = 2 T

B. Motion remains S.H.M. with time period = 4 T

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

Watch Video Solution

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

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

D. 2

Answer: C

Watch Video Solution

195. 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

196. 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. $\sqrt{3}s$

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

Answer: B

Watch Video Solution

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

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

Answer: C

Watch Video Solution

198. 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

199. 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 $60^\circ \left(B_H = 4 \times 10^{-5} T\right)$ is

A. 0.125

B. 1.1 A

C. 2.1 A

D. 1.5 A

Answer: B

Watch Video Solution

200. 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

201. The magnetic moment of atomic neon is

A. Zero

B. $\mu B / 2$

C. μB

D. $3\mu B / 2$

Answer: A

Watch Video Solution

202. 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

203. Demagnetization of magnets can be done by

A. Rough handling

B. Heating

C. Magnetising in the opposite direction

D. All the above

Answer: D

Watch Video Solution

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

A. Ferromagnetic domains are perfectly arranged

B. Ferromagnetic domains becomes random

C. Ferromagnetic domains are not influenced

D. Ferromagnetic material changes itself into diamagnetic material

Answer: B

Watch Video Solution

205. 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

206. 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

207. 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

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

A. Critical temperature

B. Boyle's temperature

C. Debye's temperature

D. Curie temperature

Answer: D

Watch Video Solution

209. 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

210. The only property possessed by ferromagnetic substance is

A. Hysteresis

B. Susceptibility

C. Directional property

D. Attracting magnetic substances

Answer: A

Watch Video Solution

211. 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

212. Diamagnetic substances 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

213. The magnetic susceptibility is

A. $\chi = \frac{1}{H}$

B. $\chi = \frac{B}{H}$

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

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

Answer: A

Watch Video Solution

214. Which of the following statments are false about the magnetic susceptibility m c of paramagnetic substance?

(a) Value of χ_m is inversely proportional to the absolute temperature of the sample

(b) χ_m is negative at all temperature

(c) χ_m does depend on the temperature of the sample

(d) χ_m is positive at all temperature

A. (a)

B. (b)

C. (c)

D. (d)

Answer: B

Watch Video Solution

215. 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

216. An example of a diamagnetic substance is

A. Aluminium

B. Copper

C. Iron

D. Nickel

Answer: B

Watch Video Solution

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

A. Voltage loss

B. Hysteresis loss

C. Current loss

D. All of these

Answer: B

Watch Video Solution

218. Magnetic permeability is maximum for

A. Diamagnetic substance

B. Paramagnetic substance

C. Ferromagnetic substance

D. All of these

Answer: C

Watch Video Solution

219. 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. Remain as such

Answer: B

Watch Video Solution

220. The relative permeability is represented by μ_r and susceptibility is denoted by χ for a magnetic substance then for a paramagnetic substance.

