PHYSICS

BOOKS - TARGET PHYSICS (HINGLISH)

MAGNETISM

Mcqs

1. The property of attracting small pieces of iron by a substance is referred as

A. magnetism

B. demagnetisation

C. magnetisation

D. electromagnetisation

Answer: A

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2. A magnet is referred to as magnetic dipole in which its pole

A. can be isolated

B. cannot be isolated

C. are fictitious

D. both B and C

Answer: D

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3. Which of the following is NOT the unit of magnetic induction?

A. Wb/m^2

B. tesla

C. N/A m

D. N m/a

Answer: D

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4. Magnetic lines of force are

A. continous

B. discountinous

C. always straight line

D. zig-zag lines

Answer: A

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5. Magnetic lines of force in external space and inside the magnetic dipole respectively go from

A. S-pole to N-pole and N-pole to S-pole

B. N-pole to S-pole and S-pole to N-pole

C. S-pole to N-pole in both cases

D. N-pole to S-pole in both cases.

Answer: B

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6. Magnetic flux is defined as number of magnetic lines of forces passing through a

given area, such that angle between the lines of forces and surface is

A. 0°

B. 45°

C. 90°

D. 120°

Answer: C

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7. The magnetic length of a dipole is

A. $\frac{5}{6} \times$ geometric length

B. $\frac{1}{2} \times$ geometric length

C. $2 \times$ geometric length

D. $\frac{6}{3} \times$ geometric length

Answer: A

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8. The pole strength of a magnet is

A. vector quantity with SI unit A m

B. scalar quantity with SI unit A/m

C. vector quantity with SI unit A/m

D. scalar quantity with SI unit A m

Answer: D

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9. The magnitude of magnetic induction at a point in a magnetic field of area 25 cm and magnetic flux $5 \times 10^{-4} Wb$ is

A. 0.02 T

B. $0.2 Wb/m^2$

C. 200 gauses

D. 0.02N/A m

Answer: B

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10. The total magnetic moment of an atom is due to

A. orbital motion of electrons.

B. spin motion of electrons.

C. both (A) and (B).

D. existence of protons in nucleus.

Answer: C

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11. The net magnetic moment of an atom becomes zero, if atomic magnetic moments are oriented in

A. random directions.

B. specific direction.

C. parallel to each other.

D. perpendicular to each other.

Answer: A

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12. In a conductor, moving electric charges

A. magnetic field

B. electric field

C. gravitational field

D. thermionic effect

Answer: A

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13. The cause of magnetisation of matter lies with

A. motion of electrons.

B. charge on electrons.

C. distance between the nucleus and outermost electron.

D. both (A) and (B).

Answer: D

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14. Which of the following represents correct relationship between total magnetic moment (M), orbital magnetic moment (M_0) and spin magnetic moment (M_s)?

A. $M = \frac{M_0}{M_s}$

B. $M = M_0 \times M_s$

C. $M = M_0 + M_s$

D. $M = M_0 - M_s$

Answer: C

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15. Which of the following is NOT true about magnetic dipole moment?

A. It is the product of pole strength and magnetic length.

B. SI unit of magnetic dipole moment is joule/tesla.

C. It is a vector quantity directed from '-m' to + 'm'.

D. It depends on the area of cross section of magnet.

Answer: D

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16. A bar magnet has geometric length $4.8 \times 10^{-2} m$. The magnet moment of bar magnet, of pole strength 20A m is?

A. $0.8 Am^2$

B. $0.6Am^2$

C. $0.4Am^2$

D. $1Am^2$

Answer: A

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17. The magnetic moment of a current carrying loop whose circumference with radius 'r' is equal to the perimeter of square with length / is

A. $2\pi r^2 l$

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

C. $\frac{4Il^2}{\pi}$

D. $\frac{4\pi l^2}{I}$

Answer: C

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18. The direction of magnetic moment of a current carrying circular coil is

A. along the circumference, in clockwise direction.

B. along the axis, perpendicular to the plane.

C. along anticlockwise direction.

D. along the equator in straight line. The circumference.

Answer: B

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19. A current carrying coil represents

A. an electric dipole

B. a magnetic dipole

C. a bar magnet

D. a horse shoe magnet

Answer: B

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20. When a current carrying coil is suspended in. uniform magnetic induction B, the magnitude of torque acting on it is given by

