PHYSICS

BOOKS - DC PANDEY PHYSICS (HINGLISH)

MAGNETISM AND MATTER

Example

1. Consider a sort magnetic dipole o f magnetic length 10cm. Find its geometric

length.

Watch Video Solution

2. A thin bar magnet of length 2L is bent at the mid point, so that the angle between them is 60°.Find the new length of the magnet.

Watch Video Solution

3. The length of a magnetised steel wire is l is the magnetic momemt is M. It is bent the

shape of L with two sides equal. What will be the new magnetic moment?

Watch Video Solution

4. Two magnetic poles, one of the which is four times stronger than the other, exert a force of 10gf on each other when placed at a distance of 20cm. Find the strength of each pole.

Watch Video Solution

5. Two similar magnetic poles, having pole strengths in the ration 1:3 and placed 1m apart. Find the point where a unit pole experiences no net force due to these two poles

Watch Video Solution

6. Find the magnetic field due to a dipole of magnetic moment $3Am^2$ at a point 5m away

from it in the direction making angle of 45° with the dipole exists

A. $3.79 \times 10^{-9} T, \alpha = \tan^{-1}(1)$

B. $3.79 \times 10^{-9} T, \alpha = \tan^{-1}(0.5)$

C. $3.79 \times 10^{-8} T, \alpha = \tan^{-1}(0.5)$

D. $3.79 \times 10^{-6} T, \alpha = \tan^{-1}(1)$

Answer: B

Watch Video Solution

7. A bar magnet of length 0.1m has pole strength of 50A-m. Calculate the magnetic field at distance of 0.2m from tis centre on

(i) its axial line and (ii) it equatorial line.

Watch Video Solution

8. Calculate the magnetic induction at a point 1 away from a proton, measured along its axis of spin. The magnetic moment of the proton is $1.4 \times 10^{-26} A - m^2$

Watch Video Solution

9. A short bar magnet has a magnetic moment of $0 \cdot 48JT^{-1}$. Give the direction and magnitude of the magnetic field produced by the magnet at a distance of $10cm$ from the centre of the magnet on (i) the axis (ii) the equatorial line (normal bisector) of the magnet.

Watch Video Solution

10. A current of 6A is flowing through a 20 turns circular coil of radius 5cm.The coil lies in the xy-plane. What is the magnitude and direction of the magneitc dipole moment assocaited with it?

Watch Video Solution

11. A current I flows in a conducting wire of lenth L. If we bent it in a circular form, then calculate its magnetic dipole moment.

Watch Video Solution

12. The electron in hydrogen atom moves with a speed of $2.2 \times 10^{6} m / s$ in an orbit of radius $5.3 \times 10^{-11} cm$. Find the magnetic moment of the orbiting electron.

Watch Video Solution

13. A closely wound solenoid of 800 turns and area of cross section $2 \cdot 5 \times 10^{-4} m^{2}$ carries a current of $3 \cdot 0 A$. Explain the sense in which

the solenoid acts like a bar magnet. What is its associated magnetic moment?

Watch Video Solution

14. A magnetic of magnetic moment placed along the X-axis in an magnet field .Find the torque acting on the magnetic field

Watch Video Solution

15. A bar magnet when placed at an angle of 30° to the direction of magnetic field of 5×10^{-2}T, experiences a moment of couple 2.5×10^{-6}. If the length of the magnet is 5cm, then what will be its pole strength?

Watch Video Solution

16. 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

Watch Video Solution

17. A bar magnet of magnetic moment 2.0 $A-m^2$ is free to rotate about a vertical axis through its centre. The magnet is released from rest from the east west position. Find the kinetic energy of the magnet as it takes the north south position. The horizontal component of the earth's magnetic field as

$B = 25\mu T$. Earth's magnetic field is from south to north.

Watch Video Solution

18. A short bar magnet of moment $0 \cdot 32JT^{-1}$ is placed in a uniform external magnetic field of $0 \cdot 15T$, if the bar is free to rotate in the plane of the field, which orientations would correspond to its, (i) stable and (ii) unstable equilibrium? What is the potential energy of the magnet in each case?

Watch Video Solution

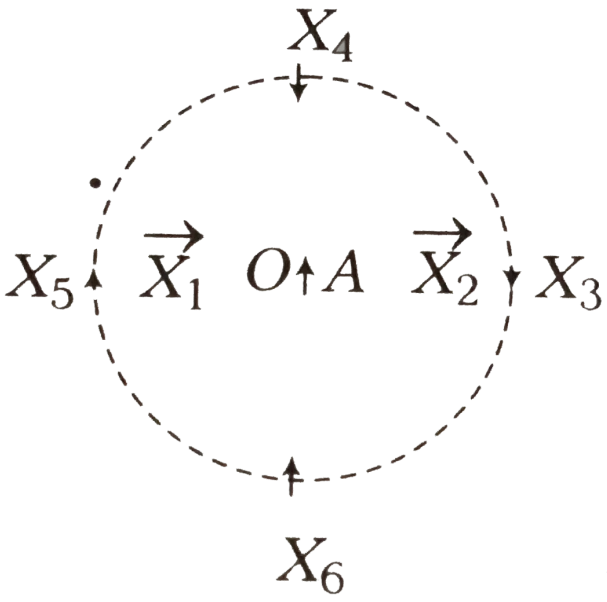
19. Consider the situation shown in the diagram, where A small magnetised needle A is placed at a centre marked, as O. The direction of its mangetic moment I s indicated by arrow. The other arrow show different position (and orientations of the magnetic moment) of antoher identical magnetised eedle X.

In which configuration the system is not in equlibrium?

(ii) In which configuration is the system in (a)

stable and (b) unsable equilibrium

(iii) Which configuration corresponds to the lowest potentials energy among all the configuration shown



Watch Video Solution

20. A magnetic needle is free to oscillate in a uniform magnetic field as shown in the figure. The magnetic moment of magnetic needle $7.2Am^2$ and moment of inertia $I = 6.5 \times 10^{-6} kgm^2$. The number of oscillation performed in 5s os 10. Calculate the magnitude of magnetic field?

Watch Video Solution

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

A. $\alpha = 45^\circ$

B. $\alpha = 60^\circ$

C. $\alpha = 25^\circ$

D. $\alpha = 30^\circ$

Answer: D

Watch Video Solution

22. In the magnetic meridian of a certain place, the horizontal component of earth's magnetic fied is $0.26G$ and the dip angle is 60°. Find

a. Vertical component of earth's magnetic field

b. the net magnetic field at this place

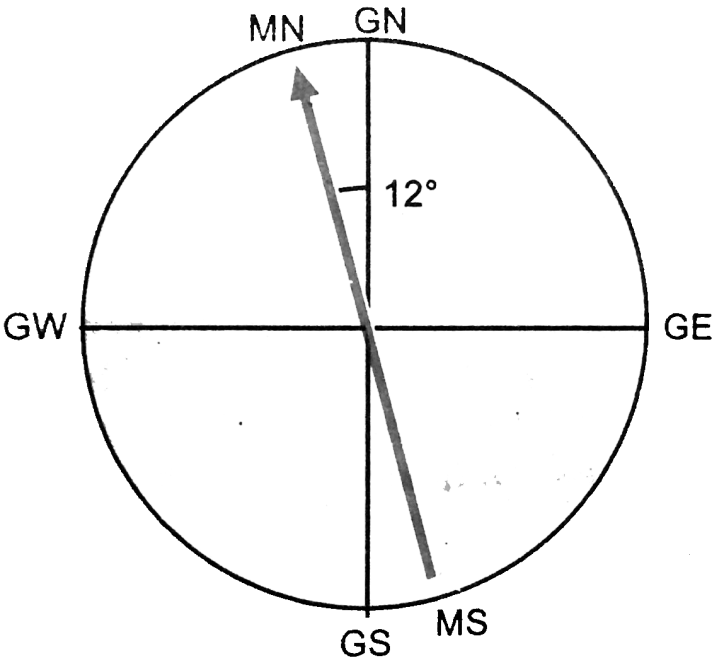
Watch Video Solution

23. The horizontal and veritical components of eaths's field at a place ar 0.22 gauss of 0.38 gauss, respectively. Calculate the angle of dip and resultant intensity of earth's field.

