PHYSICS

BOOKS - MARVEL PHYSICS (HINGLISH)

MAGNETISM

Mcq

1. Magnetic field produced by electrons in aotms and molecules is due to their -

A. spin motion only

B. orbital motion only

C. spin and orbital motion

D. neither spin nor orbital motion

Answer: C

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

A. a magnetic pole

B. a magnetic dipole

C. an electric dipole

D. an electromagnet

Answer: B

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3. A large magnet of length 25 cm is broken into two pieces of length 15 cm and 10 cm

respectively. The pole strengths of the two pieces will be in the ratio of

A. $1:1$

B. $3:2$

C. $2:3$

D. $2:1$

Answer: A

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4. A current carrying small loop behaves like a small magnet. If A be its area and M its magnetic moment, the current in the loop will be

A. $\frac{M}{A}$

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

C. MA

D. M^2A

Answer: A

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

A. Horizontal

B. Vertical

C. Any directions

D. At 45° to the horizontal

Answer: B

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6. The fiels produced by a bar magnet is similar to the field produced by a current carrying

A. Straight conductor

B. Rectangular coil

C. Solenoid

D. Circular coil

Answer: C

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7. The magnetic dipole moment of a bar magnet of geometric length 6 cm and pole strength 100 Am is

A. $2.5Am^2$

B. $10Am^2$

C. $5Am^2$

D. $7.5Am^2$

Answer: C

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8. Which one of the following is a unit of magnetic dipole moment?

A. ampere/metre^2

B. joule per tesla $\left(JT^{-1}\right)$

C. ampere metre

D. joule-tesla

Answer: B

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9. 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. $\frac{2L}{\pi}$

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

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

D. $\frac{3L}{2\pi}$

Answer: A

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10. A magnetic dipole has a magnetic moment of $5Am^2$. What is its pole strength if its magnetic length is 10 cm?

A. 30 Am

B. 40 Am

C. 50 Am

D. 60 Am

Answer: C

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11. A current of 1 A passes through a circular coil of 120 turns, each of radius 50 cm. What is the magnetic moment of the coil?

A. $45.5am^2$

B. $64.3Am^2$

C. $81.5Am^2$

D. $94.2Am^2$

Answer: D

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12. Magnetic moment of a magnet is

A. a scalar

B. a vector which is directed from N-pole to S-pole

C. a vector which is directed from S-pole to N-pole

D. is the product of its pole strength and the geometric length

Answer: C

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13. The magnetic dipole moment of current loop is independent of

A. Current in coil

B. no. of turns of coil

C. strength of magnetic field

D. area of coil

Answer: C

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14. A magnetic field exerts no force on

A. a moving charge

B. a magnet

C. an unmagnetised iron bar

D. a stationary charge

Answer: D

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15. What is the geomwtric length of a bar magnet having pole strength 60 Am and magnetic moment $6Am^2$?

A. 20 cm

B. 8 cm

C. 12 cm

D. 0.1 m

Answer: C

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16. A bar magnet of magnetic moment $20Am^2$ is divided into two equal parts by cuting it along its axis. The magnetic moment of each part will be

A. $5am^2$

B. $10am^2$

C. $20Am^2$

D. $15Am^2$

Answer: B

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17. A bar magnet of magnetic moment $40Am^2$ is divided into two equal parts by cutting it along its equator. The magnetic moment of each part will be

A. $10Am^2$

B. $15Am^2$

C. $20Am^2$

D. $30Am^2$

Answer: C

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18. The magnetic dipole moment of a bar magnet of geometric length 6 cm and pole strength 100 Am is

A. $2.5Am^2$

B. $10Am^2$

C. $5Am^2$

D. $7.5Am^2$

Answer: C

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19. The pole strength of a bar magnet is 100 units. It is cut into two pieces along a line paralle to its equator in such a way that the length of one piece is half the length of the

other. What will be the ratio of the pole strength of the two pieces?