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

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

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

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

Answer: D

Watch Video Solution

221. Which of the following is true?

A. Diamagnetism is temperature dependent

B. Paramagnetism is temperature dependent

C. Paramagnetism is temperature independent

D. None of these

Answer: B

Watch Video Solution

222. In which type of material the magnetic susceptibility does not depend on temperature?

A. Ferrite substances

B. Ferromagnetic substances

C. Diamagnetic substances

D. Paramagnetic substances

Answer: C

Watch Video Solution

223. Identify the paramagnetic substance

A. Iron

B. Aluminium

C. Nickel

D. Hydrogen

Answer: B

Watch Video Solution

224. 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

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

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

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

C. $eJ2m$

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

Answer: B

Watch Video Solution

226. The magnetic susceptibility is negative for

A. Paramagnetic materials

B. Diamagnetic materials

C. Ferromagnetic materials

D. Paramagnetic and ferromagnetic materials

Answer: B

Watch Video Solution

227. The universal proporty among all substance is

A. Diamagnetism

B. Ferromagnetism

C. Paramagnetism

D. All of these

Answer: A

Watch Video Solution

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

A. This effect is common to all ferromagnetic substances

B. The hysteresis loop area is proportional to the thermal energy developed per unit volume of the material

C. The hysteresis loop area is independent of the thermal energy developed per unit volume of the material

D. The shape of the hysteresis loop is characteristic of the material

Answer: C

Watch Video Solution

229. Curies law can be written as

A. $\chi \propto (T - T_C)$

B. $\chi \propto \frac{1}{T - T_C}$

C. $\chi \propto \frac{1}{T}$

D. $\chi \propto T$

Answer: C

Watch Video Solution

230. A superconductor exhibits perfect

A. Ferrimagnetism

B. Ferromagnetism

C. Paramagnetism

D. Diamagnetism

Answer: D

Watch Video Solution

231. 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. Ferri-magnetic

D. Antiferro-magnetic

Answer: A

Watch Video Solution

232. 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

233. Curie temperature is the temperature above which

A. A paramagnetic material becomes ferromagnetic

B. A ferromagnetic material becomes paramagnetic

C. A paramagnetic material becomes diamagnetic

D. A ferromagnetic material becomes diamagnetic

Answer: B

Watch Video Solution

234. 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. Paramagnetic

B. Diamagnetic

C. Ferromagnetic

D. Antiferromagnetic

Answer: B

Watch Video Solution

235. 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

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

A. Below Curie temperature

B. Above Curie temperature

C. At Curie temperature only

D. At all temperatures

Answer: B

Watch Video Solution

237. The material suitable for making electromagnets should have

A. High retentivity and high coercivity

B. Low retentivity and low coercivity

C. High retentivity and low coercivity

D. Low retentivity and high coercivity

Answer: C

Watch Video Solution

238. The given figure represents a material which is

A. Paramagnetic

B. Diamagnetic

C. Ferromagnetic

D. None of these

Answer: B

Watch Video Solution

239. 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

240. 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

241. 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

Watch Video Solution

242. Which of the folowing is diamagnetism?

A. Aluminium

B. Quartz

C. Nickel

D. Bismuth

Answer: D

Watch Video Solution

243. 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

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

A. Retentivity

B. Coercive force

C. Lorentz force

D. None of the above

Answer: B

Watch Video Solution

245. 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. $\mu_d \neq 0$ and $\mu_p = 0$

Answer: C

Watch Video Solution

246. 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 explained in terms of electromagnetic induction

C. Diamagnetic materials have a small positive susceptibility

D. The magnetic moment of individual electrons neutralize each other

Answer: C

Watch Video Solution

247. Susceptibility of ferromagnetic substance is

A. gt1

B. lt1

C. 0

D. 1

Answer: A

Watch Video Solution

248. 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

249. Two identical magnetic dipoles of magnetic moments $1 \cdot 0 Am^2$ each are placed at a separation of $2m$ with their axes perpendicular to each other. What is the resultant magnetic field at a point midway between the dipoles?

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

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

C. $10^{-7} T$

D. None of these

Answer: B

Watch Video Solution

250. 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

Watch Video Solution

251. 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. $\frac{\mu_0}{4\pi}(\sqrt{5})\frac{M}{d_3}$

C. $\frac{\mu_0}{4\pi}(\sqrt{5})\frac{M}{d_3}$

D. $\frac{\mu_0}{4\pi}(\sqrt{5})\frac{M}{d_3}$

Answer: D

Watch Video Solution

252. A magnet suspended at 30° with magnetic meridian makes an angle of 45° with the horizontal. What shall be the actual value of the 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

253. 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

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

60^(@)

$, the apparent dip \in a \in cl \in edatan\angle of$

30^(@)` with magnetic meridian is

A. $\tan^{-1}, \frac{1}{2}$

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

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

D. None of these

Answer: B

Watch Video Solution

255. 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

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

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

257. A cylindrical rod magnet has a length of 5 cm and a diameter of 1 cm. It has a unifirm magnetisation of $5.30 \times 10^3 Amp/m^3$. What its 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