Watch Video Solution

24. At a certain location in Africa, compass points 12° west of geographic north, figure. The north tip of magnetic needle of a dip circle placed in the plane of magnetic meridian

points 60° above the horizontal. The horizontal component of earth's field is measured to be $0.16 gauss$. Specify the direction and magnitude of the earth's field at the location.



Watch Video Solution

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

A. approx45^(@) `

B. 30°

C. $\approx 41^\circ$

D. approx51^(@) `

Answer: C

Watch Video Solution

26. A ship is to reach a place of 10° south of west. In which direction should it be steered if the declination at the place is 18° west of north.

A. 72°

B. 90°

C. $\hat{} 100(\circ$

D. 82°

Answer: D

Watch Video Solution

27. A dip circle shows an apparent dip of 45° at a place where the true dip is 30° . If the dip circle is rotated through 90°, what apparent dip will it show?

Watch Video Solution

28. A short magnet $\left(M = 4 \times 10^{-2}\right)$ lying in a horizontal plane with its north pole points 37° east of north. Find the net horizontal field a ta point of the magnet of 0.1m away from it $(B_h = 11\mu T)(\sin 37^{\circ} = 3/5, \cos 37^{\circ} = 4/5)$

A. $17.56 \cdot 10^{-6} T \tan\beta = 0.14$

B. $10^{-6} T \tan\beta = 0.5$

C. $10^{-5} T \tan\beta = 0.14$

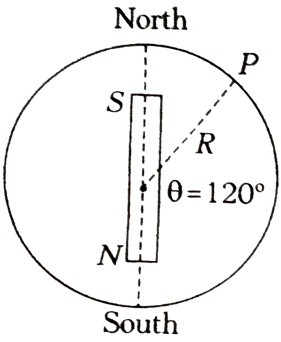
D. $10^{6} T \tan\beta = 0.14$

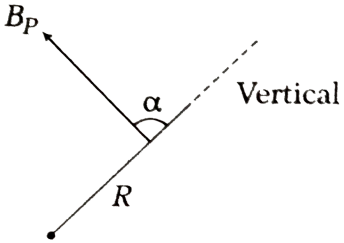
Answer: A

Watch Video Solution

29. The earth's magnetic field at geomagnetic poles has a magnitude $8 \times 10^{-5} T$. Find the magnitude and the direction of the field at a point on the earth's surface where the radius makes an angle of 120° with its axis of the earth's assumed magnetic dipole. What is the

inclination dip at this point?





Watch Video Solution

30. A bar magnet $30cm$ long is placed in magnetic meridian with its north pole pointing south. The neutral point is observed at a distance of $30cm$ from its centre. Calculate the pole strength of the magnet.

Given horizontal component of earth's field is $0 \cdot 34G$.

Watch Video Solution

31. A short bar magnet is placed with its north pole pointing north. The neutral point is $10cm$ away from the centre of the magnet. If $H = 0.4G$, calculate the magnetic moment of the magnet.

Watch Video Solution

32. In a tangent galvanometer, when a current of $10mA$ is passed, the deflection is 31°. By what percentage, the current has to be increased, so at to produce a deflection of 42° ?

Watch Video Solution

33. The coil of a tangent galvonometer of radius 12cm is having 200turns. If the forinzontal component of earth's magnetic

field is $25\mu T$. Find the current which gives a deflection of 60°.

Watch Video Solution

34. A bar magnet of length 5cm, width 3cm and height 2cm takes 5s to complete an oscillation in viberation magnetometer placed in a horizontal magnetic field of $20\mu T$. The mass of this bar magnet is 250g(a). Find the magnetic moment of the magnet. (b) If the magnet is put in the magnetormer with its

0.5cm edge horizontal, what would be the new time period?

Watch Video Solution

35. A magnetic needle performs 20 oscillations per minute in a horizontal plane. If the angle of dip be 30°, then how many oscillation per minute will this needle perform in vertical, north south plane and in vertical east -west plane?

Watch Video Solution

36. A magnet performs 15 oscillations per minute in a horizontal plane, where angle of dip is 60° and earth is total field is 0.5G. At another place, where total field is 0.6G, the magnet performs 20 Oscillation per minutes. What is the angle of dip at this place.

Watch Video Solution

37. The time period of viberation of two magnets in sum position (magnets placed

with similar poles on one sides one above the other) is 3s. When polarity of weaker magnet is reversed the combination makes 12 oscillations per minutes. What is the ratio of magnetic moments of two magnets?

Watch Video Solution

38. A small bar magnet having a magnitic moment of $9 \times 10^{-3} Am^{-2}$ is suspended at its centre of gravity by a light torsionless string at a distance of $10^{-2} m$ vertically above

a long, straight horizontal wire carrying a current of 1.0A from east to west. Find the frequency of oscillation of the magnet about its equilibrium position. The moment of inertia of the magnet is `6xx10^(-9)kgm^(2). (H=3xx10^(-5)T).

Watch Video Solution

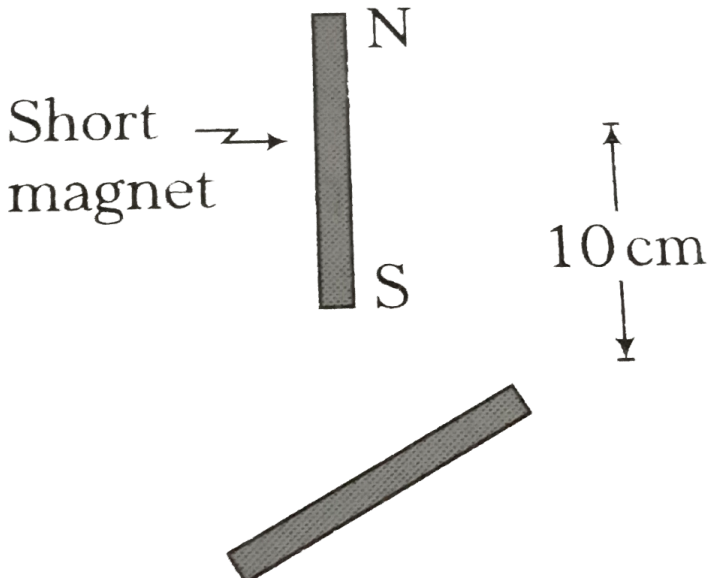
39. A thin rectangular magnet suspended freely has a period of oscillation equal to T. Now it is broken into two equal halves (each

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

Watch Video Solution

40. The time period of the magnetic in an oscillation pmagnetometer in the earth magnetic field is 2s. A short bar magnet is placed to the north of the magnetometer, at a separation 10cm from the oscillation magnet,

with its north pole pointing towards north. The time period beceomes half. Calculate the magnetic moment of this short magnet.



View Text Solution

41. The magnetic moment of a magnet $(15cm \times 2cm \times 1cm) is 1.2A - m^2$. Calculate its intensity of magnetisation

Watch Video Solution

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

Watch Video Solution

43. The magnetic field of 20CGS units produces of a flux of 2400 CGS units in a bar of cross section $0.2cm^3$ Calculate the (i) permeability and (ii) susceptibility of the bar.

Watch Video Solution

44. A solenoid having 2000 turns/m has a core of a material with relative permeability 220. The area of core is $4cm^2$ and carries a current of 5A. Calculate (a) Magnetic intensity (b)

Magneic field (c) Magnetisation (I) of the core

Also calculate the pole strength developed.

Watch Video Solution

45. The space within a current carrying solenoid is filled with magneisum having magnetic suscepitbiliy. $x = M_g = 1.2 \times 10^{-5}$. What will be the percentage increase in magnetic field?

Watch Video Solution

46. Consider a bar magnet having pole strength 2A-m, magnetic length 4cm and area of cros-section $1cm^2$ Find

(I) the magnetisation I

(II) the magneic intensity H and

(III) the magnetic field at the centre of magnet

Watch Video Solution

47. The magnetic suscepitbility of a paramagnetic material $at - 72^\circ Cis0.0075.$ Find the value at $-173^\circ C.$

Watch Video Solution

48. A solenoid having 5000 turns/m carries a current of 2A. An aluminium ring at temperature 300K inside the solenoid provides the core, (a) If the magnetisation I is $2 \times 10^{-2} \frac{A}{m}$. Find the susceptibility of aluminium at 300K (b) If temperature of the aluminium ring is 320K, what will be the magnetisation ?