A. $1:1$

B. $1:2$

C. $1:3$

D. $5:2$

Answer: A

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20. 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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21. The magnetic moment has dimensions of

A. current $\times$ length

B. charge $\times$ time $\times$ length

C. current $\times$ area

D. $\frac{\text{current}}{\text{area}}$

Answer: C

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

A. ml

B. $2ml$

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

D. $\sqrt{2}ml$

Answer: D

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23. A magnetised wire of magnetic moment $'M'$ and length $'l'$ is bent in the form of a semicircle of radius $'r'$. The new magnetic moment is

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

B. M

C. $2M$

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

Answer: D

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24. The pole strength of a bar magnet is 300 units. It is cut into two pieces A and B along a line parallel to its axis in such a way that the breadth of A is double the breadth of B. Then the pole strengths of A and B are in the ratio

A. $1:1$

B. $1:2$

C. $2:1$

D. $3:1$

Answer: C

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25. A circular coil of radius r, and carrying a current I has a magnetic dipole moment M. What is its new dipole moment, if the radius of the coil is doubled and the current passing through the coil is halved?

A. $M_2 = M_1$

B. $M_2 = \frac{M_1}{2}$

C. $M_2 = 2M_1$

D. $M_2 = 3M_1$

Answer: C

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26. the magnetic lines of force inside a bar magnet

A. depend upon the area of cross-section of the bar magnet

B. do not exist

C. are from the north-pole to the south-pole of the magnet

D. are from the south-pole to the north-pole of the magnet

Answer: D

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27. A charged particle (charge q) is moving in a circle of radius R with unifrom speed v. The associated magnetic moment μ is given by

A. qvR^2

B. $qvR^2/2$

C. qvR

D. $qvR/2$

Answer: D

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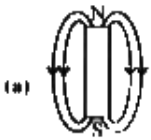
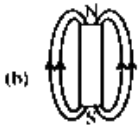
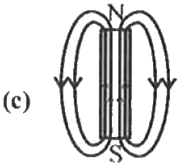
28. The magnet field lines due to a bar magnet are correctly shown in

A. 

B. 

C. 

D.

Answer: C

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29. A magnetised steel wire of length L has a magnetic moment of $3.14Am^2$. If the wire is bent into a semicircular arc, then what would be its new magnetic moment? (assume that the poles are situated at the ends of the wire.)

A. $5Am^2$

B. $4Am^2$

C. $3Am^2$

D. $2Am^2$

Answer: D

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30. In a hydrogen atom, the electron revolves round the nucleus in a circular orbit of radius 0.5Å at a frequency of 5×10^{15} rev/second. What is the effective magnetic dipole moment?

A. $4.28 \times 10^{-24} Am^2$

B. $5.28 \times 10^{-24} Am^2$

C. $6.28 \times 10^{-24} Am^2$

D. $8.28 \times 10^{-24} Am^2$

Answer: C

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31. 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.

A. $\frac{IL}{4\pi}$

B. $\frac{4\pi}{IL^2}$

C. $4pIL^2$

D. $\frac{IL^2}{4\pi}$

Answer: D

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32. A charge q is circulating with a constant speed v in a semicircular loop of wire of radius R. The magnetic moment of this loop is

A. qnR

B. $\frac{\pi Rqv}{2(\pi+2)}$

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

D. $\frac{qv\pi R}{\pi+2}$

Answer: B

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33. What is the magnetic moment of an electron orbiting in a circular orbit of radius r with a speed v?

A. evr

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

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

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

Answer: B

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34. Which is the wrong unit of magnetic dipole moment?

A. ampere $\text{metre}^2 \left(Am^2\right)$

B. newton metre/tesla

C. newton metre^3/weber

D. joule tesla

Answer: D

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35. What is the magnetic moment of a current carrying thin circular loop if the radius of the

loop is equal to R and the magnetic induction at its centre is equal to B ?

