PHYSICS

BOOKS - MARVEL PHYSICS (HINGLISH)

MAGNETISM

Mcq

1. A current I is flowing in a conductor of length L when it is bent in the form of a circular loop its magnetic moment

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

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

C. $4\pi IL^2$

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

Answer: D

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2. A current of 10 A is flowing through a circular coil of 5 turns each of radius 7 cm the coil lies in the X-Y plane what is the magnitude

and direction of the magnetic dipole mometn

associated with it ?

A. 0.47 am^2 along Z axis

B. 0.77Am^2 along Z axis

C. 0.77Am^2 along Y axis

D. 1.54Am^2

Answer: B

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3. A straight wire carrying a current is turned into a circular loop if the magnitude of magnetic moment associated with it is M then the length of the wire will be

A. $\dfrac{Moi}{4i}$

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

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

D. $4\pi i M$

Answer: C

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4. For a circular coil magnetic moment is M r is the radius and L is the length of the coil then M is proportional to

A. L^0

B. N^1

C. L^2

D. L^3

Answer: C

5. A planer loop of irregular shape enclose an area of $7.5 \times 10^{-4} m^2$ and carries a current of 1.2 A what is the magnitude of the magnetic dipole moment vector associated with the current loop ?

A. 1

B. 2

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

D. $\dfrac{1}{3}$

Answer: D

6. A coil of n turns and radius R carries a current I it is unwound and rewound to make a new coil of radius $\dfrac{R}{2}$ and the same current is passed through it what is the ratio of the magnetic moment of the new coil and the original coil ?

A. $\dfrac{1}{6}$

B. $\dfrac{1}{8}$

C. $\dfrac{1}{4}$

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

Answer: C

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7. Two identical pieces of metal wires are used to make a circular loop and a square loop same current is passed through both the loops what is the ratio of magneitc dipole

moment associated with the circular loop that of the square loop ?

A. 4π

B. $\dfrac{4}{\pi}$

C. $\dfrac{2}{\pi}$

D. 2π

Answer: B

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8. The magnetic dipole moment of earth is $6 \cdot 4 \times 10^{21} Am^2$. If we consider it to be due to a current loop wound around the magnetic equator of the earth, then what should be the magnitude of the current? Take earth to be a sphere of radius $6400km$.

A. amper $metre^2 (Am^2)$

B. newton metre / tesla

C. newton $metre^3$ / weber

D. joule tesla

Answer: A

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

  A. the magnitude of magnetic mometn diminishes

  B. the magnetic moment does not change

C. the magnitude of B at (0,0,z) $z > R$ increases

D. the magnitude of B at $(0, 0, z)z > R$ is unchanged

Answer: D

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10. A current carrying circular loop of radius R is placed in the x-y plane with centre at the

origin. Half of the loop with $x > 0$ is now bent so that it now lies in the y-z plane.

A. 1

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

C. $\dfrac{1}{4}$

D. $\dfrac{1}{8}$

Answer: A

11. A coil carrying a current 'I' has radius 'r' and number of turns 'n' it is reqound so that radius of the new coil is $\frac{r}{4}$ and it carries current `I' The ratio of the magnetic moment of the new coil to that of the original coil is

   A. evr

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

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

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

Answer: C

12. The orbital speed of an electron orbiting around the nucleous in a circular orbit or radius r is v then the magneitc dipole moment of the electron will be

A. $\dfrac{L_0}{M_0}$

B. $\dfrac{M_0}{L_0}$

C. $L_0 M_0$

D. $\dfrac{\sqrt{M_0}}{L_0}$

Answer: B

13. If M_0 and L_0 denote the orbital angular moment and angular momentum of the electron due to its orbital motion then the gyromagnetic ratio is given by

A. $0.8 \times 10^{-23} Am^2$

B. $1.1 \times 10^{-22} Am^2$

C. $1.256 \times 10^{-23} Am^2$

D. $1.256 \times 10^{-8} Am^2$

Answer: B

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14. The electon in the hydrogen atom revolves around the nucleus in an orbit of radius 0.5 A what is the equivalent magnetic moment if the frequency of revolution of the electron is 10^{10} MHz ?

A. $amper/meter^2 \left(\dfrac{A}{m^2} \right)$

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

C. amper metre

D. joule tesla

Answer: C

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

A. $\dfrac{e}{2m}$

B. $\dfrac{e}{m}$

C. $\dfrac{m}{2e}$

D. $\dfrac{m}{e}$

Answer: B

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16. What is the ratio of the magnetic moment of an electron to its angular momentum in the ground state of a hydrogen atom ?