Watch Video Solution

258. 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

259. 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. $3 \times 10^{3} \text{amp} / m$

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

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

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

Answer: A

Watch Video Solution

260. 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. $(2\tan\theta)^{-1/3}$

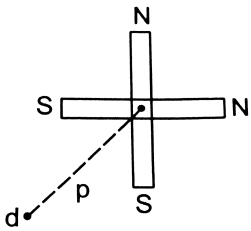
C. $(2 \cot \theta)^{1/3}$

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

Answer: C

Watch Video Solution

261. 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

262. 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 $A = 1.0cm^2$, length of arm OA of the balance beam is $l = 30cm$. When there is no current in the coil the balance is in equilibrium. On passing a current $I = 22mA$ through the coil the equilibrium is restored by putting the additional counter weight of mass $\Delta m = 60mg$ on the balance pan. Find the magnetic induction at the spot where coil is located.

A. $0.4T$

B. $0.3T$

C. $0.2T$

D. $0.1T$

Answer: A

Watch Video Solution

263. 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. $6.64 \text{amp} \times m$

B. $2 \text{amp} \times m$

C. $10.25 \text{amp} \times m$

D. None of these

Answer: A

Watch Video Solution

264. If θ_1 and θ_2 be the apparent angles of dip observed in two vertical planes at right angles to each other, then show that the true angle of dip, θ is given by $\cot^2 \theta = \cot^2 \theta + \cot^2 \theta$.

A. $\cos^2\phi = \cos^2\phi_1 + \cos^2\phi_2$

B. $\sec^2\phi = \sec^2\phi_1 + \sec^2\phi_2$

C. $\tan^2\phi = \tan^2\phi_1 + \tan^2\phi_2$

D. $\cot^2\phi = \cot^2\phi_1 + \cot^2\phi_2$

Answer: D

Watch Video Solution

265. 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. $5.74 Am^2$

C. $7.54 Am^2$

D. $75.4 Am^2$

Answer: C

Watch Video Solution

266. 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 $0.5 A$ is passed through the solenoid, then the magnetic moment of the rod is

A. $10 A m^2$

B. $15 A m^2$

C. $20 A m^2$

D. $25 A m^2$

Answer: D

Watch Video Solution

267. 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. 2 A

B. 4 A

C. `6 A

D. 8 A

Answer: D

Watch Video Solution

268. 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

269. 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

270. The unit for molar susceptibility is

A. m

B. kg-m

C. kg m

D. no unit

Answer: A

Watch Video Solution

271. 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. 0.1 s

B. 0.089 s

C. 0.076 s

D. 0.057 s

Answer: C

Watch Video Solution

272. 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

Watch Video Solution

273. 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

Watch Video Solution

274. 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.

Answer: D

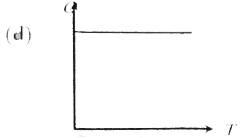
Watch Video Solution

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

A.

B.

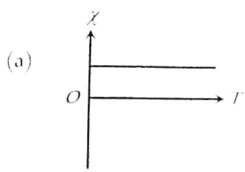
C.

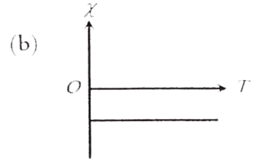
D. 

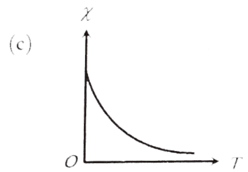
Answer: C

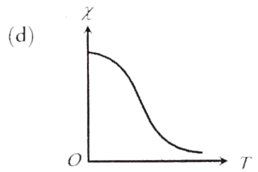
Watch Video Solution

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

A. 

B. 

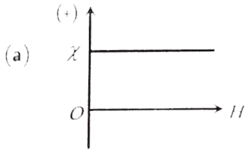
C. 

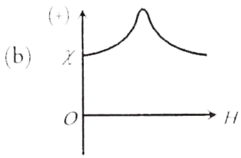
D. 

