RK VISION ACADEMY

PHYSICS

XII – MAGNETISM

SECTION A

1. A very small magnet is placed in the magnetic meridian with its south pole pointing north. The null point is obtained 20 *cm* away from the centre of the magnet. If the earth's magnetic field (horizontal component) at this point be 0.3 *gauss*, the magnetic moment of the magnet is

(1) 8.0×10^2 e.m.u
(2) 1.2×10^3 e.m.u
(3) 2.4×10^3 e.m.u
(4) 3.6×10^3 e.m.u

2. Intensity of magnetic field due to earth at a point inside a hollow steel box is

(1) Less than outside
(2) More than outside
(3) Same
(4) Zero

3. Earth's magnetic field always has a horizontal component except at or Horizontal component of earth's magnetic field remains zero at

(1) Equator
(2) Magnetic poles
(3) A latitude of 60°
(4) An altitude of 60°

4. A dip needle in a plane perpendicular to magnetic meridian will remain

(1) Vertical
(2) Horizontal
(3) In any direction
(4) At an angle of dip to the horizontal

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

(1) Zero
(2) 45°
(3) 90°
(4) 180°

6. The correct relation is

(Where B_H =Horizontal component of earth's magnetic field; B_V= Vertical component of earth's magnetic field and B = Total intensity of earth's magnetic field)

(1) $B = \frac{B_V}{B_H}$
(2) $B = B_V \times B_H$
(3) $|B| = \sqrt{B_H^2 + B_V^2}$
(4) $B = B_H + B_V$

7. 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

(1) 60°
(2) 45°
(3) 90°
(d) 30°

8. 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

(1) Magnetic poles
(2) Geographical poles
(3) Every place
(d) Magnetic equator

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

(1) Angle of dip
(2) Angle of declination
(3) Magnetic moment
(d) Power of magnetic field

10. **The lines of forces due to earth's horizontal component of magnetic field are**

(1) Parallel straight lines

(2) Concentric circles

(3) Elliptical

(d) Parabolic

11. **The pole strength of a bar magnet is 48 *ampere-metre* and the distance between its poles is 25 *cm*. The moment of the couple by which it can be placed at an angle of 30º with the uniform magnetic intensity of flux density 0.15 *Newton /ampere-metre* will be**

(1) 12 *Newton* × *metre*

(2) 18 *Newton* × *metre*

(3) 0.9 *Newton* × *metre*

(d) None of the above

12. **The magnetic field at a point *x* on the axis of a small bar magnet is equal to the field at a point *y* on the equator of the same magnet. The ratio of the distances of *x* and *y* from the centre of the magnet is**

(1) 2^{-3}

(2) $2^{-1/3}$

(3) 2^{3}

(d) $2^{1/3}$

13. **A magnet of magnetic moment 20 C.G.S. units is freely suspended in a uniform magnetic field of intensity 0.3 C.G.S. units. The amount of work done in deflecting it by an angle of 30º in C.G.S. units is**

(1) 6

(2) $3\sqrt{3}$

(3) $3(2-\sqrt{3})$

(d) 3

14. **A bar magnet having centre O has a length of 4 *cm*. Point P_1 is in the broad side-on and P_2 is in the end side-on position with $OP_1 = OP_2 = 10$ *metres*. The ratio of magnetic intensities *H* at P_1 and P_2 is**

(1) $H_1 : H_2 = 16 : 100$

(2) $H_1 : H_2 = 1 : 2$

(3) $H_1 : H_2 = 2 : \mathbf{1}$

(4) $H_1 : H_2 = 100 : 16$

15. **The magnetic field due to a short magnet at a point on its axis at distance *X cm* from the middle point of the magnet is 200 *Gauss*. The magnetic field at a point on the neutral axis at a distance *X cm* from the middle of the magnet is**

(1) 100 *Gauss*

(2) 400 *Gauss*

(3) 50 *Gauss*

(d) 200 *Gauss*

16. **In the case of bar magnet, lines of magnetic induction**

(1) Start from the north pole and end at the south pole

(2) Run continuously through the bar and outside

(3) Emerge in circular paths from the middle of the bar

(4) Are produced only at the north pole like rays of light from a bulb

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

(1) Teak wood

(2) Plastic material

(3) Soft iron of high permeability

(4) A metal of high conductivity

18. **The field due to a magnet at a distance *R* from the centre of the magnet is proportional to**

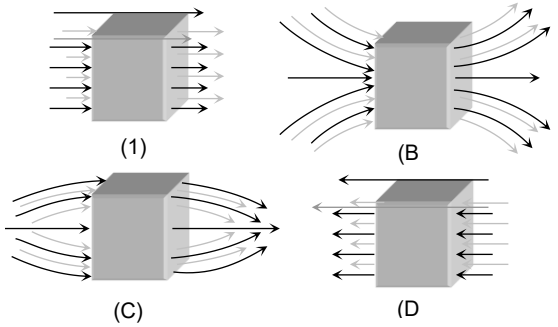
(1) R^2

(2) R^3

(3) $1/R^2$

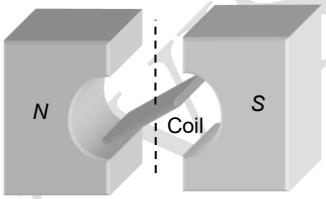
(4) $1/R^3$

19. **A uniform magnetic field, parallel to the plane of the paper existed in space initially directed from left to right. When a bar of soft iron is placed in the field parallel to it, the lines of force passing through it will be represented by**



(1) Figure (1)
(2) Figure (2)
(3) Figure (3)
(4) Figure (4)