A. evr

B. $\dfrac{evr}{4}$

C. $\dfrac{evr}{2}$

D. $\dfrac{evr}{8}$

Answer: A

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17. The magnetic moment of an electron of charge e moving in a circular orbit of radius r with speed v is given by

A. qvR

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

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

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

Answer: C

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18. A charge q is circulating with constant

speed v in a semicular loop of wire of radius R

the magnetic moment of this loop is

A. $M \propto n^2$

B. $M \propto \dfrac{1}{n}$

C. $M \propto \dfrac{1}{n^2}$

D. $M \propto n$

Answer: B

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19. The magnetic moment (M or μ) of a revolving electron around the nucleus varies with the principal quantum

A. $10^{-20} Am^2$

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

C. $10^{23} Am^2$

D. $3 \times 10^{-19} Am^2$

Answer: D

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20. The electron in the hydrogen atom is moving with a speed of 2.5×10^6 m/s in an

orbit of radius 0.5 A what is the magnetic moment of the revolving electron ?

A. $4.64 \times 10^{-226} Am^2$

B. $9.28 \times 10^{-26} Am^2$

C. $4.64 \times 10^{-245} Am^2$

D. $9.28 \times 10^{-22} Am^2$

Answer: C

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21. A muon is a particle that has the same charge as that of an electron but is 200 times revolves round a proton instead of an electron then what will be the orbital magnetic moment of the muon in the ground state of such an atom ? [Given that Bohr magneton = $9.28 \times 10^{24} Am^2$]

    A. independent of which orbit it is n

    B. negative

    C. postive

D. decreases with the quantum number n

Answer: A

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22. The gyro magnetic ratio of an electron in an H atom according to Bohr model is

A. 9×10^{10} C/kg

B. 8.8×10^{10} C/kg

C. 8.5×10^{11} C/kg

D. 8.2×10^{10} kg

Answer: A

23. The charge to mass of an electron is 1.76×10^{11} C/Kg what is the gyromagnetic ratio of an orbital electron

A. 3.21×10^{-22}

B. 2.16×10^{-23}

C. 1.26×10^{-23}

D. 3.21×10^{-24}

Answer: B

24. An electron in a circular orbit of radius 0.05nm performs 10^{16} revolutions per second. The magnetic moment due to this rotation of electron is (in A . m^2)

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

B. $\dfrac{2\pi^2 BR^3}{\mu_0}$

C. $\dfrac{BR^2}{2\pi\mu_0}$

D. $\dfrac{2\pi BR^2}{\mu_0}$

Answer: C

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25. Magnetic induction produced at the center of a circular loop of radius R carrying a current is 'B' The magnetic moment of the loop is

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: B

26. Electromagnets are mage of sof iron because soft iron has

A. $4.4 \times \dfrac{Wb}{m^2}$

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

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

D. $0.44 \dfrac{Wb}{m^2}$

Answer: A

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27. A magnetising field produces a magnetic flux of 2.2×10^{-5} weber in an iron bar of

cross section $0.5 cm^2$ what is the magnetic iduction ?

A. $\dfrac{1}{300}$

B. 300

C. $\dfrac{1}{600}$

D. 600

Answer: D

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28. A magnetising field of $360 Am^{-1}$ produces a magnetic flud density (B) =0.6 T in a ferromagnetic material what is its permeability in TmA^{-1} ?

   A. $4\pi \times 10^{-5}$

   B. $8\pi \times 10^{-7}$

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

   D. $\dfrac{2000}{4\pi \times 10^{-7}}$

Answer: C

29. The relative permeability of iron is 2000 what is its absolute permeability in SI units ?

A. 4×10^5 A/m

B. 5×10^5 A/m

C. 6×10^6 A/m

D. 5×10^6 A/m

Answer: C

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30. A domain in a ferromagnetic material (iron) is in the form of a cube of side length 1μ The dipole moment of the domain when all the atomic dipoles get perfectly aligned is $5 \times 10^{-12} Am^2$ what is the intensity of magnetisation of the domain in this situation ?

A. 10^4

B. 10^5

C. 2×10^6

D. 3×10^5

Answer: D

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31. The permeability of a metal is $0.1256 TmA^{-1}$ what is its relative permeability ?