A. $\frac{2\pi BR^3}{\mu_0}$

B. $\frac{4\pi BR^3}{\mu_0}$

C. $\frac{BR^2}{\mu_0}$

D. $\frac{\pi BR^3}{\mu_0}$

Answer: A

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36. Two wires of same length are shaped into a square and a circle. If they carry same current, ratio of the magnetic moment is

A. $2:\pi$

B. $\pi:2$

C. $\pi:4$

D. $4:\pi$

Answer: C

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

A. $1:1$

B. $2:1$

C. $1:2$

D. $2:3$

Answer: B

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38. The magnetic moment of a circular current loop is $2.3 \times 10^{-5} Am^2$. What is the magnitude of the magnetic field on the axis of the loop at a distance of 1 cm from the loop?

A. $2.6 \times 10^{-6} T$

B. $3.6 \times 10^{-6} T$

C. $4.6 \times 10^{-6} T$

D. $5.6 \times 10^{-6} T$

Answer: C

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39. A magnetising field produces a magnetic flux of 2.2×10^{-5} weber in an iron bar of cross section $0.5cm^2$. What is the magnetic induction?

A. $4.4 \ \ \mathrm{Wb/m^2}$

B. $2.2 \times 10^{-2} \ \ \mathrm{Wb/m^2}$

C. $4.4 \times 10^{-4} \ \ \mathrm{Wb/m^2}$

D. $0.44 \ \ \mathrm{Wb/m^2}$

Answer: D

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40. What is the magnetic induction due to a short bar magnet of moment of $0.5Am^2$ at a point along its axis at a distance of 20 cm from the centre of the magnet?

$\left(\frac{\mu_0}{4\pi} = 10^{-7} \text{ SI unit}\right)$

A. $6.25 \times 10^{-6} \text{ Wb/m}^2$

B. $25 \times 10^{-6} \text{ Wb/m}^2$

C. 12.5×10^{-6} $\mathrm{Wb/m^2}$

D. 18.5×10^{-6} $\mathrm{Wb/m^2}$

Answer: C

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41. What is the magnetic induction due to a short bar magnet of magnetic moment $0.5Am^2$ at a point along the equator at a distance of 20 cm from the centre of the magnet?

A. $12.5 \times 10^{-6}\ \mathrm{Wb/m^2}$

B. $6.25 \times 10^{-6}\ \mathrm{Wb/m^2}$

C. $3.5 \times 10^{-6}\ \mathrm{Wb/m^2}$

D. $18.5 \times 10^{-6}\ \mathrm{Wb/m^2}$

Answer: B

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42. A magnetic dipole has a pole strength of 40 Am and magnetic length 20 cm. What is the magnetic induction at a point on its axis at a

distance of 30 cm from the centre of the dipole?

$\left(\frac{\mu_0}{4\pi} = 10^{-7} \text{ Wb/Am}\right)$

A. $4.5 \times 10^{-5} \text{ Wb/m}^2$

B. $5.5 \times 10^{-5} \text{ Wb/m}^2$

C. $6.5 \times 10^{-5} \text{ Wb/m}^2$

D. $7.5 \times 10^{-5} \text{ Wb/m}^2$

Answer: D

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43. A bar magnet has a pole strength of 15 Am and magnetic length 20 cm. What is the magnetic induction produced by it at a point at a distance of 30 cm from either pole?