A. $MB\cos\theta$

B. $nIAB\sin\theta$

C. $nIAB\cos\theta$

D. MB

Answer: B

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21. An arrangement of a long insulated wire wound in a closely packed helix represents

A. solenoid

B. electric dipole

C. magnetic needle

D. galvometer

Answer: A

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22. Suppose we wish to have a current carrying coil equivalent to a magnet with moment $10Am^2$. When the coil has 75 turns and carries a current of 120 mA, the area of the coil is

A. $0.1cm^2$

B. $1.1m^2$

C. $1.2m^2$

D. $11.2m^2$

Answer: B

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23. A torque of 25 N m acts on a current carrying coil of area $5m^2$ and magnetic moment $2Am^2$ in a magnetic field of induction $2Wb/m^2$. The angle between normal to coil and magnetic induction is 30°. Then value of current is

A. 0.4A

B. 0.5A

C. 400mA

D. 5A

Answer: D

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24. The magnetic induction at a point distant 15 cm on the axis of a short bar magnet of moment 0.5 A m is

A. $3 \times 10^{-5} Wb/m^2$

B. $3 \times 10^{-8} Wb/m^2$

C. $3 \times 10^{-11} Wb/m^2$

D. $4 \times 10^{-5} Wb/m^2$

Answer: A

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25. The magnetic moment of a bar magnet is equal to the moment of couple when magnet is kept

A. parallel to uniform magnetic field of unit induction.

B. perpendicular to uniform magnetic field of unit induction.

C. parallel to uniform magnetic field of any induction.

D. perpendicular to uniform magnetic field of any induction.

Answer: B

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26. The torque acting on a magnet of magnetic moment 'M' placed in a uniform magnetic field B is

A. perpendicular to $\vec{M}$, parallel to $\vec{B}$

B. parallel to $\vec{M}$, perpendicular to $\vec{B}$

C. perpendicular to both $\vec{M}$ and $\vec{B}$

D. parallel to both $\vec{M}$ and $\vec{B}$.

Answer: C

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27. The ratio of torque acting on a magnet of magnetic moment M' placed in uniform magnetic field when angle between

$\overrightarrow{M}$ and $\overrightarrow{B}$ are 90° and 0° respectively is magnetic field, it experiences

A. 1

B. 0

C. ∞

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

Answer: C

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28. A bar magnet is placed inside a uniform magnetic field, What does in experience?

A. only force

B. only torque

C. both force and torque

D. no force, n torque

Answer: B

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29. If the magnitude of torque is equal to the magnetic dipole moment and the axis of magnet is perpendicular to the field then the magnitude of magnetic induction is

A. 1 gauss

B. $1Wb/m^2$

C. 10^4 gauss

D. both B and C

Answer: D

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30. The study of earth's magnetic field is called as

A. geographic magnetism.

B. terrestrial magnetism.

C. geomagnetism.

D. both (B) and (C).

Answer: D

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31. Which of the following is true about axis of earth's magnetic dipole and axis of rotation of the earth?

A. They coincide with each other.

B. They are mutually perpendicular.

C. The magnetic axis is inclined at an angle 11.5° to axis of rotation of the earth.

D. They are parallel to each other.

Answer: C

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32. The direction of earth's magnetic field at any place is specified in terms of

A. magnetic induction at meridian.

B. magnetic field declination.

C. magnetic field inclination.

D. both (B) and (C).

Answer: D

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

A. magnetic declination

B. magnetic inclination

C. angle of dip

D. both (B) and (C)

Answer: A

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34. The angle between earth's magnetic field at a given place and the horizontal is known as.....

A. angle of dip

B. magnetic declination

C. magnetic inclination

D. both (A) and (C)

Answer: D

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35. The angle of dip at any place on earth's surface lies between

A. 0° to 90°

B. 90° to 360°

C. 0° to 180°

D. 90° to 270°

Answer: A

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36. At a given place let angle of dip be 30° then the vertical component of earth's magnetic induction is

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

B. B

C. 0

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

Answer: D

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37. At a particular place, horizontal and vertical components of earth's magnetic field are equal. The angle of dip at that place is..... .