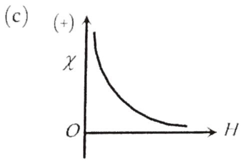
Answer: B

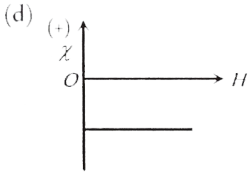
Watch Video Solution

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

A. 

B. 

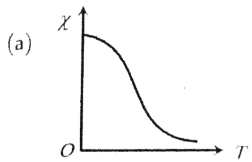
C. 

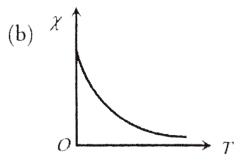
D. 

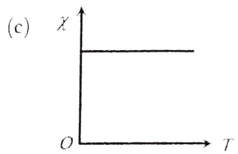
Answer: A

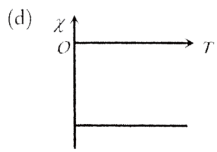
Watch Video Solution

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

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

279. 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

280. 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

Watch Video Solution

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

A. A

B. B

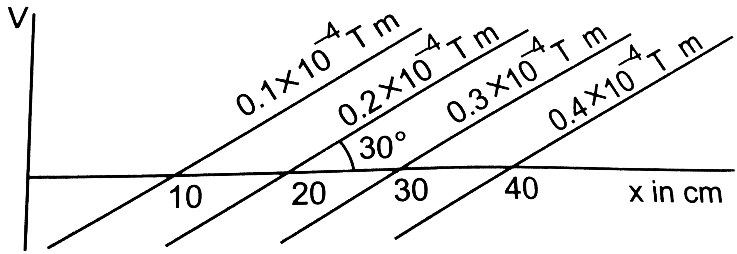
C. C

D. D

Answer: B

Watch Video Solution

282. Figure shows some of the equipotential surfaces of the magnetic scalar potential. Find the magnetic field B at a point in the region.



A. $10^{-4}T$

B. $2 \times 10^{-4}T$

C. $0.5 \times 10^{-4}T$

D. None of these

Answer: B

Watch Video Solution

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

A. 57 K

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

C. 570 K

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

Answer: A

Watch Video Solution

284. 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 and OR should be large

D. OQ and OR should both be small

Answer: B

Watch Video Solution

285. 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

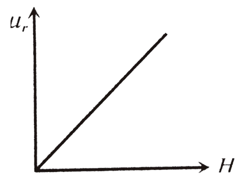
C. OB

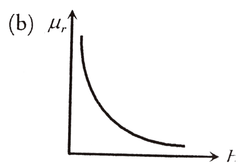
D. OA

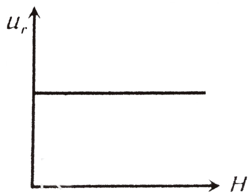
Answer: B

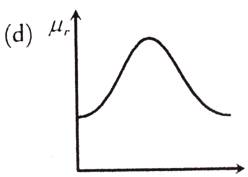
Watch Video Solution

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

A. 

B. 

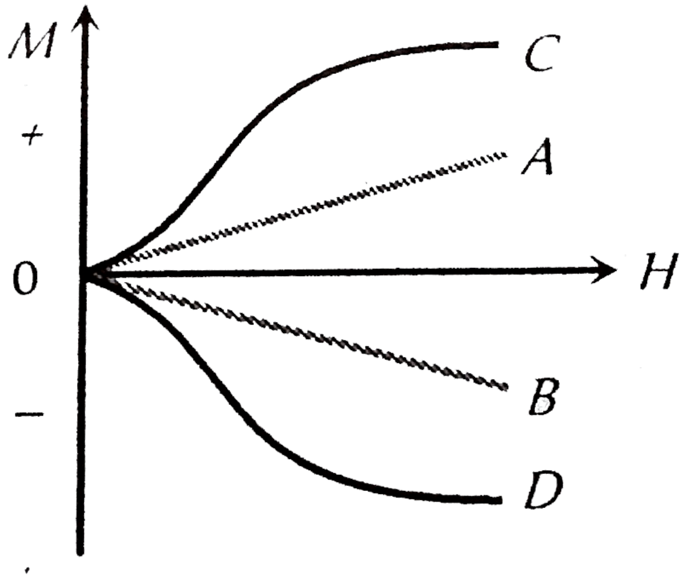
C. 