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32. which of the following substances have a positive permeability and a negative magnetic susceptibility

    A. resistivity

    B. conductivity

    C. resistance

    D. conductance

Answer: B

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33. Permeability in a magnetic cirucit is similar

_____in an electric ciruit

A. $\mu_R < x < 0$

B. $\mu_R < 1, x > 0$

C. $4\pi < 1, x > 0$

D. $\mu_R > 1, x < 0$

Answer: B

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

    A. $2\pi \times 10^{-4}$

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

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

    D. $4.8\pi \times 10^{-4}$

Answer: B

35. The magnetic susceptibility of the material of a rod is 599 what is the absoulte permeability of the material of the rod ?

$$\left[\mu_0 - 4\pi \times 10^{-7}\right]$$

A. susceptibility

B. coercivity

C. retentivity

D. permeability

Answer: B

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

    A. 4001

    B. 3999

    C. 4000×10^{-2}

    D. 4000×10^{2}

Answer: B

37. Relative permeability of iron is 4000 what

is its magnetic susceptibility

    A. 3×10^{-11} F/m

    B. 4.25×10^{-11} F/m

    C. 6.4×10^{-11} F/m

    D. 1.770×10^{-11} F/m

Answer: B

38. Whast is the absolute permittivity of mica if its relative permittivity is 5

$$\left[\varepsilon_0 = 8.85 \times 10^{-12} \frac{F}{m}\right]$$

A. $2.5 \times 10^{-3} \frac{N}{m^2}$

B. $4 \times 10^{-4} \frac{N}{m^2}$

C. $5 \times 10^{-4} \frac{N}{m^2}$

D. $8 \times 10^{-4} \frac{N}{m^2}$

Answer: B

39. A magnetising field fo 1000 A/m produces a magnetics flux of 2.4×10^{-5} Wb in an iron bar of cross sectional area 0.3 cm^2 what is the magnetic permeability of the iron bar ?

A. weber metre ampere^{-1}

B. weber metre^{-1}ampere^{-1}

C. weber metre^{-2}ampere^{-1}

D. weber metre ampere

Answer: D

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40. What is the SI unit of permeability

    A. 3×10^{-2} j/T

    B. 2×10^{-2} J/T

    C. 1.5×10^{-2} J/T

    D. 1×10^{-2} J/T

Answer: B

41. Amagnet of magnetic moment 3 Am^2 weghs 75 g The density of the material of the magnet is 7500 kg/m^3 what is the intensity of mgnetisation ?

A. 2.5×10^4 A/m

B. 3×10^5 A/m

C. $2.5 \times 10^3 \dfrac{A}{m}$

D. $2.5 \times 10^2 \dfrac{A}{m}$

Answer: B

42. A Cylindrical magnet has a length of 5cm and a diameter of 1 cm it has a uniform magnetisation of $5.30 \times 10^3 \dfrac{A}{m^3}$ what is its magnetic dipole moment ?

A. 4Am^(2)

B. 8Am^(2)

C. 2Am^(2)

D. 1Am^(2)

Answer: B

43. A solenoid having 500 turns / metre has a core of a material with relative permeability 500 what is the magnetisation of the core material if a current of 1 A is passed through it?

A. 3×10^{-3}

B. 2×10^{-4}

C. 2.5×10^{-4}

D. 4×10^{-3}

Answer: C

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44. A bar magnet has coercivity $4 \times 10^3 \, Am^{-1}$

. It is desired to demagnetise it by inserting it

inside a solenoid $12cm$ long and having 60

turns. The current that should be sent through the solenoid is

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

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

C. $6Am^{-1}$

D. $2.4Am^{-1}$

Answer: B

45. A magnetising field of 2500 A/m produces a magnetic flux of 2.5×10^{-5} in an iron of cross section $0.5 \ cm^2$ weber in an iron rod of cross section $0.5 cm^2$ what is the permeability of the iron rod in TmA^{-1} ?

A. 2×10^{-4}

B. 2.1×10^{-3}

C. 4.2×10^{-3}

D. 1.05×10^{-3}

Answer: B

46. A paramagnetic sample shows a net magnetisation 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 magnetisation will be

A. only the orbital motion of the electrons

B. only the spin motion of the electrons

C. orbital and spin motions of the electrons

D. orbital motion of the protons and neutrons

Answer: B

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47. The space within a current carrying toroid is filled with aluminium of magnetic suceptibiliuty 2.1×10^{-5} what is the

percentage increase in the magnetic induction

B ?