A. 60°

B. 0°

C. 45°

D. 30°

Answer: C

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38. The earth's magnetic field

A. varies in direction but not in magnitude.

B. varies in magnitude but not in direction.

C. varies both in magnitude and direction.

D. remains constant.

Answer: C

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39. A vertical plane passing through the magnetic north and south pole of the earth is.....

A. geographic axis

B. geographic meridian

C. magnetic meridian

D. magnetic equator

Answer: C

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40. The strength of the earth's magnetic field is

A. $10^{-4}Wb$

B. 10^{-4} tesla

C. 10^{-4} A m

D. 10^{2}gauss

Answer: B

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41. Which of the following statements is true?

A. The magnetic meridian coincides with geographic meridian.

B. The angle between magnetic meridian and geographic meridian is angle of dip.

C. The magnetic declination is same at all places on earth.

D. Magnetic equator is a great circle on the surface of the earth, perpendicular to the magnetic axis.

Answer: D

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42. The direction of earth's magnetic field is horizontal and vertical respectively at

A. magnetic equator, geographical poles.

B. magnetic equator, magnetic poles.

C. geographical equator, magnetic poles.

D. geographical equator, geographical poles.

Answer: B

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43. Soft iron is used for making electromagnet because it

A. has low retentivity.

B. has low coercivity.

C. small hysteresis loss.

D. all of these.

Answer: D

44. Which of the following are uses of electromagnets?

A. To lift ferromagnetic substances such as iron.

B. In circuit brakers, braking system of train.

C. Used in charged particles accelerators (cyclotrons).

D. All of these.

Answer: D

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45. Strength of electromagnet can be increased by

A. decreasing current in the coil.

B. decreasing number of turns.

C. using core of high permeability.

D. using core of low permeability.

Answer: C

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46. The magnetic induction due to a bar magnet at a point on its axis is directed from

A. N-pole to S-pole

B. S-pole to N-pole

C. $-m \text{to} \quad +m$

D. both (B) and (C)

Answer: D

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47. 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. $1:2$

C. $2:1$

D. $3:1$

Answer: C

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48. Two points A and B are situated perpendicular to the axis of 4 cm long bar magnet at a distance x and 3x from its centre on opposite sides. The ratio of magnetic inductions at A and B will be equal to

A. $27:1$

B. $2:9$

C. $6:8$

D. $1:27$

Answer: A

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49. The magnetic induction due to short magnetic dipole of moment $0.1\ \mathrm{A\,m^2}$ at equatorial point cm away from centre of dipole is $\left(\mu_0 = 4\pi \times 10^{-7} Wb/Am\right)$

A. 0.1T

B. 0.01T

C. 0.00T

D. 0.001T

Answer: B

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50. The magnetic induction due to a bar magnet of length $6 \times 10^{-2} m$ and pole strength $5 \times 10^{-3} m$ at a point 0.1 m away from the centre and along the equator

A. $3 \times 10^{-9} N / Am$, directed from N-pole to S-pole

B. $3 \times 10^{-8} N / Am$, directed from S-pole to N-pole.

C. $3 \times 10^{-8} T$, directed from S-pole to N-pole

D. $3 \times 10^{-9} T$, directed from S-pole to N-pole.

Answer: B

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51. Using mass (M), length (L), time (T) and current (A) as fundamental quantities, the dimensions of permeability are :

A. $\left[M^1L^1T^{-2}A^1\right]$

B. $\left[M^1L^1T^{-1}A^{-1}\right]$

C. $\left[M^2L^1T^2A^{-1}\right]$

D. $\left[M^1L^1T^2A^{-2}\right]$

Answer: D

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52. The magnetic induction at a point on axis or equator is proportional to n" power of distance from centre where n is

A. 3

B. -3

C. -2

D. 2

Answer: B

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53. When a bar magnet is placed in a non-uniform magnetic field, it performs

A. rotational motion.

B. translational motion.

C. rectilinear motion.

D. both (A) and (B).

Answer: D

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54. In order to have a strong electromagnet it must have

A. high value of saturation magnetisation.

B. low retentivity.

C. low hysteresis loss.

D. all of these.

Answer: D

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55. Earth's magnetic field always has a horizontal component except at