D. 

Answer: D

Watch Video Solution

287. The most appropriate magnetization M versus magnetising field H curve for a paramagnetic substance is



A. A

B. B

C. C

D. D

Answer: A

Watch Video Solution

288. 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 assertion and reason are true and the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: D

Watch Video Solution

289. 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 assertion and reason are true and the reason is the correct explanation of the assertion.

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

the assertion

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: B

Watch Video Solution

290. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

291. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: C

Watch Video Solution

292. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: B

Watch Video Solution

293. Assertion (A): The earth's magnetic field is due to iron present in its core.

Reason (R): At a high tempeature magnet losses its magnetic property or magnetism.

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

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

C. f assertion is true but reason is false.

D. If assertion is false but reason is true

Answer: D

Watch Video Solution

294. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: D

Watch Video Solution

295. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: B

Watch Video Solution

296. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: B

Watch Video Solution

297. Assertion : The properties of paramagnetic and ferromagnetic substance are not effected by heating.

Reason : As temperature rises, the alignment of molecular magnets gradually decreases.

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

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

the assertion

C. if assertion is true but reason is false.

D. If assertion is false but reason is true

Answer: D

Watch Video Solution

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

Reason: Soft iron has narrow hysteresis loop.

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

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

299. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

300. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

301. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: C

Watch Video Solution

302. Assertion: Electromagnets are made of soft iron.

Reason: Coercivity of soft iron is small.

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

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

303. 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 assertion and reason are true and the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

304. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: D

Watch Video Solution

305. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: D

Watch Video Solution

306. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: C

Watch Video Solution

307. Assertion : The susceptibility of diamagnetic materials does not depend upon temperature.

Reason : Every atom of a diamagnetic material is not a complete magnet in itself.

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

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

C. if assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: C

Watch Video Solution

308. 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 the reason is the correct explanation of the assertion.

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

the assertion

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: D

Watch Video Solution

309. Statement-1 : Gauss theorem is not applicable in magnetism. Statement-2 : Mono magnetic pole does not exist.

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

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

310. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: A

Watch Video Solution

311. 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 the reason is the correct explanation of the assertion.

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

C. f assertion is true but reason is false.

D. If the assertion and r eason both are false

Answer: B

Watch Video Solution

Magnet And It S Properties

1. A magnet is placed in iron powder and then taken out, then maximum iron powder is at

A. Some away from north pole

B. Some away from south pole

C. The middle of the magnet

D. The end of the magnet

Answer: D

View Text Solution

2. The magnetism of magnet is due to

A. The spin motion of electron

B. Earth

C. Pressure of big magnet inside the earth

D. Cosmic rays

Answer: A

View Text Solution

3. Which of the following, the most suitable material for making permanent magnet is

A. Steel

B. Soft iron

C. Copper

D. nickel

Answer: A

View Text Solution

4. In the case of bar magnet, lines of magnetic induction

A. Start from the north pole and end at the south pole

B. Run continuously through the bar and outside

C. Emerge in circular paths from the middle of the bar

D. Are produced only at the north pole like rays of light from a bulb

Answer: B

View Text Solution

5. A sensitive magnetic instrument can be shielded very effectively from outside magnetic fields by placing it inside a box of