Watch Video Solution

49. The hysteresis loss for a specimen of iron weighing 15kg is equivalent at $300Jm^{-3}cyc \leq^{-1}$ Find the loss of energy per hour at 25 cycle s^{-1}. Density of iron is $7500kgm^{-3}$

Watch Video Solution

50. The coercivity of a certain permanent magnet is $4.0 \times 10^4 Am^{-1}$. The magnet is placed insider a solenoid 20cm long having

700 turns and a current is passed in the solenoid to demagnetise it completely. Find the current

Watch Video Solution

5 1

1. Magnetic length is

A. less than geometric length

B. equal to geometric length

C. greater than geometric length

D. none of these

Answer:

 Watch Video Solution

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

A. a point is always has a single net magnetic field

B. the line is always diverge from a single point

C. the is always diverge froma single point

D. none of these

Answer:

Watch Video Solution

3. SI unit of magnetic pole strength is

A. A-m

B. $A - m^{-1}$

C. $A - m^{-2}$

D. $A - m^{2}$

Answer:

Watch Video Solution

4. A bar magnet of magnetic moment M_1 is axially cut into two equal parts. If these two pieces are arranged perpendicular to each

other, the resultant magnetic moment is M_2.

Then the vale of $\frac{M_1}{M_2}$ is

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

B. 1

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

D. $\sqrt{2}$

Answer: D

Watch Video Solution

5. The ratio of the magnetic fields due to small bar magnet in end position and on broad side position is (at equal distance from the magnet)

A. $1/4$

B. $1/2$

C. 1

D. 2

Answer:

Watch Video Solution

Watch Video Solution

6. Two solenoids acting as short bar magnets P and Q are arranged such that their centres are on the X-axis and are separated by a large distance. The magnetic axes of P and Q are along X and Y-axes, respectively. At a point R, midway between their centres, if B is the magnitude of induction due to Q , then the magnitude of total induction at R due to the magnitude is

A. 3B

B. $\sqrt{B}$

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

D. B

Answer:

View Text Solution

7. The intensity of magnetic field due to an isolated pole of strength m at a pont distant r from it will be proportional to

A. $\frac{m}{r^2}$

B. mr^2

C. $\frac{r^2}{m}$

D. $\frac{m}{r}$

Answer:

Watch Video Solution

8. A particle of charge q and mass m moves in a circular orbit of radius r with angular speed ω. The ratio of the magnitude of its magnetic

moment to that of its angular momentum depends on

A. $-\frac{q}{2m}$

B. $\frac{q\omega r^2}{2}$

C. $\frac{q\omega}{2mr^2}$

D. $\frac{q\omega r^2}{2m}$

Answer: A

Watch Video Solution

9. 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. $M \times B$

B. $-B.M$

C. M.B

D. M+B

Answer:

Watch Video Solution

10. The couple acting on a magnet of length 10cm and pole strength 15A-m, kept in a field of $B = 2 \times 10^{-5}$, at an anlge of 30° is

A. $1.5 \times 10^{-5} N - m$

B. $1.5 \times 10^{-3} N - m$

C. $1.5 \times 10^{-2} N - m$

D. $1.5 \times 10^{-6} N - m$

Answer:

Watch Video Solution

11. A bar magnet is held at right angle to a uniform magneitc field. The couple acting on the acting on the magnet is to be halved by rotating it form this position. The angle of rotation is

A. 60°

B. 45°

C. 30°

D. 75°

Answer:

Watch Video Solution

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

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

B. $MB\sin\theta$

C. $MB\cos\theta$

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

Answer:

Watch Video Solution

13. The effect due to uniform magnetic field on a freely suspended magnetic needle is as follows

A. Both torque and net force are present

B. torque is present but no net force

C. Both torque and net force are absent

D. net force is presetn but not torque

Answer:

Watch Video Solution

14. The net magnetic flux through any closed surface, kept in a magnetic field is

A. zero

B. $\frac{\mu_0}{4\pi}$

C. $4\pi\mu_0$

D. $\frac{4\mu_0}{\pi}$

Answer:

Watch Video Solution

5 2

1. The earth's magnetic field is

A. $10^{-4}T$

B. $10^{-5}T$

C. $10^{-6}T$

D. None of these

Answer:

View Text Solution

2. Magentic meridian is a

A. point

B. horizontal plane

C. veritcal plane

D. line along N-S

Answer:

Watch Video Solution

3. 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:

Watch Video Solution

4. The angle of dip at the magnetic equator is

A. 0°

B. 30°

C. 60°

D. 90°

Answer: A

Watch Video Solution

5. If $H = \frac{1}{\sqrt{3}}V$, then find angle of dip. (where symbols have their usual meaning)

A. 60°

B. 30°

C. 45°

D. 90°

Answer:

Watch Video Solution

6. 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:

Watch Video Solution

7. If a magnet is suspended an angle 30° to the magnetic field at any point on eath. Near the north pole.

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

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

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

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

Answer:

Watch Video Solution

8. The dip at a place is delta. For measuring it, the axis of the dip needle is perpendicular to the magnetic meridian. If the axis of the dip needle makes angle θ with the magnetic

meridian, the apparent dip will be given $\tan \delta_1$ which is equal to:

A. $\tan \delta \operatorname{cosec} \theta$

B. $\tan \delta \sin \theta$

C. $\tan \delta \cos \theta$

D. $\tan \delta \sec \theta$

Answer:

Watch Video Solution

9. At a neutral point

A. field of magnet is zero

B. field of earth is zero

C. field of magnetic is perpendicular to field to earth

D. none of the above

Answer:

View Text Solution

10. TANGENT GALVANOMETER

A. capacitance

B. current

C. resistance

D. potential difference

Answer:

Watch Video Solution

11. Two tangent galvanometer A and B are identical except in their number of turns. They are connected in series. On passing a current through them, deflections of 60° and 30° are produced. The ration of the number of turns in A and B is

A. $1:3$

B. $3:1$

C. $1:2$

D. $2:1$

Answer:

 Watch Video Solution

12. Vibration magnetometer is used for comparing

A. magnetic fields

B. earth's field

C. magnetic moment

D. All of these

Answer:

Watch Video Solution

13. The time period of a freely suspended bar magnet in a field is 2s. It is cut into two equal parts along its axis, then the time period is

A. 4s

B. 0.5s

C. 2s

D. 0.25s

Answer:

Watch Video Solution

14. A bar magnet suspended freely in a uniform magnetic field is vibrating with a time period of 3s. If the field strength is increased to 4 times of the earlier field strength, then the time period (in second) will be

A. 12

B. 6

C. 1.5

D. 0.75

Answer: C

Watch Video Solution

5 3

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

A. Iron

B. Nickel

C. Cobalt

D. Brass

Answer: D

Watch Video Solution

2. What is the SI unit of permeability

A. Am^{-1}

B. A-m

C. $Henrym^{-1}$

D. No unit, it is a dimensionless number

Answer: C

Watch Video Solution

3. The unit of magnetic susceptiblity is

A. H

B. Wb/m

C. A/m

D. None of these

Answer: D

 Watch Video Solution

4. The relation connecting B, H and I in SI system is

A. B=H+1

B. B=H-1

C. $B = \mu_0(H + 1)$

D. $b = \mu_0(H - I)$

Answer: C

Watch Video Solution

5. An example of a diamagnetic substance is

A. aluminium copper

B. copper

C. iron

D. nickel

Answer: B

Watch Video Solution

6. Out of dia, para and ferromagnetism, the universal property of all substances is

A. diamagnetism

B. ferro magnesium

C. paramagnetic

D. all of these

Answer: A

Watch Video Solution

7. The magnetic susceptibility is negative for

A. diamagnetism materials

B. Paramagnetic materials

C. Ferromagnetic materials

D. all of these

Answer: A

Watch Video Solution

8. Identify the paramagnetic substance

A. Iron

B. Aluminium

C. Nickel

D. Hudrogen

Answer: B

Watch Video Solution

9. Which of the following is true?

A. Diamagnetism is temperature dependent

B. Paramagnetism is temperature dependnt

C. Paramagnetism is magnetic independent

D. None of these

Answer: B

View Text Solution

10. Magnetic permeability is maximum for

A. diamagnetic substance

B. paramagnetic substance

C. inversion temperature

D. all of these

Answer: C

Watch Video Solution

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

A. neutral temperature

B. Curie temperature

C. inversion temperature

D. critical temperature

Answer: B

Watch Video Solution

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

A. diamagnetism

B. ferromagnitism

C. Paramagnetism is magnetic independent

D. ferrimagneitsm

Answer: C

Watch Video Solution

13. 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

14. The only property possessed by ferromagnetic substance is

A. hysteresis

B. susceptiility

C. directional property

D. attracting magnetic substances

Answer: A

Watch Video Solution

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

A. diamagnetic substance

B. Paramagnetic

C. Ferromagnetic

D. Electromagnetic

Answer: C

Watch Video Solution

Medical Gallery

1. A bar magnet is hung by a thin cotton thread in a uniform horizontal magnetic field and is in equilibrium state. The energy required to rotate it by 60° is W. Now the torque required to keep the magnet in this new position is