$\left(\frac{\mu_0}{4\pi} = 10^{-7} \text{ Wb/Am}\right)$

A. $1.11 \times 10^{-5} \text{ Wb/m}^2$

B. $0.8 \times 10^{-4} \text{ Wb/m}^2$

C. $1.5 \times 10^{-5} \text{ Wb/m}^2$

D. $2.75 \times 10^{-5} \text{ Wb/m}^2$

Answer: A

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44. 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. $3^{1/3}$

C. $2^{2/3}$

D. $4^{1/3}$

Answer: A

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45. Magnetic induction at a point P on the axis is 54 times the magnetic induction at a point Q on the equator of a short magnetic dipole. The ratio of the distances of the points P and Q from the centre of the dipole is given by

A. $\frac{r_P}{r_Q} = 3$

B. $\frac{r_P}{r_Q} = \frac{1}{2}$

C. $\frac{r_P}{r_Q} = \frac{2}{1}$

D. $\frac{r_P}{r_Q} = \frac{1}{3}$

Answer: D

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

A. $1:1$

B. $2:1$

C. $1:3$

D. $1:2$

Answer: D

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47. A short bar magnet produces a magnetic induction of 4×10^{-4} tesla at an axial point, 20 cm away from its centre. What is the dipole moment of the magnet?

A. $M = 8Am^2$

B. $M = 12Am^2$

C. $M = 16Am^2$

D. $M = 20Am^2$

Answer: C

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48. What is the magnetic induction due to a short magnetic dipole of moment $0.1Am^2$ at

an equatorial point 10 cm away from the centre of the dipole/

A. $10^{-4}\ \mathrm{Wb/m^2}$

B. $10^{-5}\ \mathrm{Wb/m^2}$

C. $10^{-6}\ \mathrm{Wb/m^2}$

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

Answer: B

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49. The magnetic induction at a point P on the axis is 16 times the magnetic induction at a point Q on the equator of a short magnetic dipole. The point P is at a distance of 10 cm from the centre of the dipole, what is the distance of the point Q from its centre?

A. 12.5 cm

B. 15 cm

C. 17.5 cm

D. 20 cm

Answer: D

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50. The magnetic induction at a point on the equator, at a distance of 15 cm from the centre of a short bar magnet is 1.2×10^{-5} $\mathrm{Wb/m^2}$. What is the magnetic induction at a point on the axis at the same distance from the centre?

A. 1.8×10^{-5} $\mathrm{Wb/m^2}$

B. 2.4×10^{-5} $\mathrm{Wb/m^2}$

C. $3.2 \times 10^{-5} \ \mathrm{Wb/m^2}$

D. $0.6 \times 10^{-5} \ \mathrm{Wb/m^2}$

Answer: B

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51. The magnetic induction due to a short magnet at a distance of 20 cm on the axial line of a short bar magnet is $1.5 \times 10^{-6} \ \mathrm{Wb/m^2}$. What is the magnetic induction at a point on

its axis at a distance of 5 cm from the centre of the magnet?

A. 6.4×10^{-5} $\mathrm{Wb/m^2}$

B. 3.2×10^{-5} $\mathrm{Wb/m^2}$

C. 9.6×10^{-5} $\mathrm{Wb/m^2}$

D. 1.6×10^{-4} $\mathrm{Wb/m^2}$

Answer: C

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52. Calculate the magnetic field due to a bar magnet $2cm$ long and having pole strength of $100A - m$ at a point $10cm$ from each pole.

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

B. $8\pi \times 10^{-4}T$

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

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

Answer: D

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53. What is the dimensions of magnetic field B in term of C(coulomb), M, L and T ?

A. $MT^{-2}C^{-1}$

B. $MLT^{-1}C^{-1}$

C. $MT^{2}C^{-2}$

D. $MT^{-1}C^{-1}$

Answer: D

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54. Two short magnets P and Q are placed one over another with their magnetic axes mutually perpendicular to each other. It is found that resultant magnetic field at a point on the prolongation of magnetic axis of P is inclined at 30° with this axis. Compare the magnetic moments of the two magnets.

A. $\frac{M_1}{M_2} = \sqrt{3}$

B. $\frac{M_1}{M_2} = \frac{2}{\sqrt{3}}$

C. $\frac{M_1}{M_2} = \frac{1}{\sqrt{3}}$

D. $\frac{M_1}{M_2} = \frac{\sqrt{3}}{2}$

Answer: D

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55. Two short bar magnets A and B of dipole moment $0.15 Am^2$ respectively are placed with their axes along the same line, with their centres 0.15 m apart. The dipole moments due to A and B point in opposite directions. What is the position of the point, between the two magnets, where the resultant induction is zero?