A. Teak wood

B. Plastic material

C. Soft iron of high permeability

D. A metal of high conductivity

Answer: C

View Text Solution

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

A. $MB(1-\sin\theta)$

B. $MB\sin\theta$

C. $MB\cos\theta$

D. $MB(1-\cos\theta)$

Answer: D

View Text Solution

7. Magnetic induction is a

A. Scalar quantity

B. Vector quantity

C. Both (a) and (b)

D. None of the above

Answer: B

View Text Solution

8. If a hole is made at the centre of a bar magnet, then its magnetic moment will

A. Increase

B. Decrease

C. Not change

D. None of these

Answer: C

View Text Solution

9. Magnetic lines of force

A. Always intersect

B. Are always closed

C. Tend to crowd far away from the poles of magnet

D. Do not pass through vacuum

Answer: B

View Text Solution

10. The direction of line of magnetic field of bar magnet is

A. From south pole to north pole

B. From north pole to south pole

C. Across the bar magnet

D. From south pole to north pole inside the magnet and from north pole to south pole outside the magnet

Answer: D

View Text Solution

11. A bar magnet of magnetic moment $10 - J/T$ is free to rotate in a horizontal plane. The work done in rotating the magnet slowly from a direction parallel to a horizontal magnetic field of $4x \times 10$ T to a direction 60^o from the field will be

A. 0.2 J

B. 2.0 J

C. 4.18 J

D. $2 \times 10 J$

Answer: A

View Text Solution

12. Magnetic lines of force due to a bar magnet do not intersect because

A. A point always has a single net magnetic field

B. The lines have similar charges and so repel each other

C. The lines always diverge from a single point

D. The lines need magnetic lenses to be made to intersect

Answer: A

View Text Solution

13. The unit of magnetic moment is

A. Wb/m

B. Wbm^2

C. A.m

D. $A.\,m^2$

Answer: D

View Text Solution

14. Two equal bar magnets are kept as shown in the figure. The direction of resultant magnetic field, indicated by arrow head at the point P is (approximately)

A.

B.

C.

D.

Answer: B

View Text Solution

15. Magnetic dipole moment is a

A. Scalar quantity

B. Vector quantity

C. Constant quantity

D. None of these

Answer: B

View Text Solution

Earth Magnetism

1. The correct relation is

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

B. $B = B_V \times B_H$

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

D. $B = B_H + B_V$

(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)

Answer: C

View Text Solution

2. The north pole of the earth's magnet is near the geographical

A. South

B. East

C. West

D. North

Answer: A

View Text Solution

3. The magnetic field of earth is due to

A. Motion and distribution of some material in and outside the earth

B. Interaction of cosmic rays with the current of earth

C. A magnetic dipole buried at the centre of the earth

D. Induction effect of the sun

Answer: A

View Text Solution

4. Angle of dip is 90° at

A. Poles

B. Equator

C. Both (a) and (b)

D. None of these

Answer: A

View Text Solution

5. Magnetic meridian is a

A. Point

B. Horizontal plane

C. Vertical plane

D. Line along N - S

Answer: C

View Text Solution

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

A. 2

B. 1

C. 0

D. 4

Answer: B

View Text Solution

7. At the magnetic poles of the earth, a compass needle will be [

A. Vertical

B. Bent slightly

C. Horizontal

D. Inclined at 45o to the horizontal

Answer: B

View Text Solution

8. If magnetic lines of force are drawn by keeping magnet vertical, then number of neutral points will be

A. One

B. Two

C. Four

D. Five

Answer: A

View Text Solution

Magnetic Equipments

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

A. $3:1$

B. $1:3$

C. $3:5$

D. $5:4$

Answer: D

View Text Solution

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

A. 4 sec

B. 2 sec

C. $\sqrt{2}\,\mathrm{sec}$

D. 1 sec

Answer: D

View Text Solution

Magnetic Materials

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

A. Iron

B. Nickel

C. Cabalt

D. Brass

Answer: D

View Text Solution

Assertion Reason

1. Assertion : For a perfectly diamagnetic substance permeability is always one.

Reason : The ability of a material of permit the passage of magnetic lines of force through it is called magnetic permeability.

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

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

the assertion

C. f assertion is true but reason is false.

D. If assertion is false but reason is true

Answer: D

View Text Solution