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

B. $\sqrt{3}W$

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

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

Answer: B

Watch Video Solution

Others

1. A magnet is placed in iron poweder and the taken out , them maximum iron powder is at

A. some distannce away from north pole

B. some distance away from north pole

C. the middle of the magnet

D. the end of the magnet

Answer: D

Watch Video Solution

2. A permanet magnet

A. attracts all substance

B. attracts only magnetic substance

C. attracts magnetic substance and repels all non-magnetic substances

D. attracts non-magnetic substances and repels magnetic substances

Answer: B

View Text Solution

3. Magnetic field is measured by

A. pyrometer

B. hydrometer

C. thermometer fluxmeter

D.

Answer: D

View Text Solution

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

A. isoclinic line

B. isogonic line

C. isoclinic lines

D. isodynamic lines

Answer: C

Watch Video Solution

5. 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

6. A clinic lines are the lines joining places of

A. zero dip

B. equal dip

C. zero declination

D. equal declination

Answer: A

View Text Solution

7. The arms of a deflection magnetometer in the tan B posittion are placed

A. east-west

B. north- south

C. north-east

D. south- west

Answer: B

View Text Solution

8. IF the current is doubled, the deflection is also doubled in

A. a tangent galvanometer

B. a moving coil galvanometer

C. Both (a) and (b)

D. None of the above

Answer: B

Watch Video Solution

9. Which of the following is diamagetic ?

A. Aluminium

B. Quartz

C. Nickel

D. Bismuth

Answer: D

View Text Solution

10. The permeablitiy of paramgentic substance is

A. slinght more than vacuum

B. slight less than vacuum

C. much more than vaccum

D. None of the above

Answer: A

Watch Video Solution

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

A. tesla

B. $weber / meter^2$

C. newton / ampere-meter

D. All of these

Answer: D

Watch Video Solution

12. Magnetic field intensity is defined as

A. magnetic moment per unit volume

B. magnetic indction force acting ona unit magnetic pole

C. number of lines of force crossing per unit area

D. number of lineas of forces corssing per unit volume

Answer: C

Watch Video Solution

13. Permeability is defined as the ratio between

A. magnetic induction and susceptibility

B. magnetic indction and magnetising field

C. magnetising field and magnetic induction

D. magnetising field and magnetic induction

Answer: B

Watch Video Solution

14. Hysteresis loss for steel is ..... .that for iron.

A. lesser than

B. equal to

C. greater than

D. Either (b) and (c)

Answer: C

Watch Video Solution

15. Hysteresisis exhibited by a ..... . Substance.

A. parmagnetic

B. ferromagnetic

C. diamagentic

D. All of these

Answer: B

View Text Solution

16. Which of the following materials has got the maximum retentvity ?

A. Copper

B. Zinc

C. Soft iron

D. Hard iron

Answer: C

View Text Solution

17. The area enclosed by a hysteresis loop is a measure of

A. retentivity

B. susceptibility

C. permeability

D. energ loss per cycle

Answer: D

Watch Video Solution

18. Which of the following is the most suitable mateial for making permanent magnet ?

A. Steel

B. Soft iron

C. Copper

D. Nickel

Answer: A

View Text Solution

19. The material suitable for making electromagnets should have

A. high retentivity and high corecivity

B. low retentivity and low coerivity

C. high retentivity and low coercivity

D. low retenivity and high corecivity

Answer: C

Watch Video Solution

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

A. Iron

B. Steel

C. Soft iron

D. Cu- Ni alloy

Answer: C

Watch Video Solution

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

A. a force and torque

B. a force but not a torque

C. a torque but not a force

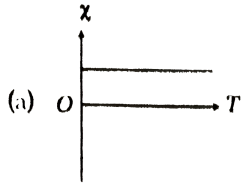
D. Neither a tarque nor a froce

Answer: A

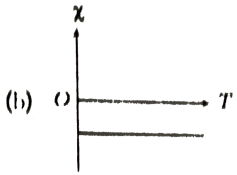
Watch Video Solution

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

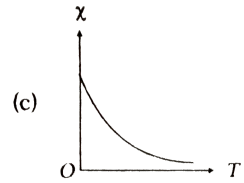
A.



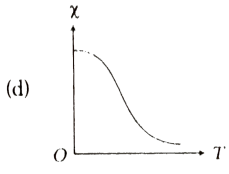
B.



C.



D.



Answer: B

Watch Video Solution

23. The angle between the earth's magnetic and the earth's geographic axis is

A. zero

B. 11.5°

C. 23°

D. None of the above

Answer: B

View Text Solution

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

A. magnetiic meridian

B. geometric meridian

C. angle of dip

D. None of the above

Answer: A

 Watch Video Solution

25. 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

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

A. 0°

B. 30°

C. 60°

D. 90°

Answer: D

View Text Solution

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

A. stay in north-south direction only

B. stay in east-west direction only

C. becomes rigid showing no movenent

D. stay in any position

Answer: D

 Watch Video Solution

28. 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

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

A. require greater kinetic energy to reach the equator than pole

B. require less kinetic energy to reach the equator than pole

C. can never reach the pole

D. can never reach the quator

Answer: C

Watch Video Solution

30. 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 componet of earth's magnetic field

D. All of these

Answer: C

Watch Video Solution

31. An electron moving around the nucleus with an angular momenturm l has a magnetic moment

A. $\frac{e}{m}l$

B. $\frac{e}{2m}l$

C. $\frac{2e}{m}l$

D. $\frac{e}{2\pi m}l$

Answer: B

Watch Video Solution

32. A vibration magnetometer is placed at the south pole, then the time period will be

A. zero

B. infinity

C. same as at magnetic equator

D. same as at any other place on earth

Answer: B

Watch Video Solution

33. Which of the following statements are ture about the magnetic susceptibility $\chi(m)$ of paramagnetic substance?

A. Value of χ_m is respectively proportional to the absolute temperature of the sample

B. χ_m is positive at all temperature

C. χ_m is negative at all temperature

D. χ_m does not depends on the temperature of the sample

Answer: A::B

 Watch Video Solution

34. The angle which the total magnetic field of earth makes with the surface of the called

View Text Solution

35. Resultant force acting on a diamagentic material in a magnetic field is in direction

Watch Video Solution

36. The mathematical equation for magnetic field lines of force is

View Text Solution

37. Two lines of force due to a bar magnet

View Text Solution

38. What is happens to the force between magnetic poles when their pole strenght and

the distance between them both gets doubled ?

Watch Video Solution

39. 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

40. Two magnets have the same length and the same pole strenght . But one of the magnets have a small hole at its centre. Then

A. Both have equal magnetic moment

B. One with hole has smaller magnetic moment

C. One with hole has larger magnetic moment

D. One with hole loses magnetism through the hole

Answer: B

View Text Solution

41. The magnetic field at a distance d from a short bar magnet in longitudinal and transverse positions are in the ratio.

Watch Video Solution

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

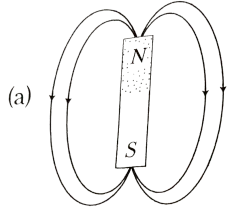
D.