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48. In order to consider the magnetic properities of materials we consider

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49. Susceptibity of

A. a diamagnetic susbtance has a small positive value

B. a ferromagnetic substance has a lare negative value

C. a paramagnetic substance has a small negative value

D. a paramagnetic substance has a small positve value

Answer: D

50. Ferromagnetism is not found in

A. solids

B. powdered iron

C. liquids

D. cobalt

Answer: C

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51. If a diamagnetic liquid placed in a watch glass is kept on two strong magnets with their unlike poles facing each other then the liquid will

    A. move towards the end s

    B. show a small depression in the middle

    C. not change its position

    D. show a small elevation near the centre

Answer: B

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52. If a rod of diamagneitc substance is freely suspended in a uniform magnetic field then it will set itself with its length

    A. parallel to the field

    B. perependicular to the field

    C. inclined at $30°$ to the magnetic field

    D. inclined at $45°$ to the magnetic field

Answer: B

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53. Which one of the following substance has the highest magnetic susceptibility ?

A. brass

B. soft iron

C. steel

D. all have equal magnetic susceptibility

Answer: B

54. The permeability of a material is 0.9990

The material must be

A. 1. diamagnetic

B. 2.paramagnetic

C. 3.ferromagnetic

D. 4. a conductor

Answer: A

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55. When a thin rod is kept suspended under influence of the horizontal component of eath magnetic field the rod remains in the East west direction this shows that the material of the rod is

A. diamagnetic

B. paramagentic

C. ferromagnetic

D. non magnetic

Answer: A

56. If the resultant magnetic moment of the atoms of a material is positive then the material

    A. must be diamagnetic

    B. must be ferromagentic

    C. must be paramagnetic

    D. may be paramagnetic or ferroomagnetic

Answer: D

57. A ferromagnetic material is placed in an external magnetic field. The magnetic domains

A. is increased

B. is decreased

C. may increased or decrease

D. does not depend upon th estrenght of the field

Answer: C

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58. For a paramagnetic substance

   A. $\mu_0 > \mu$

   B. $\mu_0 = \mu$

   C. $\mu_0 < \mu$

   D. $\mu_0 > \mu$

Answer: C

59. If a liquid is poured in a U tube and if a magnetic field is applied to the liquid in one arm of the U tube and if the liquid meniscus is seen to rise then it indicates that the liquid is

A. paramagnetic

B. ferromagnetic

C. diamagnetic

D. non magnetic

Answer: A

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60. The hysteresis curve is generally studied in the case of

    A. paramagnetic substances

    B. ferromagnetic substances

    C. diamagnetic substances

    D. non magnetic substances

Answer: B

61. If the relative permeability of a piece of iron is 1000 then its absolute permeability expressed in Wb/A/m will be

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

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

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

    D. $6\pi \times 10^{-6}$

Answer: C

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62. The magnetic moment of atomic neon is

A. ∞

B. $-\infty$

C. zero

D. -5

Answer: A

63. Two substances A and B have relative permeabilities slightly greater and less than unity respectively. What is their magnetic nature?

A. A is paramagnetic and B is diamagnetic

B. A is diamagnetic and B is paramagnetic

C. both A and B are paramagnetic

D. both A and B are diamagnetic

Answer: A

64. Nickel is ferromagnetic

    A. at NTP only

    B. at all temperatrues

    C. belwo $360°C$

    D. above $360°C$

Answer: C

65. If a diamagnetic solution is poured into a U-tube and one aem of this U-tube placed between the poles of a strong magnet with the meniscus in a line with the field, then the level of the solution will

A. rise

B. fall

C. oscillate slowly

D. not to be affected

Answer: B

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

A. considerably increases

B. slightly increases

C. considerably decreases

D. slightly decreases

Answer: A

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67. A frog can be levitated in a magnetic field produced by a current in a vertical solenoid plaed below the frog this is possible because the body of the frog behaves as

A. paramagnetic

B. diamagnetic

C. ferromagnetic

D. anti ferromagnetic

Answer: A

68. If the magnetic dipole of moment of an atom of diamagnetic material, paramagnetic

material and ferromagnetic material are donated by μ_d, μ_p and μ_f respectively, then:

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

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

C. $\mu_p = 0$ and $\mu_f \neq 0$

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

Answer: A

69. The relative permeability of a ferromagnetic material is 500 what is its magnetic susceptibility

    A. 501

    B. 499

    C. 499×10^{-7}

    D. 501×10^{7}

Answer: B

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

A. 4

B. 3

C. 2

D. 1

Answer: A

71. For dimgnetic materials magnetic susceptibility is

    A. small and negative

    B. small and positive

    C. large and negative

    D. large and positive

Answer: A

72. The examples of paramagnetic ferrognetic and diamgnetic materials are respectively

    A. aluminium silver nickel

    B. silver nickel aluminium

    C. aluminium nickel silver

    D. nickel silver aluminium

Answer: C

73. Magnetic permeability is maximum for

    A. diamagnetic substance

    B. Pramagnetic substances

    C. ferromagnetic substances

    D. all of the above

Answer: C

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74. Needles N_1, N_2, and N_3 are made of a ferromagnetic, a paramagnetic and a diamagnetic substance respectively . A magnet when brought close to them will

A. attract N_1 and N_2 strongly but repel N_3

B. attract all of them

C. attract N_1 strongly but repel N_2 and N_3 weakly

D. attract N_1 strongly N_2 weakly and repel N_3 weakly

Answer: D

75. The susceptibility of a paramagnetic material is x at $27°c$ at what temperature will its suceptibility be $\dfrac{x}{3}$

A. $327° C$

B. $500° C$

C. $627° C$

D. $427° C$

Answer: C

76. Relative permittivity and permeability of a material are ε_r and μ_r respectively which of the following values of these quantities are allowed for a diamagnetic material ?

    A. $\varepsilon = 0.5, \mu_r = 0.5$

    B. $\varepsilon_r = 1.5, \mu_r = 0.5$

    C. $\varepsilon_r = 0.5 \mu_r = 1.5$

D. $\varepsilon_r = 1.5\mu_r = 1.5$

Answer: B

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77. How does the magnetic susceptibility (x) of a paramagnetic substance change with absoute temperature T?

A. $x \propto T$

B. $X \propto \dfrac{1}{T}$

C. $X \propto e^T$

D. $X \propto T^2$

Answer: B

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78. The susceptibility of a magnetism at 300 K is 1.4×10^{-5}. The material is heated and at a particular temperature is susceptibility increased to 2.1×10^{-5}. What is the change in temperature of the material ?

A. 200 k

B. 300 k

C. 400 k

D. 100 k

Answer: D

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79. Curie weiss law is obeyed by cobalt

A. at all temperatures

B. a below curie temperature

C. above curie temperature

D. at curier temperature only

Answer: C

80. The susceptibility of a paramagnetic substance was found for different temperaturee and a graph of x agains $\frac{1}{T}$ was plotted from the graph it was found that

when $x = 0.5$, $\dfrac{1}{T} = 5 \times \dfrac{10^{-3}}{K}$ what is the curit constant for the substance

A. 50 K

B. 75 k

C. 100 k

D. 125 k

Answer: C

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81. Curie temperature is the temperature above which

A. is paramagnetic substance become ferromagnetic

B. a paramagnetic substance becomes diamagnetic

C. a ferromagnetic substance becomes paramagnetic

D. a diamagnetic susbtance becomes ferromagnetic

Answer: C

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82. 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. $\dfrac{2\mu_0}{\pi}\dfrac{m}{d^3}$

B. $\dfrac{\mu_0}{4\pi}\left(\sqrt{5}\right)\dfrac{M}{d^3}$

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

D. $\dfrac{\mu_0}{4\pi}\left(\sqrt{2}\right)\dfrac{M}{d^3}$

Answer: B

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

A. $10^{-7}T$

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

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

D. None of these

Answer: C

84. A bar magnet of magnetic moment 3 Am^2

is placed in a uniform magnetic induction of

2×10^3 T if each pole of the magnet

experiences a force of 6×10^{-4} T if each pole

of the magnet experience a force of 6×10^{-4}

N then the length of the magnet is

A. 0.1

B. 0.02 m

C. 0.3 m

D. 0.5 m

Answer: A

85. A bar magnet of magnetic mament $3Am^2$ is placed in a uniform magnetic induction of 2×10^{-2} T experiences a troque of 25×10^{-6}

N-m what is its poles strenght if the imagnetic length of the magnet is 5 cm ?