A. equator.

B. magnetic pole.

C. latitude of 60°.

D. an inclination of 60°.

Answer: B

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56. Each pole of magnet of length 20 cm in a magnetic field of induction 0.2 T experiences a force 20 N. The magnetic moment of magnet is

A. $20Am^2$

B. $15Am^2$

C. $10Am^2$

D. $5Am^2$

Answer: A

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57. If the moment of a magnet is $0.4Am^{-1}$ and force seting on esch pote in a uniform magnetic field of induction $3.2 \times 10^{-5}\mathrm{Wb/m^2}$ is $5.12 \times 10^{-5}N,$ the dstance berween the poles of magnet is

A. 25cm

B. 16cm

C. 12.5cm

D. 12cm

Answer: A

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58. If at a given place the earth's magnetic inchretion B is 5×10^{-4} tesla and the horizontal component B_H is 3 gauss then vertical component B_V is

A. 4×10^{-4} gauss

B. 5 gauss

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

D. $3.5 \times 10^{-4} T$

Answer: C

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59. The torque acting on a magnetie dipole of moment $5Am^2$ when placed in an external uniform magnetic induction $1.5 \times 10^{-4}\ \mathrm{Wb/m^2}$ at right angle to magnetic induction is

A. $7.5 \times 10^{-4} Nm$

B. $75 \times 10^{-4} Nm$

C. $1.25 \times 10^{-5} Nm$

D. $1.5 \times 10^{-4} Nm$

Answer: A

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60. The number of electrons flowing in a current carrying circular coil per second having area of $2m^2$ and magnetic moment of $8 \ \text{A m}^2$ is

A. 5×10^{18}

B. 2.5×10^{18}

C. 25×10^{18}

D. 6.25×10^{18}

Answer: C

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61. The vector sum of magnetic moments of all electrons inside the atom is the

A. magnetic moment of proton.

B. magnetic moment of neutron.

C. magnetic moment of atom.

D. average magnetic moment of electron.

Answer: C

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62. 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. Assertion is True, Reason is True,

Reason : is a correct explanation for Assertion:

B. Assertion is True, Reason is True,

Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

Answer: C

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63. A small hole is made at the centre of the magnet then its magnetic moment

A. increases

B. decreases

C. does not change

D. none of these

Answer: C

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

A. 

B. 

C. 

D. 

Answer: C

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65. The current carrying loop behaves as magnetic dipole because,

A. upper face of loop behaves as south pole and lower as north pole.

B. lower face of loop behaves as south pole and upper face as north pole.

C. one face of loop behaves as south pole and other face as north pole.

D. Both faces of loop keep switching between north and south pole respectively.

Answer: C

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66. The number of small magnetic dipoles in a solenoid is proportional to

A. number of turns (N)

B. amount of current flow

C. magnetic induction

D. permeability

Answer: A

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67. 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. $4\pi IM$

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

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

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

Answer: B

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

A. perpendicular to the field of the earth.

B. parallel to the vertical component of the earth's field.

C. at an angle of 33° with respect to the N-S direction.

D. along the North-South (N-S) direction.

Answer: A

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

A. $\theta = 0^\circ$

B. $\theta = 45^\circ$

C. $\theta = 60^\circ$

D. $\theta = 90^\circ$

Answer: A

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

A. 12N/m

B. 18N/m

C. 0.9N/m

D. 1.6N/m

Answer: C

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71. 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° A bar magnet is held perpendicular to

A. 30°

B. 45°

C. 60°

D. 90°

Answer: C

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72. If a needle is suspended at different places on earth then needle becomes exactly vertical and horizontal respectively along

A. magnetic axis only.

B. magnetic equator only.

C. magnetic axis and magnetic equator.

D. magnetic equator and magnetic axis.

Answer: C

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73. The lines of force of earth's magnetic field will be perpendicular to earth's surface

A. at all positions.

B. near the poles.

C. near the equator.

D. at the centre of the earth.

Answer: B

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74. 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

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75. A ship is to reach a place 10° south of west. In what direction should it be steered if declination at the place is 17° west?