Answer: B

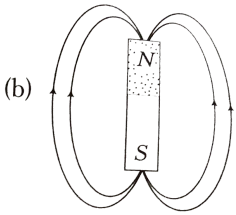
Watch Video Solution

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

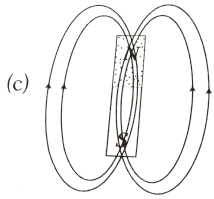
A.



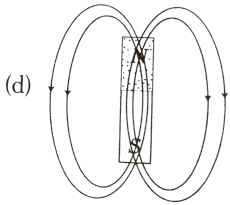
B.



C.



D.



Answer: D

Watch Video Solution

44. Suscepitbility is positive and large for a

Watch Video Solution

45. Torques τ_1 and τ_2 are required for a magnetic needle to remain perpendicular to the magnetic fields at two different places. The magnetic field at those places are B1 and B2 respectively, then $\frac{B_1}{B_2}$ is

Watch Video Solution

46. A dip circle is taken to geomagnetic equator. The needle is allowed to move in a vertical plane perpendicular to the magnetic meridian. The needle will stay

Watch Video Solution

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

Watch Video Solution

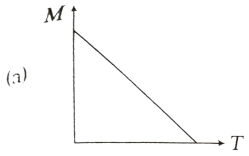
48. When the magnetic inclination (dip) was measured at various places on earth, in one of the following countries it was found to be zero. Which to be zero. Which one was it ?

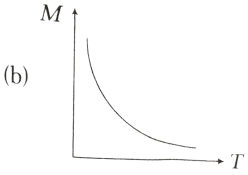
View Text Solution

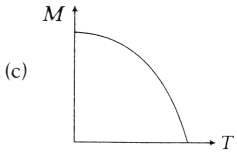
49. In a deflection magnetometer, the needle is short and the pointer is long because, the

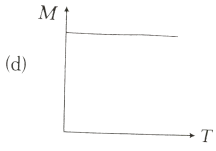
View Text Solution

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

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

51. The tangents deflection produced in tan A and B positions by a short magnet at equal distances are in the ratio .

View Text Solution

52. The relative permeability is represented by μ_r and susceptibility is denoted by χ for a

magnetic substance then for a paramagnetic substance.

A.

B.

C.

D.

Answer: D

Watch Video Solution

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

A. 1

B. 2

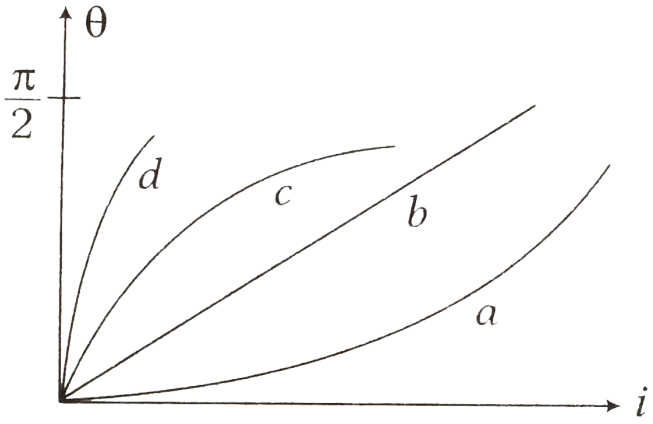
C. 3

D. 4

Answer: D

Watch Video Solution

54. Which of the four the graphs may best represent the current-deflection realation in a tangent galvanormetre?



View Text Solution

55. 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

Watch Video Solution

56. A paramagnetic liquid is taken in a U-tube and arranged so that one of its limbs is kept between pole pieces of the magnet. The liquid level in the limb

Watch Video Solution

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

Watch Video Solution

58. All these magnetic materials loss their magnetic properties when

View Text Solution

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

Watch Video Solution

60. Above the Curie temperature, the susceptility of a ferromagentic substance varies

View Text Solution

61. The given figure represents a material which is

A. paramagnetic

B. diamagnetic

C. ferromagnetic

D. none of these

Answer: B

Watch Video Solution

62. A long thin magnet of moment M is bent into a semi circle. The decrease in the magnetic moment is

Watch Video Solution

63. A magnet of magnetic moment M amd pole strenth m is divided in two equal parts, then magnetic moment of each part will be

Watch Video Solution

64. 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.

Watch Video Solution

65. 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

Watch Video Solution

66. 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

Watch Video Solution

67. 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

Watch Video Solution

68. A toroid of n turns, mean radius R and cross-sectional radius a carries current I. It is

placed on a horizontal table taken as x-y plane. Its magnetic moment $\overrightarrow{M}$

A. is non-zero and points in the Z-direaction by symmetry

B. points along the axis of the toroid $(m = m\phi)$

C. is zero, otherwise there would be a field falling as $\frac{1}{r^3}$ at large distance outside the toriod

D. is pointing radially outwards

Answer: C

Watch Video Solution

69. 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. zero

D. $+2MB$

Answer: D

Watch Video Solution

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

A. $0.1J$

B. $0.2J$

C. $1J$

D. $2J$

Answer: B

Watch Video Solution

71. A planar coil having 15turns carries 20 A current . The coil is oriented with respect to the uniform magnetic field $B = 0.5T$ such that its direction area is $A = -0.04\hat{i}m^2$. The

potential energy of the coil in the given orientation is

A. 0

B. $+0.72$

C. $6J$

D. $-1.44J$

Answer: C

Watch Video Solution

72. The magnetic field of Earth can be modelled by that of a point dipole placed at the centre of the Earth. The dipole axis makes an angle of $11 \cdot 3^{\circ}$ with the axis of Earth. At Mumbai, declination is nearly zero. Then,

A. the declination varies between $11.3^{\circ} W$ to $11.3^{\circ} E$

B. the least declination is 0°

C. the plane defined by dipole axis and the earth axis passes through Greenwhich

D. declination averaged over the earth must be always negative

Answer: A

Watch Video Solution

73. The magnetic filed on the axis of a short bar magnet at a distance of 10 cm is 0.2 oersted. What will be the field at a point, distant 5 cm on the line perpendicular to the axis and passing through the magnet ?

A. 0.025 oersted

B. 0.2 oersted

C. 0.4 oersted

D. 0.8 oersted

Answer: D

View Text Solution

74. 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

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

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

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

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

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

Answer: C

Watch Video Solution

76. 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. $1/\sqrt{3}$

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

Answer: C

Watch Video Solution

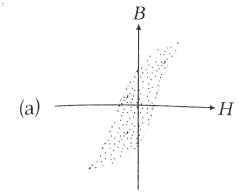
77. In a permanent magnet at room temperature.

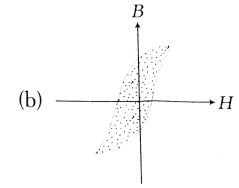
Watch Video Solution

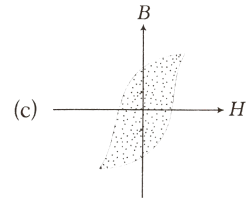
78. A dip needle lies initially in the magnetic merdian when it shows an angle of dip θ at a place. The dip circle is rotated through an angle x in the horizontal plane and then it shows an angle of dip θ'. Then $\frac{\tan\theta'}{\tan\theta}$ is

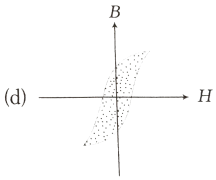
Watch Video Solution

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

A. 

B. 

C. 

D. 