A. 10 cm from the centre of A

B. 12 cm from the centre of A

C. 5 cm from the centre of A

D. 8 cm from the centre of A

Answer: C

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56. A bar magnet of magnetic moment $0.4Am^2$ is placed in a uniform magnetic field of induction 5×10^{-2} tesla. The angle

between the magnetic induction and the magnetic moment is 30°. The torque acting on the magnet is

A. 0.5 Nm

B. 10^{-1} Nm

C. 10^{-2} Nm

D. 10^{-3} Nm

Answer: C

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

A. 0.4 J/T

B. 0.3 J/T

C. 0.8 J/T

D. 0.6 J/T

Answer: A

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

A. 0.1 J

B. 0.2 J

C. 1 J

D. 2 J

Answer: B

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59. A bar magnet of pole strnegth $2A - m$ is kept in a magnetic field of induction $4 \times 10^{-5} wbm^{-2}$ such that the axis of the magnet makes an angle 30° with the directon of the field. The couple acting on the magnet is found $80 \times 10^{-7} N - m$. Then the distance between the poles of the magnet is

A. 8 m

B. 2 m

C. 4 m

D. 20 cm

Answer: D

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

A. a force and a torque

B. a force but not a torque

C. a torque but not a force

D. neither a force nor a torque

Answer: A

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61. A bar magnet of magnetic moment $0.4Am^2$ is placed in a uniform magnetic field of induction 5×10^{-2} tesla. What is the torque

acting on the magnet if the angle between the magnetic induction and the magnetic moment is 30°.

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

B. $10^{-2} N - m$

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

D. $0.5 \times 10^{-3} N - m$

Answer: B

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

A. a force and a torque

B. a force but not a torque

C. a torque but not a force

D. a pseudo force

Answer: C

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63. A magnet of magnetic dipole moment $4Am^2$ is deflected though 45° from the direction of a magnetic field of induction $3\sqrt{2}\ \mathrm{Wb/m^2}$. What is the magnitude of the torque on the magnet?

A. 4 N-m

B. $8\sqrt{2}N - m$

C. 12 N-m

D. $\frac{12}{\sqrt{2}}N - m$

Answer: C

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64. A magnet suspended in a uniform magnetic field of induction $0.2\ \mathrm{Wb/m^2}$, makes an angle of 60° with the normal to the direction of the field. What is the magnetic moment of the magnet, if a torque of moment 15×10^{-2} Nm acts on it?

A. $1Am^2$

B. $1.25Am^2$

C. $1.5Am^2$

D. $2Am^2$

Answer: C

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65. When a bar magnet is placed at 90° to a uniform magnetic field, it is acted upon by a couple which is maximum. For the couple to be half of the maximum value, at what angle should the magnet be inclined to the magnetic field (B)?

A. 45°

B. 30°

C. 60°

D. 75°

Answer: B

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66. A magnet when placed perpendicular to a uniform field of strength $10^{-4} Wb/m^2$ experiences a mximum couple of moment

$4 \times 10^{-5} N/m$. What is its magnetic moment?

A. $0.4 Am^2$

B. $0.3 Am^2$

C. $0.2 Am^2$

D. $0.5 Am^2$

Answer: A

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

A. W

B. 2 W

C. $\sqrt{3}W$

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

Answer: C

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68. 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. 2

B. 1

C. 0.5

D. 0.25

Answer: A

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

A. 30°

B. 60°

C. 45°

D. 90°

Answer: B

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70. A current of 5A flows through a circular coil of 200 turns, each of radius 20 cm. It is placed in a uniform magnetic induction of 5×10^{-2} $\mathrm{Wb/m^2}$, such that the plane of the coil is parallel to the field. What is the torque acting on the coil?