A. 73° west of magnetic north.

B. 27° west of magnetic south

C. 83° west of magnetic north.

D. 7° east of magnetic south.

Answer: C

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

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

Answer: C

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77. Magnetic induction due to a short magnet at a point 100 mm from the centre of magnet on equatorial line is $10\mu T$. The magnetic moment of the magnet is

A. $2Am^2$

B. $0.5Am^2$

C. $0.1Am^2$

D. $10Am^2$

Answer: C

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78. Two identical magnetic dipoles of magnetic moments $1 \cdot 0Am^2$ 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. $2 \times 10^{-7} T$

Answer: B

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79. When a bar magnet of pole strength 'm' and magnetic moment 'M' is cut into n equal parts longitudinaly and transversely then pole

strength and magnetic moment of each piece is respectively

A. $m/n, M/n$

B. $m/n, M/n^2$

C. $m/n^2, M/n$

D. $m/n^2, M/n^2$

Answer: B

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80. The magnetic induction at a point 1000 mm from the centre of the dipole alor is equal in magnitude to the earth's horizontal component of magnetic field. The angle of dip δ is such that $\cos\delta = \sin\delta$ and $B_v = 5 \times 10^{-4}T.$ The magnetic dipole moment is

A. $4 \times 10^3 Am^2$

B. $5 \times 10^3 Am^2$

C. $5 \times 10^{-4} Am^2$

D. $4 \times 10^4 Am^2$

Answer: B

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81. A magnetising field of 1600 A/m produces a magnetic flux of $2.4 \times 10^{-5} Wb$ in a bar of iron of cross section 0.2cm^2. Then permeability of the bar is the equator

A. $7.5 \times 10^{-4} TA^{-1} m$

B. $7.5 \times 10^{-4} TAm^{-1}$

C. $7.5 \times 10^{-3} TAm$

D. $7.5 \times 10^{-2} TAm^{-1}$

Answer: A

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82. According to the Atomic theory, on heating a magnet, the thermal energy of the elementary magnet

A. decreases

B. increase

C. remains the same

D. increase to a certain value then reamains constant.

Answer: B

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83. The north pole of a magnet is brought near a stationary negatively charged conductor. Will the pole experience any force?

A. Yes

B. No

C. Can't say

D. Depends on the magnitude of pole strength.

Answer: B

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84. The orbital speed of an electron orbiting around the nucleus in a circular orbit of radius r is v. Then the magnetic dipole moment of the electron will be

A. ever

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

C. $\frac{ev}{2r}$

D. $\frac{vr}{2e}$

Answer: B

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85. Which of the following is a vector quantity?

A. Pole strength

B. Permeability

C. Magnetic lines of force

D. Magnetic pole

Answer: C

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86. Choose the correct statement/s:

(i) Magnetic field lines try to expand in length.

(ii) Magnetic field lines repel each other laterally.

(iii) Magnetic field lines attract each other laterally.

(iv) Magnetic field lines are crowded in region where magnetic induction has least value.

A. i

B. ii

C. iii,iv

D. iv,i

Answer: B

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87. 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. Assertion is True, Reason is True, Reason is a correct explanation for is Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False,

Answer: D

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88. 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. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for

Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

Answer: A

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89. The electron in a hydrogen atom is moving with a speed of $2 \cdot 3 \times 10^6 ms^{-1}$ in an orbit of radius $0 \cdot 53 \overset{o}{A}$. Calculate the magnetic moment of revolving electron.

A. $8.75 \times 10^{-24} Am^2$

B. $9.75 \times 10^{-24} Am^2$

C. $2.75 \times 10^{-24} Am^2$

D. $9.75 \times 10^{-20} Am^2$

Answer: B

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90. Two lines of force due to a bar magnet

A. intersect at the neutral point.

B. intersect near the poles of the magnet.

C. intersect on the equatorial axis of the magnet.

D. do not intersect at all.

Answer: D

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

A. 

B. 

C. 

D. 

Answer: D

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

A. 12cm

B. 10cm

C. 8cm

D. 14cm

Answer: A

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93. Unit of magnetic flux density (or magnetic induction) is

A. tesla

B. $\text{weber}/\text{metre}^2$

C. newton/ampere-metre

D. all of the above

Answer: D

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94. 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

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

C. $\frac{m}{4}$

D. $\frac{m}{8}$

Answer: B

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95. What is magnetic dipole moment? Calculate the magnetic dipole moment of a revolving electron.