Answer: D

Watch Video Solution

80. 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:

Watch Video Solution

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

Watch Video Solution

82. 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

Watch Video Solution

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

Watch Video Solution

84. The magnetic moment produced in a substance of $1gmis6 \times 10^{-7}\text{ampere, metre}^2$. If its density is $5gm/cm^3$, then the intensity of magnetisation in A/m will be

Watch Video Solution

85. A short bar magnet is arranged with its north pole pointing gergraphical north. It is found that the horizontal component of earth's magnetic induction (B_H) is balaced by

the magnetic induction of the magnet at a point which is at a distance of 20 cm from its centre .The magnetic moment of the magnet is $\left(\text{ if } H = 4 \times 10^{-5} Wbm^{-2} \right)$

View Text Solution

86. 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

Watch Video Solution

87. Consider the two idealized systems: (i) a parallel plate capacitor with large plates and small separation and (ii) a long solenoid of length $L > > R$, radius of cross-section. In (i) $\vec{E}$ is ideally treated as a constant between plates and zero outside. In (ii) magnetic field is constant inside the solenoid and zero outside. These idealised assumptions, however, contradict fundamental law as below:

Watch Video Solution

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

A. 9 gauss

B. 4 gauss

C. 36 gauss

D. 4.5 gauss

Answer: C

Watch Video Solution

89. 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 ratio of resultant magnetic field at the two places is

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

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

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

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

Answer: C

Watch Video Solution

90. 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

(##HCV_VOL2_C36_E01_006_Q01##)

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

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

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

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

Answer: B

Watch Video Solution

91. Two bar magnets of the same length and breadth but having magnetic moments M and $2M$ are joined with like poles together and

suspended by a string. The time of oscillation of this assembly in a magnetic field of strength B is 3 sec. What will be the period of oscillation, if the polarity of one of the magnets is changed and the combination is again made to oscillate in the same field ?

A. $\sqrt{3}s$

B. $3\sqrt{3}s$

C. $3s$

D. 6s

Answer: B

Watch Video Solution

92. The period of oscillation of a suspended thin cylindrical magnet is 4 seconds. It is broken into exactly two halves. Find the period of oscillation of each half when freely suspended.

A. 4s

B. 2s

C. 1s

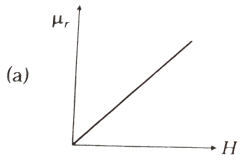
D. $2\sqrt{2}s$

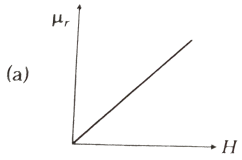
Answer: B

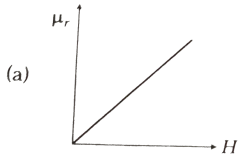
Watch Video Solution

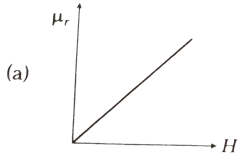
93. For ferromagnetic material, the relative permeability (mu_(r)), versus magnetic intensity (H) has the following shape

A.



B. 

C. 

D. 

Answer: D

Watch Video Solution

94. 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

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

(i) A is feebly repelled

(ii) B is feebly attracted

(iii) C is strongly attracted

(iv) D remains unaffected

Which one of the following is true?

A. C is a diamagnetic material

B. D is of a ferromagnetic material

C. A is of a non-magnetic meterial

D. B is of a paramagnetic material

Answer: D

Watch Video Solution

96. 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. QQ should be large, OR should be small

B. QQ 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

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

A. At a point 10cm from the stronger pole

B. At a point 20cm from the stronger pole

C. At the mid point

D. At infinity

Answer: B

 Watch Video Solution

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

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

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

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

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

Answer: B

Watch Video Solution

99. A circuit coil of radius 20 cm and 20 turns of wire is mounted vertically with it's plane in the magnetic meridian. A small magnetic needle placed at the center of the coil is deflected through 45° when a current is passed through the coil. What is the value of the current? (horizontal induction of earth's field = $3.6x10^{-5}Wb/m^2$

A. 0.6A

B. 6A

C. $6 \times 10^{-3} A$

D. 0.06A

Answer: A

Watch Video Solution

100. A dip circle is adjusted so that its needle moves freely in the magnetic meridian. In this position, the angle of dip is 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

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

A. $0.904Wb$

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

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

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

Answer: B

Watch Video Solution

102. A paramagnetic sample shows a net magnetization of $8Am^{-1}$ when placed in an external magnetic field of $0 \cdot 6T$ at a temperature of $4K$. When the same sample is placed in an external magnetic field of $0 \cdot 2T$ at a temperature of $16K$, the magnetization will be

A. $\frac{32}{3}Am^{-1}$

B. $\frac{2}{3}Am^{-1}$

C. $6Am^{-1}$

D. $2.4Am^{-1}$

Answer: B

Watch Video Solution

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

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

A. $\theta = \tan^{-1}(\tan\delta_1 \tan\delta_2)$

B. $\theta = \tan^{-1}(\tan\delta_1 + \tan\delta_2)$

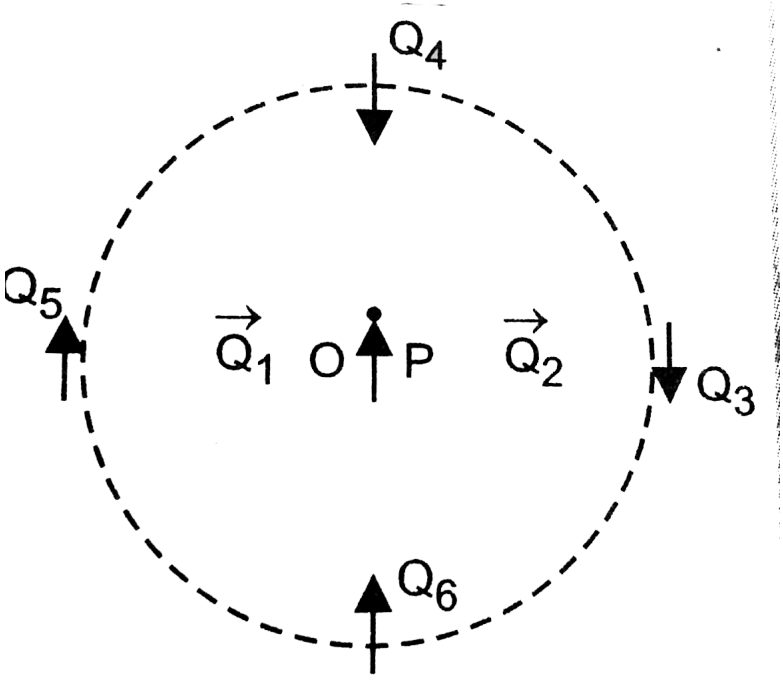
C. $\theta = \tan^{-1}\left(\frac{\tan\delta_1}{\tan\delta_2}\right)$

D. $\theta = \tan^{-1}(\tan\delta_1 - \tan\delta_2)$

Answer: C

Watch Video Solution

104. Figure shows a small magnetised needle P placed at a point O. The arrow shows the direction of magnetic moment. The other arrows show different positions (and orientations of the magnetic moment) of another identical magnetised needle Q.



(a) In which configuration is the system not in equilibrium?

(b) In which configuration is the system in (i) stable and (ii) unstable equilibrium?

(c) Which configuration corresponds to the lowest potential energy among all the configurations shown?

A. PQ_3

B. PQ_4

C. PQ_5

D. PQ_6

Answer: D

Watch Video Solution

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

A. 0.1T

B. 0.2T

C. 0.3T

D. 0.4T

Answer: A

 Watch Video Solution

106. Two magnets are held together in a vibration magnetometer and are allowed to oscillate in the earth's magnetic field with like poles togather, 12 oscillations per minute are made but for unlike poles togather only 4

oscillations per minute are axecuted. The ratio of their magnetic miments is

A. $3:1$

B. $1:3$

C. $3:5$

D. $5:4$

Answer: D

Watch Video Solution

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

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

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

C. $4:9$

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

Answer: B

Watch Video Solution

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

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

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

C. $\left(\frac{2\mu_0}{4\pi}\right)\frac{M}{d^3}$

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

Answer: D

Watch Video Solution

109. A short magnet oscillation in vibration magnetometer with a frequency 10Hz. A downward current of 15A is established in a long vertical wire placed 20cm to the West of

the magnet. The new frequency of the short magnet is (the horizontal of the component of earth's magnetic field is 12μ)

A. 4Hz

B. 2.5Hz

C. 9Hz

D. 15Hz

Answer: D

Watch Video Solution

110. Two bar magnets having same geometry with magnetic moments M and 2M, are firstly placed in such a way what their similar poles are same side then its time period of oscillation is T_1. Now the polarity of one of the magnet is reversed then time period of oscillation will be:-

A. $T_1 < T_2$

B. $T_1 > T_2$

C. $T_1 = T_2$

D. $T_1 = \infty, T_1 = 0$

Answer: A

Watch Video Solution

111. 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. $\frac{2}{3}s$

C. $2\sqrt{3}s$

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

Answer: B

Watch Video Solution

112. 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 Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: B

 Watch Video Solution

113. Assertion (A): It is not necessary that every magnet has one north pole and one south pole.

Reason (R): It is a basic fact that magnetic poles occur in pairs

A. If both Assertain and Reason are true and Reason is the correct explanation of

Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: D

Watch Video Solution

114. 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 Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: B

 Watch Video Solution

115. Assertion (A): The net magnetic flux coming out of a closed surface is always zero.

Reason (R): Unlike poles of equal strength exist together

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

 Watch Video Solution

116. Assertion:Horizontal component of eath's magnetic field (H) has been chosen as a magnetic element instead of the vertical component (V).