A. 3.14 N-m

B. 1.57 N-m

C. 6.28 N-m

D. 9.42 N-m

Answer: C

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

A. magnetic latitude

B. magnetic longitude

C. magnetic declination

D. magnetic dip

Answer: C

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72. 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. 45°

C. 60°

D. 75°

Answer: C

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73. Which one of the following is not a magnetic element of the earth?

A. Dip

B. Declination

C. Vertical component of earth's magnetic field

D. Horizontal component of earth's magnetic field

Answer: C

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

A. Isogonic lines

B. Isodynamic lines

C. Isoclinic lines

D. Isobaric lines

Answer: C

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

A. Isoclinic lines

B. Isodynamic lines

C. Isogonal lines

D. Isochoric lines

Answer: B

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76. In a magnetic map, the line joining the places of zero dip is called an aclinic line. This line can also be called

A. Magnetic pole

B. magnetic equator

C. Magnetic axis

D. Magnetic meridian

Answer: B

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77. What is the strength of earth's magnetic field at the surface of earth?

A. 1 tesla

B. $10^{-2}T$

C. $10^{-4}T$

D. $10^{2}T$

Answer: C

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78. Terrestrial magnetism is related to the study of the magnetic field of

A. the stars and planets

B. the earth

C. the magnetic dipoles

D. revolving electrons

Answer: B

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79. Which of the following is the most suitable material for making permanent magnet ?

A. Soft iron

B. Copper

C. Aluminium

D. Steel

Answer: D

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80. Which of the following is the most suitable material for making permanent magnet ?

A. Copper

B. Soft iron

C. Nickel

D. Zinc

Answer: C

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81. The material suitable for making electromagnets should have

A. high retentivity and low coercivity

B. high retentivity and high coercivity

C. low retentivity and high coercivity

D. low retentivity and low coercivity

Answer: D

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

A. Equator

B. Magnetic pole

C. A latitude 60°

D. An inclination of 60°

Answer: B

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83. The angle of dip at a place is 37° and the vertical component of the earth's magnetic field is $6 \times 10^{-5}T$. What is the earth's magnetic field at this place?

$\left(\tan 37^\circ = \frac{3}{4}\right)$

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

B. $3 \times 10^{-5}T$

C. $10^{-4}T$

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

Answer: C

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84. 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. $\delta = \tan^{-1}\frac{3}{4}$

B. $\delta = \tan^{-1}\frac{5}{3}$

C. $\delta = \tan^{-1}\frac{3}{5}$

D. $\delta = \tan^{-1}\frac{4}{3}$

Answer: D

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85. What are isogonic, isoclinic and isodynamic lines?

A. equal dip

B. equal declination

C. equal horizontal field

D. zero declination

Answer: B

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86. A dip needle arranged to move freely in the magnetic meridian dips by an angle θ. The vertical plane in which the needle moves is now rotated through an angle α from the magnetic meridian. Through what angle the needle will dip in the new position?

A. less than θ

B. α

C. θ

D. more than θ

Answer: D

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87. What is the angle of dip at a place where horizontal and vertical components of earth's field are equal?

A. 60°

B. 45°

C. 30°

D. 90°

Answer: B

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

A. retentivity

B. coereivity

C. permeability

D. susceptibility

Answer: B

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89. The best material for the core of a transformer is

A. stainless steel

B. mild steel

C. hard steel

D. soft iron

Answer: D

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90. At which place Earth's magnetic field becomes horizontal?