A. scalar quantity

B. constant quantity

C. vector quantity

D. pseudo vector

Answer: B

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96. 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 is...$A - m^2$.

A. 1.6

B. 1.2

C. 0.16

D. 0.12

Answer: C

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97. 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. 2M

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

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

Answer: C

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

A. $\frac{\sqrt{M}}{2\pi}$

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

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

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

Answer: D

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

C. $\frac{M}{4}$

D. 2M

Answer: B

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100. A coil of length L, carries a current i. The magnetic moment of coil is proportional to

A. L

B. L^2

C. L^{-1}

D. L^{-2}

Answer: B

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101. A wire of length l, carrying current i, is bent in circle of radius r, then magnetic momennt at centre of loop is

A. $\frac{l^2 i}{2\pi}$

B. $\frac{l^2 i}{4\pi}$

C. $\frac{l i^2}{2\pi}$

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

Answer: B

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102. A bar magnet of moment M is placed in a magnetic field of indiction B. The torque exerted on it is

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

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

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

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

Answer: C

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103. 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 act along the same line.

D. the forces are perpendicular to each other.

Answer: D

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

A. $50N - m$

B. 25 N-m

C. 20N-m

D. 15N-m

Answer: B

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105. 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. $7.5 \times 10^{-4}N - m$

B. $3.0 \times 10^{-4}N - m$

C. $1.5 \times 10^{-4}N - m$

D. $6.0 \times 10^{-4}N - m$

Answer: C

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

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

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

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

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

Answer: B

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107. A closely wound solenoid of 2000 turns and area of cross-section $1.5 \times 10^{-4} m^2$ carries a current of $2.0 A$. It is suspended through its centre and perpendicular to its length, allowing it to turn in a horizontal plane in a uniform magnetic field 5×10^{-2} tesla making an angle of 30° with the axis of the solenoid. The torque on the solenoid with the

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

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

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

D. $3 \times 10^{-2} N - m$

Answer: C

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108. Magentic meridian is a

A. point

B. horizontal plane

C. vertical plane.

D. line along N-S

Answer: C

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109. The relation between B_H, B_v, and B is

A. $B = \sqrt{B_v^2 + B_H^2}$

B. $B = B_H . B_V$

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

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

Answer: A

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110. Direction of magnetic field at equatorial point

A. parallel to $\overrightarrow{M}$

B. perpendicular to $\overrightarrow{M}$

C. making an angle of 45° with $\overrightarrow{M}$.

D. antiparallel to $\overrightarrow{M}$

Answer: D

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

A. 45°

B. 30°

C. zero

D. 90°

Answer: D

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112. Angle of dip is zero at

A. poles

B. between poles of equator.

C. equator

D. none of these

Answer: C

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113. 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_0

B. $\sqrt{2}B_0$

C. $2B_0$

D. B_0^2

Answer: B

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114. At certain place, the horizontal component of earth's magnetic field is 3.0G and the angle dip at the place is 30°. The magnetic field of earth at that location

A. 4.5G

B. 5.1G

C. 3.5G

D. 6.0G

Answer: C

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

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

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

C. $\tan^{-1}(1.518)$

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

Answer: C

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116. 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. 30°

B. 60°

C. 45°

D. 90°

Answer: A

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117. 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. 30°

B. 60°

C. 45°

D. 0°

Answer: B

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118. The angle of dip at a place is 37° and the vertical component of the earth's magnetic field is $1.6 \times 10^{-5} T$. The earth's magnetic field at this place is $\left(\tan 37^\circ = \frac{3}{4}\right)$

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

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

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

D. $10^{-4} T$

Answer: D

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119. The Earth's magnetic field at some place on magnetic equator of Earth is $0.5 \times 10^{-4} T$. Consider the radius of Earth at that place as 6400 km. Then, magnetic dipole moment of the Earth is ....Am^2 $\left(\mu = 4\pi \times 10^{-7} TmA^{-1}\right)$

A. 1.05×10^{23}

B. 1.31×10^{23}

C. 1.15×10^{23}

D. 1.62×10^{23}

Answer: B

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

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

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

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

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

Answer: A

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121. 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: B