Reason: Most of our experiments are

performed in horizontal configuration. So, H is more relevant.

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

View Text Solution

117. Assertion:At neutral point, a compass needle may point out in any arbitrary direction.

Reason:Magnetic field of earth is balced by fied due to manetic at neutral point.

A. If both Assertain and Reason are true and Reason is the correct explanation of

Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

View Text Solution

118. Assertion (A): Steel is attracted by a magnet

Reason (R): Steel is a magnetic substance

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: C

Watch Video Solution

119. Assertion (A): Relative magnetic permeability has no units and no dimmensions

Reason (R): $\mu_r = \mu / \mu_0$, where the symbols have their standard meaning.

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

 Watch Video Solution

120. Assertion (A): If one arm of a $U-$ tube containing a diamagnetic solution is placed in between the poles of a strong magnet with the level in line with the field, the level of the solution falls,

Reason (R): Diamagnetic substances do not aligned with the field

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

 Watch Video Solution

121. 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 Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: D

 Watch Video Solution

122. Assertion (A): Earth's magnetic field inside a closed iron box is less as compared to the outside

Reason (R): The magnetic permeability of iron is low

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: C

 Watch Video Solution

123. 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 Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of

Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: B

Watch Video Solution

124. Assertion (A): $\chi - T$ graph for a diamagnetic material is a straight line parallel to $T -$ axis

Reason (R): This is because susceptibility of a

diamagnetic material is not affected by temperature

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

 Watch Video Solution

125. 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 Assertain and Reason are true and Reason is the correct explanation of

Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

 Watch Video Solution

126. Assertion (A): A magnetic suspended freely in an uniform magnetic field experiences no net force, but a torque that tends to align the magnet along the field when it is deflected form equilibrium position

Reason (R): Net force $mB - mB = 0$, but the forces on north and south poles being equal, unlike and parallel make up a couple that tends to align the magnet, along the field.

A. If both Assertain and Reason are true and Reason is the correct explanation of

Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

 Watch Video Solution

127. Assertion: Time period of vibration of a pair of magnets in sum position is always smaller than in difference position.

Reason: `T=2pi sqrt(I//MH), where symbols have their standard meaning.

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of

Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: B

Watch Video Solution

128. 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 Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: B

 Watch Video Solution

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

Reason: Soft iron has narrow hysteresis loop.

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: A

 Watch Video Solution

130. 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 Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of

Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: C

Watch Video Solution

131. With reference to magnetic dipole, match the tems of Column I with the tems of Column Ii and Choose the correct option from the

codes given below.

Column I		Column II
(A) Dipole moment	(p)	$-M \cdot B$
(B) Equatiorial field for a short dipole	(q)	$M \times B$
(C) Axial field for a short dipole	(r)	$-\mu_0 m / 4\pi r^3$
(D) External field : Torque	(s)	**m**
(E) External field : Energy	(t)	$\mu_0 2m / 4\pi r^3$

Watch Video Solution

132. Consider the expression for magnetic potential energy U_m obtained in previous question, match the tems of colum I with the tems of Column II and choose the correct

option from the codes given below.

	Column I		Column II
(A)	Potential energy at $\theta = 90°$	(p)	Minimum
(B)	Potential energy at $\theta = 0°$	(q)	Maximum
(C)	Potential energy at $\theta = 180°$	(r)	Zero

Watch Video Solution

133. Match the terms of Column I with the tems of Column II and choose the correct option from the codes given below.

	Column I		Column II
(A)	Negative susceptibility	(p)	Ferromagnetic
(B)	Positive and small susceptibility	(q)	Diamagnetic
(C)	Positive and large susceptibility	(r)	Paramagnetic

Watch Video Solution

134. Match the terms of Column I with the items of Column II and choose the correct option from the codes given below.

	Column I		Column II
(A)	Diamagnetic	(p)	$\mu >> \mu_0, \mu_r >> 1$ and $\chi >> 1$
(B)	Paramagnetic	(q)	$-1 \leq \chi < 0, \leq \mu_r < 1$ and $\mu < \mu_0$
(C)	Ferromagnetic	(r)	$0 < \chi < \varepsilon, 1 < \mu_r, < 1 + \varepsilon$ and $\mu > \mu_0$

Watch Video Solution

135. The magnetic susceptibility is negative for

A. paramagnetic material onty

B. ferromagnetic material only

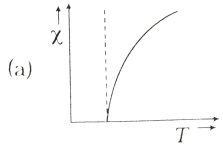
C. paramagnetic and ferromagnetic materials

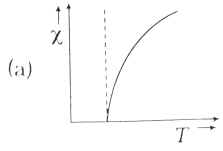
D. diamagnetic materials only

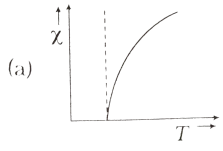
Answer: D

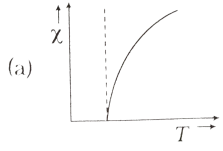
 Watch Video Solution

136. The variation of magnetic susceptibility χ with the temperature T of a ferromagnetic material can be plotted as

A. 

B. 

C. 

D. 

Answer: B

Watch Video Solution

137. Let r be the distance of a point on the axis of a magnetic dipole from its centre. The magnetic field at such a point is proportional to

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

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

C. $\frac{1}{r^3}$

D. none of these

Answer: C

Watch Video Solution

138. Let r be the distance of a point on the axis of a magnetic dipole from its centre. The magnetic field at such a point is proportional to

A. 16A

B. 8A

C. 4A

D. 2A

Answer: B

 Watch Video Solution

139. The effective length of magnet is 31.4cm and its pole strength is 0.8Am. The magnetic moment, if it is bent in the form of a semicircle in $A - m^2$.

A. 1.2

B. 1.6

C. 0.16

D. 0.12

Answer: C

Watch Video Solution

140. The vertical component of earth's magnetic field at a place is $\sqrt{3}$ times the

horizontal component the value of angle of dip at this place is

A. 60°

B. 30°

C. 45°

D. 0°

Answer: A

Watch Video Solution

141. A tangent galvanometer has a coil of 50 turns and a radius of 20cm. The horizontal component of the earth's magnetic field is $B_H = 3 \times 10^{-5} T$. Find the current which gives a deflection of 45°).

A. 0.39A

B. 0.29A

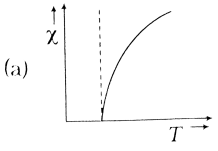
C. 0.19A

D. 0.09A

Answer: C

Watch Video Solution

142. The correct between intensity of magnestisation (I) and magnetic field (H) for a ferromagnetic substance is given by

A. 

B. 

C. 

D. 

Answer: B

View Text Solution

143. A bar magnet with magnetic moment $2.5 \times 10^3 JT^{-2}$ is rotating in horizontal plane in the space containing magnetic induction $B = 4 \times 10^5 T$. The work done in rotating the magnet slowly from a direction parallel to the field to a direction 45° from the field, is (in joule).

A. 0

B. 0.2

C. 0.03

D. 0.02

Answer: C

Watch Video Solution

144. Core of electromagnets are made of ferromagnetic materials which have

A. low permeability and high retentivity

B. high permeability and low retentivity

C. low permeability and low retentivity

D. high permeability and high retentivity

Answer: B

Watch Video Solution

145. If the magnetising field on a ferromagnetic material is increased, its permeability is

A. decrease

B. increase

C. is unaffected

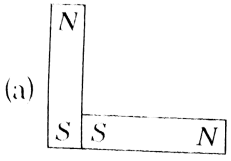
D. may be increase or decrease

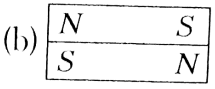
Answer: A

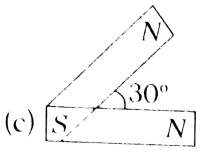
Watch Video Solution

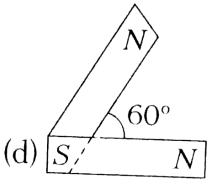
146. Following figures show the arrangement of bar magnets in different configurations. Each magnet has magnetic dipole moment

(m). Which configuration has highest value of magnetic dipole moment?