A. 2 A-m

B. 5 a-m

C. 5×10^{-2} A-m

D. 2×10^{-2} A-m

Answer: D

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86. 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. 4 M

B. $M/4$

C. $2M/\pi$

D. 2 M

Answer: C

87. An electron moving in a circular orbit of radius r makes n rotation per secound. The magnetic field produced at the centre has magnitude

A. $\dfrac{\mu_0 n^2 e}{2r}$

B. $\dfrac{\mu_0 \neq}{2\pi r}$

C. $\dfrac{\mu_0 \neq}{2r}$

D. zero

Answer: C

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88. A circular current loop of magnetic moment M is in an arbitrary orientation in an external magnetic field $\overrightarrow{B}$. The work done to rotate the loop by $30°$ about an axis perpendicular to its plane is :

A. MB

B. $\dfrac{\sqrt{3MB}}{2}$

C. $\dfrac{MB}{2}$

D. zero

Answer: D

89. For making the electromagnets the retentivity and permeablity of the material should be respectively

    A. high-high

    B. low -low

    C. high -low

    D. low-high

Answer: D

90. For a permanent magnet the properties retentivity and coercivity are respecitively

A. high -low

B. low-high

C. high-high

D. low-low

Answer: C

91. 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. $\theta = 60°$

B. $\theta = 90°$

C. $\theta = 45°$

D. $\theta = 0°$

Answer: D

92. A closely wound solenoid of 100 turns and area of cross section $5 \times 10^{-4}m^2$ carries current of 2A it is placed in such a way that its horizontal axis is at $30°$ with the direction of a uniform magnetic field of intensity 0.2 T what

is the torque experienced by the solenoid in the magnetic field ?

A. 0.1 Nm

B. 0.2 Nm

C. 0.01 Nm

D. 0.02 Nm

Answer: C

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93. A solenoid of length 0.4 m and having 500 turns of wire carries a current of 3 amp. A thin coil having 10 turns of wire and of radius 0.01 m carries a current of 0.4 amp. The torque (in Nm) required to hold the coil in the middle of the solenoid with its axis perpendicular to the axis of the solenoid is ($\mu_0 = 4\pi \times 10^{-7}$ V-s/A-m)

A. 6×10^6 N-m

B. 6×10^{-6} N-m

C. 7.5×10^{-6} N-m

D. 4.2×10^{-6} N-m

Answer: B

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94. Which one is the correct graph which gives the variation of magnetic susceptibility (x) with tempperature for a diamagnetic substacne?

A.

B.

C.

D.

Answer: C

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95. The susceptibility x against $\dfrac{1}{T}$ graph for a paramagnetic substance what is the cuire constant

A. 50 K

B. 100 K

C. 75 K

D. 5×10^{-3} K

Answer: B

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96. Which gives the variation of magnetic suscetibility (x) with magnetising field for a paramagnetic substance ?
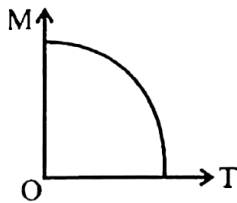
A.

B.

C.

D.

Answer: D

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97. A curve between magnetic moment and temperature of a magnet best represented by

A.

B.

C.

D.

Answer: A

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98. The susceptibiltiy of magnesium at 300 k is

2.4×10^{-5} at what temperature will the

susceptibility increase to 3.6×10^{-5}

A. 400 K

B. 200 K

C. 250 K

D. 350 K

Answer: B

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99. The magnetic susceptibility of annealed iron at saturation is 4224 what is the permeability of anneled iron at saturation ? [$\mu_0 = 4\pi \times 120^{-7}$SI unit]

A. $5.31 \times 10^{-3} T \frac{m}{A}$

B. $5.71 \times 10^{-4} T \frac{m}{A}$

C. 6.8×10^{-3} Tm/A

D. 3.78×10^{-3} Tm/A

Answer: A

100. A iron rod is placed parallel to magnetic field of intensity $2000\dfrac{A}{m}$ The magnetic flux through the rod is 6×10^{-4} Wb its cross sectional area is $3\ cm^2$ The magnetic permeability of the rod in Wb/A -m is

A. 10^{-1}

B. 10^{-2}

C. 10^{-3}

D. 10^{-4}

Answer: C

101. The magnetic moment of electron due to orbital motion is proportional to

(n= principle quantum numbers)