A. plane through magnetic meridian

B. plane through magnetic equator

C. plane through magnetic poles

D. it is not horizontal anywhere

Answer: B

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91. The imaginary vertical plane passing through the axis of a freely suspended magnetic needle is called

A. geometric meridian

B. magnetic meridian

C. geo-magnetic meridian

D. geographic meridian

Answer: B

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

A. magnetic N-pole

B. magnetic equator

C. geographic poles

D. magnetic south pole

Answer: B

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93. 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. 1

B. $\sqrt{3}$

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

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

Answer: D

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94. 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. 90°

B. 60°

C. 45°

D. 30°

Answer: D

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95. The total intensity of the earth's magnetic field at the equator is 5 nits. What is its magnetude and direction at the poles?

A. 2 units, horizontal

B. 3 units, vertical

C. 4 units and inclined at 45° to the horizontal

D. 5 units, vertical

Answer: D

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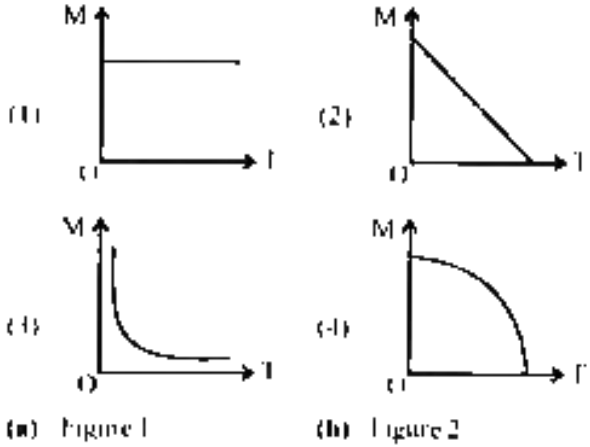
96. A curve between magnetic moment and temperature of magnet is as shown in



A. Figure 1

B. Figure 2

C. Figure 3

D. Figure 4

Answer: D

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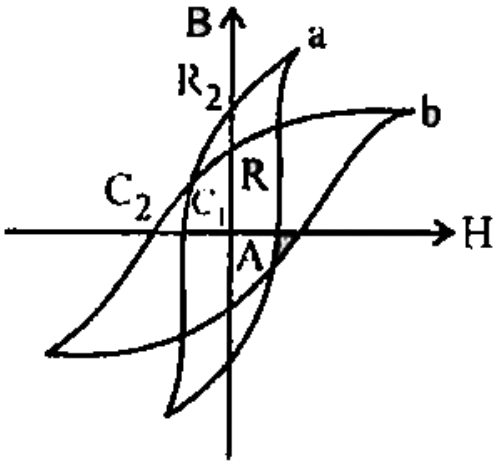
97. The B-H curves (a) and (b) shown in the figure are associated with



A. Soft iron and steel respectively

B. Steel and soft iron respectively

C. A paramagnetic and a ferromagnetic substance respectively

D. A diamagnetic and a paramagnetic substance respectively

Answer: A

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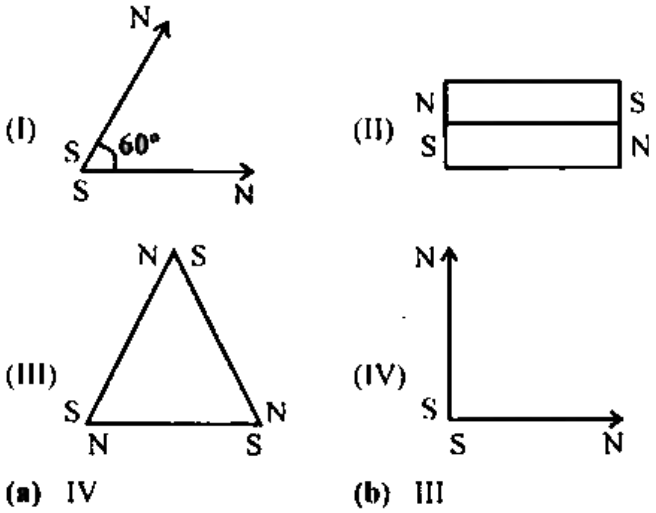
98. Following figures show different combinations of two magnets, each of magnetic moment M. Which combination has

the largest magnetic moment?