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

A. high susceptibility and low retentivity,

B. low susceptibility and high retentivity,

C. low susceptibility and low retentivity.

D. high susceptibility and high retentivity,

Answer: A

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123. Consider a point on an equatorial axis of a short bar magnet. The direction of magnetic field at that point is

A. antiparallel to magnetic moment

B. parallel to magnetic moment

C. perpendicular to magnetic moment

D. arbitary depended on a distance of a point from centre of the magnet

Answer: A

 Watch Video Solution

124. 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:

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

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

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125. The bar magnet produces magnetic induction of $4 \times 10^{-5} T$ at a point 10 cm from centre on the axis of magnet. The magnetic moment is The bar magnet produces magnetic induction

A. $0.2 Am^2$

B. $0.002 Am^2$

C. $2 Am^2$

D. $0.02 Am^2$

Answer: A

Watch Video Solution

126. The magnetic induction at a point P on the axis is equal to the magnetic induction at a point Q on the equator of a short magnetic dipole. What is the ratio of the distances of P and Q from the centre of the dipole?

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

B. 2

C. $2^{1/3}$

D. $2^{1/2}$

Answer: C

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127. Two identical short bar magnets, each having magnetic moment of $10Am^2$, are arranged such that their axial lines are perpendicular to each other and their centres be along the same straigh line in a horizonetal

plane. If the distance between their centres is $0.2m$, the resultant magnetic induction at a point midway between them is $(\mu_0 = 4\pi \times 10^{-7} Hm^{-1})$

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

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

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

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

Answer: D

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128. Two short bar magnets of length $1cm$ each have magnetic moments $1.20Am^2$ and $1.00Am^2$ respectively. They are placed on a horizontal table parallel to each other with their N poles pointing towards the south. They have a common magnetic equator and are separted by a distance of $20.0cm$. The value of the resultant horizontal magnetic induction at the mid - point O of the line joining their centres is close to (Horizontal

component of earths magnetic induction is $3.6 \times 10.5 Wh/m^2$

A. $3.6 \times 10^{-5} Wb/m^2$

B. $2.56 \times 10^{-4} Wb/m^2$

C. $3.50 \times 10^{-4} Wb/m^2$

D. $5.80x10^{-4} Wb/m^2$

Answer: B

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129. The ratio of magnetic fields due to a bar magnet at the two axial points P_1 and P_2 which are separated from each other by 10 cm is 25 :2 . Point P_1 is situated at 10 cm from the centre of the magnet. Magnetic length of the bar magnet is (Points P_1 and P_2 are on the same side of magnet and distance of P_2 from the centre is greater than distance of P_1 from the centre of magnet)

A. 5cm

B. 10cm

C. 15cm

D. 20cm

Answer: B

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130. Which magnaie feld is closer to that of a bar

A. A straight wire carrying a direst current.

B. A sraight wire carrying am alternating

C. Alop carying a direct current.

D. A loop catrying an alternating current.

Answer: C

Watch Video Solution

131. A circular loop and a square loop are formed from the same wire and the same current is passed through them . Find the ratio of their dipole moments.

A. 4

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

C. 2

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

Answer: D

Watch Video Solution

132. A charge Q is spread uniformly over an insulated ring of radius R.What is the

magnetic moment of the ring if it is rotated with an angluar velocity ω about its axis?

A. $\frac{q\omega R^2}{2}$

B. $\frac{q\omega R}{2}$

C. $q\omega R^2$

D. $\frac{q\omega}{2R}$

Answer: A

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133. At neutral point, the horizontal component of the magnetic field due to a magnet is

A. equal to earth's horizontal magnetic field.

B. in the same direction of the earth's horizontal magnetic field.

C. in the opposite direction of the earth's horizontal magnetic field.

D. both (A) and (C).

Answer: D

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

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

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

Answer: B

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

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

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

C. $\sqrt{3}W$

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

Answer: C

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136. A circular coil of diameter 10 cm is placed in a magnetic field of induction $2 \times 10^{-4} T$. The magnitude of flux linked with coil when the plane of coil makes an angle 45° with the field is

A. $\sqrt{3}\pi \times 10^{-8} Wb$

B. $10\pi \times 10^{-8} Wb$

C. $10^{-8}Wb$

D. $25\sqrt{2}\pi \times 10^{-8}Wb$

Answer: D

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137. Assertion: The magnetic poles of earth do not coincide with the geographic poles.