A. $\dfrac{1}{n^2}$

B. $\dfrac{1}{n}$

C. n^2

D. n

Answer: D

---

102. A bar mangnet has length 3 cm cross sectional area 2 cm^2 and magnetic moment 3 Am^2 the intensity of magnetisation of the bar magnet is

    A. 2×10^5 A/m

    B. 3×10^5 A/m

    C. 4×10^5 A/m

D. $5 \times 10^5 \text{A/m}$

Answer: D

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Test Your Grasp

1. The magnetic dipole moment has the dimension of

A. current x length

B. charge x time x length

C. current x area

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

Answer: C

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2. A closely wound solenoid of 1000 turns and area of cross section $3.2 \times 10^4 m^2$ carries a current of 5A what is the magnetic dipole moment associated with the solenoid ?

A. $0.16Am^2$

B. $1.6Am^2$

C. $3.2Am^2$

D. $1.2Am^2$

Answer: B

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3. The mgnetic flux through an air core solenoid carrying a current I is 5×10^{-6} Wb if

the length of the solenoid is 25 cm its

magnetic moment will be approximately

A. $0.5Am^2$

B. $0.75Am^2$

C. $1Am^2$

D. $2Am^2$

Answer: C

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4. An electron revolving in a circular orbit of radius r with a frequency v and velocity v has an orbital magnetic moment M_0 what will be its new magnetic moment if its frequency of revolution is doubled ?

A. M_0

B. $2M_0$

C. $\dfrac{M_0}{2}$

D. $\sqrt{M_0}$

Answer: B

5. 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. $\dfrac{1}{2}qvR$

B. qvR

C. $\dfrac{qv}{R}$

D. qv^2R

Answer: A

6. If the angular momentum of an electron is

$\overrightarrow{J}$ then the magnitude of the magnetic

moment will be

A. eJ2m

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

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

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

Answer: C

7. The magnetic moment of a magnet of dimensions $4cm \times 2cm\, 1.25cm$ is $3A\,mm^2$ what is the intensity of magnetisation ?

A. 3×10^5 Amp/m

B. 2×10^5 Amp/m

C. 10^5 Amp/m

D. 4×10^5 Amp/m

Answer: A

8. The permeability of a substance is $3\pi \times 10^{-3}$ Tm/A what is its relative permeability ? $[\mu_0 = 4\pi \times 10^{-7}]$

    A. $7.5 \times 10^{+4}$

    B. $7.5 \times 10^{+3}$

    C. $5 \times 10^{+4}$

    D. $5 \times 10^{+3}$

Answer: B

9. What is the intensity of magnetisation of a bar magnet of length 4 cm cross sectional area 2.5 cm^2 and magnetic moment 2 Am^2 ?

    A. 10^5 A/m

    B. 2×10^5 A/m

    C. 3×10^5 A/m

    D. 0.5×10^5 A/m

Answer: B

10. What is the susceptibility of a medium if its relative permeability is 0.75 ?

A. 0.5

B. 0.25

C. -0.25

D. -1.75

Answer: C

▶

11. The susceptibility of the rod of magnetic material is -0.5 what will happen if the rod is suspended in a magnetic field ?

A. it will remain parallel to the magnetic field

B. it will set itself perpendicualr to the magnetic field

C. it will perform angular S.H.M

D. it will set itself in a position making a

small angle with the field

Answer: B

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12. If X_1 and X_2 are the susceptibilities of a

diamagnetic substance at a absoulte

temperature T_1 and T_2 where $T_2 > T_1$ then

A. $X_1 \sqrt{T_1} = X_2 \sqrt{T_2}$

B. $X_1 = X_2$

C. $X_1 > X_2$

D. $X_1 < X_2$

Answer: B

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13. The susceptibility of a magneitc material is

x at $127°c$ at what temperature its

susceptibility will be reduced to half of its

original value ?

A. $327°C$

B. $427°C$

C. $527°C$

D. $627°C$

Answer: C

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14. The material suitable for making electromagnets should have

A. low retentivity and high coercivity

B. high retentivity and low coercivity

C. high retentivity and high coercivity

D. high retentivity and high coercivity

Answer: C

15. The variation of intensity of mgnetisation (I) with respect to the magnetising field(H) in a diamagnetic substance is as in the graph

which line gives the correct variation ?

A. OA

B. OB

C. OC

D. OD

Answer: D

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