A. IV

B. III

C. I

D. II

Answer: C

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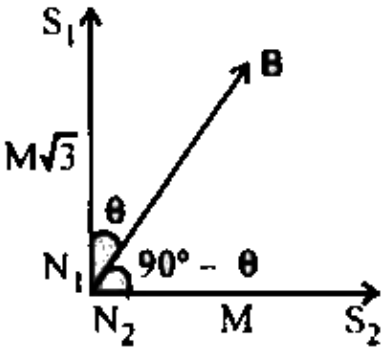
99. Two magnets of equal masses are joined at right angles to each other. Magnet N_1S_1 has a magnetic moment $\sqrt{3}$ times that of N_2S_2. This arrangement is pivoted so that it is free to rotate in a horizontal plane. What is the value

of θ, when the system is in equilibrium?



A. 60°

B. 45°

C. 0°

D. 30°

Answer: D

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Test Your Grasp

1. A magnetised steel wire of length L has a magnetic moment of $3.14Am^2$. If the wire is bent into a semicircular arc, then what would be its new magnetic moment? (assume that the poles are situated at the ends of the wire.)

A. $5Am^2$

B. $4Am^2$

C. $3Am^2$

D. $2Am^2$

Answer: D

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2. Magnetic induction at a point P on the axis is 54 times the magnetic induction at a point Q on the equator of a short magnetic dipole. The ratio of the distances of the points P and Q from the dipole is given by

A. $\frac{r_P}{r_Q} = 3$

B. $\frac{r_P}{r_Q} = \frac{1}{2}$

C. $\frac{r_P}{r_Q} = \frac{2}{1}$

D. $\frac{r_P}{r_Q} = \frac{1}{3}$

Answer: D

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3. A bar magnet is held perpendicular to a uniform magnetic field. If the couple acting on

the magnet is to be halved by rotating it, then the angle by which it is to be rotated is

A. 30°

B. 60°

C. 45°

D. 90°

Answer: B

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4. 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. 90°

B. 60°

C. 45°

D. 30°

Answer: D

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5. A short bar magnet is placed in the magnetic meridian of the earth with its north pole pointing north. Neutral points are found at a distance of 30 cm from the magnet on the East-West line drawn through the mid point of the magnet. What is the magnetic moment of the magnet in Am^2? (Given $m = 10^{-7}$ in SJ units and $B_H =$ horizontal component of earth's magnetic field $= 3.6 \times 10^{-5}$ tesla)

A. 14.6

B. 19.4

C. 9.7

D. 4.9

Answer: C

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6. The magnetic moment of a circular coil carrying current is

A. L^0

B. L^1

C. L^2

D. L^3

Answer: C

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7. A short bar magnet produces a magnetic induction of 4×10^{-4} tesla at an axial point, 20 cm away from its centre. What is the dipole moment of the magnet if $\frac{\mu_0}{4\pi} = 10^{-7}$?

A. $M = 8Am^2$

B. $M = 12Am^2$

C. $M = 16Am^2$

D. $M = 20Am^2$

Answer: C

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8. 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?

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

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

C. $\sqrt{2}M$

D. $2M$

Answer: A

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9. The horizontal compound of the earth's magnetic field at a given place is $0.4 \times 10^{-4} Wb/m^2$ and angle of dip $= 30^\circ$. What is the total intensity of the earth's magnetic field at that place?

A. $0.23 \times 10^{-4} Wb/m^2$

B. $0.46 \times 10^{-4} Wb/m^2$

C. $0.58 \times 10^{-4} Wb/m^2$

D. $0.35 \times 10^{-4} Wb/m^2$

Answer: B

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10. A wire of length $2m$ carrying a current of $1A$ is bend to form a circle. The magnetic moment of the coil is (in $A - m^2$)

A. 2π

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

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

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

Answer: D

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