Reason: The discrepancy between orientation of a compass and true north-south direction is known as magnetic declination.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

Answer: A

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138. 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. magnetic compass loses magnetism at low temperature.

D. the magnetic field near the poles is almost parallel.

Answer: B

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139. 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. zero

B. $\sqrt{3}B_H$

C. $2B_H$

D. $\sqrt{5}B_H$

Answer: D

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140. The angle of dip at a place is δ. If the dip is measured in a plane makinng an angle θ with the magnetic merdian, the apparent angle of dip δ_1 will be

A. $\tan^{-1}(\tan\delta\sec\theta)$

B. $\tan^{-1}(\tan\delta\sin\theta)$

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

D. $\tan^{-1}(\tan\delta\text{cosec}\theta)$

Answer: A

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141. A short bar magnet is placed in the magnetic meridian with its north pole pointing towards geographical south. A

neutral point is found at a distance of 30 cm from the centre of the magnet. If the horizontal component of earth's field is 0.4G , calculate the magnetic moment of the magnet .

A. $7.44\text{ampere} \times \text{metre}$

B. $77.4\text{ab-ampere} \times cm$

C. $18.5\text{ampere} \times \text{metre}$

D. $185\text{ab-ampere} \times cm$

Answer: B

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142. The valence electron in the lithium atom is moving with a speed of $1.8 \times 10^6 \mathrm{m/s}$ in an orbit of radius 152 Å. Neglecting presence of other electrons in the atom, the magnetic moment of the valence electron is

A. $2.19 \times 10^{-21} Am^2$

B. $2.19 \times 10^{-23} Am^2$

C. $4.38 \times 10^{-23} Am^2$

D. $4.38 \times 10^{-24} Am^2$

Answer: A

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143. Two short magnets with pole strengths of 100 ab ampere-cm and 64 ab ampere-cm are placed with their axes in the sarme vertical line, with similar poles facing each other, Each magnet has a length of 1 cm. When separation between the nearer poles is 1 cm, the weight of upper magnet is supported by the repulsive force between the magnets. If

$g = 1000 \ \mathrm{cm/s^2}$, then the mass of upper magnet is

A. 10g

B. 5.5g

C. 3.9g

D. 7.5g

Answer: C

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144. When magnetised, length of an iron bar

A. increases

B. decreases

C. does not change

D. becomes smaller than magnetic length.

Answer: A

 Watch Video Solution

145. A bar magnet is placed with its north pole towards geographic north. The neutral point

A. on the axial line.

B. on the equatorial line.

C. in between axial and equatorial line.

D. at 30° with the axial line.

Answer: B

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146. A solenoid has a core of inner radius 20 cm and outer radius 22 cm around which 3000 turns of wire are wound. If the current in the wire is 10 A, the field along the axis at distance of 2 m from the centre is given by

A. $1.4 \times 10^{-4} T$

B. $0.4 \times 10^{-4} T$

C. $1.04 \times 10^{-4} T$

D. $1.004 \times 10^{-4} T$

Answer: C

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147. Choose the incorrect statement.

A. Nickle possesses property of induced magnetism.

B. Magnetic monopole does not exist.

C. Two magnetic poles separated by a small finite distance obey Coulomb's law of magnetic force.

D. In a bar magnet, attraction is maximum at centre,

Answer: D

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148. Draw magnetic field lines due to a U-shaped magnet.

A. 

B. 

C. 

D. 

Answer: A

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149. A ship is sailing due west according to Mariner's compass. If thedeclination of the place is 18° cast, what is the true direction of ship?

A. 72° west of south

B. 18° west of north

C. 72° west of north

D. 18° east

Answer: C

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150. The earth's magnetic field at the equator is approximately $0 \cdot 4G$, Estimate the earth's dipole moment.

A. $3.7 \times 10^{23} Am^2$

B. $\sqrt{2} Am^2$

C. $1.5 \times 10^{23} Am^2$

D. $1.05 \times 10^{23} Am^2$

Answer: D

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