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

147. A bar magnet of moment M and pole strength m is cut into parts of equal lengths. The magetic moment and pole strength of either part is

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

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

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

D. M,n

Answer: C

Watch Video Solution

148. A susceptibility of a certain magnetic material is 400. What is the class of the magnetic material?

A. Diamagnetic

B. Paramagnetic

C. Ferromagnetic

D. Ferroelectric

Answer: C

Watch Video Solution

149. A paramagnetic sample shows a net magnetisation of $0.8A - m^{-1}$ when plced in an external mgnetic field of 0.8T at a temperature of 5K. Whent the same sample is placed in an external magnetic field of 0.4T at temperature of 20K, the magnetisation will be

A. $0.8Am^{-1}$

B. $0.8Am^{-2}$

C. $0.1Am^{-1}$

D. $0.1Am^{-2}$

Answer: C

Watch Video Solution

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

A. paramagnetic

B. anti-ferromagnetism

C. diamagnetism

D. no magnetic property

Answer: A

Watch Video Solution

151. The intensity of magnetization of a bar magnet is $5 \times 10^4 A - m^{-1}$. The magnetic length and the area of cross section of the magnet are 12cm and $1cm^{-2}$ respectively. The

magnitude of magnetic moment of this bar magnet (in SI unit) is.

A. 0.6

B. 1.3

C. 1.2

D. 2.4

Answer: A

 Watch Video Solution

152. The magnetic susceptibility of a material of a rod is 299. Permeability of vacuum μ_0

A. $3771 \times 10^{-7} Hm^{-1}$

B. $3771 \times 10^{-5} Hm^{-1}$

C. $3770 \times 10^{-6} Hm^{-1}$

D. $3771 \times 10^{-8} Hm^{-1}$

Answer: A

Watch Video Solution

153. A wire of length $Lmetre$, carrying a current Iampere is bent in the form of a circle . The magnitude of its magnetic moment in $MKSunits$.

A. $\frac{L^2I^2}{4\pi}$

B. $\frac{LI}{4\pi}$

C. $\frac{L^2I}{4\pi}$

D. $\frac{LI}{4\pi}$

Answer: C

Watch Video Solution

154. An alectron in a circular orbit of radius 0.05 mn performs $10^{16}\mathrm{rev}/s.$ the magnetic moment due to this ratation of electron is $(\in A - m^2).$

A. 2.16×10^{-23}

B. 3.21×10^{-22}

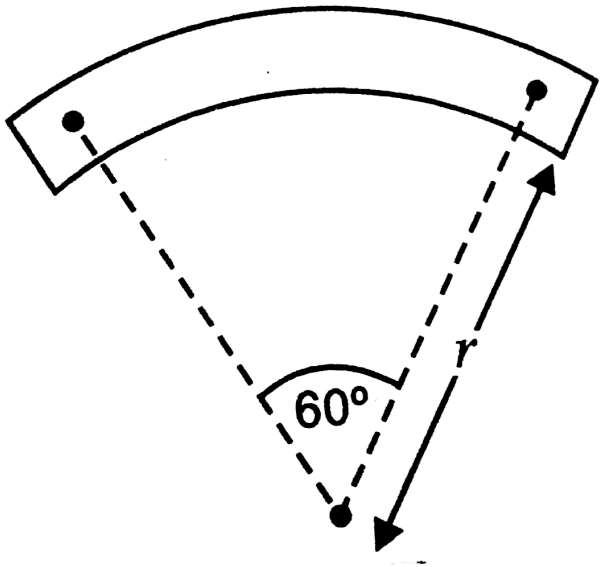
C. 3.21×10^{-24}

D. 1.26×10^{-23}

Answer: D

Watch Video Solution

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



A. M

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

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

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

Answer: B

Watch Video Solution

156. The horizontal and vertical components of earth's magnetic field at a place are 0.3G and

0.52G. The earth's magnetic field and the angle of dip are

A. $0.3G$ and $\delta = 30^\circ$

B. $0.4G$ and $\delta = 40^\circ$

C. $0.5G$ and $\delta = 50^\circ$

D. $0.6G$ and $\delta = 60^\circ$

Answer: D

Watch Video Solution

157. A bar magnet of pole strength 10A-m is cut into two equal parts breathwise. The pole strength of each magnet is

A. 5A-m

B. 10A-m

C. 15A

D. 15A-m

Answer: A

Watch Video Solution

158. A short magnet of magnetic induction fields B_1, B_2, B_3 values on this line at points which are at distance 30cm, 60cm and 90cm respectivley from the centre of the magnet is

A. $27:3:37:1$

B. $37.3:1:27$

C. $27:8:3.37$

D. $1:2:3$

Answer: A

Watch Video Solution

159. A bar magnet of moment of inertia I is vibrated in a magnetic field of inducton is $0.4 \times 10^{-4}T$. The time period period of vibration is 12 sec. The magnetic moment of the magnet is $120Am^2$. The moment of inertia of the magnet is ("in"kgm^(2))` approximately

A. 172.8×10^{-4}

B. 2.1×10^{-2}

C. 1.57×10^{2}

D. 1728×10^{-2}

Answer: A

Watch Video Solution

160. On heating a ferromagnetic substance above curie temperature

A. becomes paramagnetic

B. becomes diamagnetic

C. remains ferromagnetic with constant magnetic susceptibility

D. becomes electromagnetic

Answer: A

 Watch Video Solution

161. 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

B. 2

C. $1/2$

D. $1/4$

Answer: B

Watch Video Solution

162. 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

163. 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. $1 \times 10^{-4} NA^{-1} m^{-1}$

B. $2 \times 10^{-6} NA^{-1} m^{-1}$

C. $4 \times 10^{-2} NA^{-1} m^{-1}$

D. $6.64 \times 10^{-8} NA^{-1} m^{-1}$

Answer: B

Watch Video Solution

164. The horizontal component of the earth's magnetic field at a place is $3 \times 10^{-4} T$ and the dip is $\tan^{-1}\left(\frac{4}{3}\right)$. A metal rod of length $0.25m$ placed in the north -south position and

is moved at a constant speed of $10cm/s$ towards the east. The emf induced in the rod will be

A. $1\mu V$

B. $5\mu V$

C. $7\mu V$

D. $10\mu V$

Answer: D

Watch Video Solution

165. Assertion: Suceptibility is defined as the ration of intensity of magnetisation I to magnetic intensituy H.

Reason: Greater the value of susceptibility smaller the value of intensity of magnetisation I.

A. If both Assertain and Reason are true and Reason is the correct explanation of Assertain

B. If both Assertain and Reason are true but Reason is not correct explantion of

Assertain

C. If Assertion is true but Reason is false

D. If Assertion is false but Reason in true.

Answer: C

View Text Solution

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

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

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

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

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

Answer: D

Watch Video Solution

167. A steel wire of length l has a magnetic moment M. It is bent into a semicircular arc. What is the new magnetic moment?

A. $M \times l$

B. $\frac{M}{l}$

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

D. M

Answer: C

Watch Video Solution

168. An iron rod of volume $10^{-4}m^3$ and relative permeability 1000 is placed inside a long solenoid wound with $5\text{turns}/\text{cm}$. If a

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

A. $20Am^2$

B. $25Am^2$

C. $30Am^2$

D. $35Am^2$

Answer: B

Watch Video Solution

169. Two tangent galvanometers A and B have coils of radii $8cm$ and $16cm$ respectively and resistance 8Ω each. They are connected in parallel to a cell of emf $4V$ and negligible internal resistance. The deflections produced are 30° and 60° respectivley. A has 2 turns. What is the number of turns in B?

A. 18 turns

B. 12 turns

C. 6 turns

D. 2 turns

Answer: B

Watch Video Solution