20. **The figure below shows the north and south poles of a permanent magnet in which *n* turn coil of area of cross-section *A* is resting, such that for a current *i* passed through the coil, the plane of the coil makes an angle *θ*with respect to the direction of magnetic field B. If the plane of the magnetic field and the coil are horizontal and vertical respectively, the torque on the coil will be**



(1) $\tau = niAB\cos\theta$
(2) $\tau = niAB\sin\theta$
(3) $\tau = niAB$
(4) None of the above, since the magnetic field is radial

21. **A bar magnet *A* of magnetic moment M_A is found to oscillate at a frequency twice that of magnet *B* of magnetic moment M_B when placed in a vibrating *magneto-meter*. We may say that**

(1) $M_A = 2M_B$
(2) $M_A = 8M_B$
(3) $M_A = 4M_B$
(4) $M_B = 8M_A$

22. **Two magnets *A* and *B* are identical in mass, length and breadth but have different magnetic moments. In a vibration magnetometer, if the time period of *B* is twice the time period of *A*. The ratio of the magnetic moments M_A/M_B of the magnets will be**

(1) $1/2$
(2) 2
(3) 4
(4) $1/4$

23. **A magnet of magnetic moment *M* oscillating freely in earth's horizontal magnetic field makes *n* oscillations per minute. If the magnetic moment is quadrupled and the earth's field is doubled, the number of oscillations made per minute would be**

(1) $\frac{n}{2\sqrt{2}}$
(2) $\frac{n}{\sqrt{2}}$
(3) $2\sqrt{2}n$
(4) $\sqrt{2}n$

24. **A magnetic needle suspended horizontally by an unspun silk fibre, oscillates in the horizontal plane because of the restoring force originating mainly from**

(1) The torsion of the silk fibre
(2) The force of gravity
(3) The horizontal component of earth's magnetic field
(4) All the above factors

25. **At two places *A* and *B* using vibration magnetometer, a magnet vibrates in a horizontal plane and its respective periodic time are 2 *sec* and 3 *sec* and at these places the earth's horizontal components are H_A and H_B respectively. Then the ratio between H_A and H_B will be**

(1) 9 : 4
(2) 3 : 2
(3) 4 : 9
(4) 2 : 3

26. The time period of a bar magnet suspended horizontally in the earth's magnetic field and allowed to oscillate

(1) Is directly proportional to the square root of its mass

(2) Is directly proportional to its pole strength

(3) Is inversely proportional to its magnetic moment

(4) Decreases if the length increases but pole strength remains same

27. Magnets *A* and *B* are geometrically similar but the magnetic moment of *A* is twice that of *B*. If T_1 and T_2 be the time periods of the oscillation when their like poles and unlike poles are kept together respectively, then $\frac{T_1}{T_2}$ will be

(1) $\frac{1}{3}$
(2) $\frac{1}{2}$
(3) $\frac{1}{\sqrt{3}}$
(4) $\sqrt{3}$

28. A small bar magnet *A* oscillates in a horizontal plane with a period *T* at a place where the angle of dip is 60°. When the same needle is made to oscillate in a vertical plane coinciding with the magnetic meridian, its period will be

(1) $\frac{T}{\sqrt{2}}$
(2) T
(3) $\sqrt{2}T$
(4) $2T$

29. Vibration magnetometer works on the principle of

(1) Torque acting on the bar magnet
(2) Force acting on the bar magnet
(3) Both the force and the torque acting on the bar magnet
(4) None of these

30. Tangent galvanometer is used to measure

(1) Steady currents
(2) Current impulses
(3) Magnetic moments of bar magnets
(4) Earth's magnetic field

31. A superconductor exhibits perfect

(1) Ferrimagnetism
(2) Ferromagnetism
(3) Paramagnetism
(4) Diamagnetism

32. A small rod of bismuth is suspended freely between the poles of a strong electromagnet. It is found to arrange itself at right angles to the magnetic field. This observation establishes that bismuth is

(1) Diamagnetic
(2) Paramagnetic
(3) Ferri-magnetic
(4) Antiferro-magnetic

33. A diamagnetic material in a magnetic field moves

(1) From weaker to the stronger parts of the field

(2) Perpendicular to the field

(3) From stronger to the weaker parts of the field

(4) In none of the above directions

34. Curie temperature is the temperature above which

(1) A paramagnetic material becomes ferromagnetic

(2) A ferromagnetic material becomes paramagnetic

(3) A paramagnetic material becomes diamagnetic

(4) A ferromagnetic material becomes diamagnetic

35. A frog can be deviated in a magnetic field produced by a current in a vertical

solenoid placed below the frog. This is possible because the body of the frog behaves as

(1) Paramagnetic
(2) Diamagnetic
(3) Ferromagnetic
(4) Antiferromagnetic

SECTION B

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

(1) Iron
(2) Nickel
(3) Cobalt
(4) Brass

37. Liquid oxygen remains suspended between two pole faces of a magnet because it is

(1) Diamagnetic
(2) Paramagnetic
(3) Ferromagnetic
(4) Antiferromagnetic

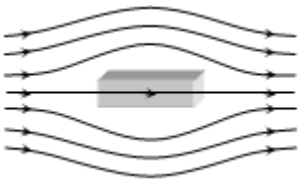
38. Curie-Weiss law is obeyed by iron at a temperature .....

(1) Below Curie temperature
(2) Above Curie temperature
(3) At Curie temperature only
(4) At all temperatures

39. The materials suitable for making electromagnets should have

(1) High retentivity and high coercivity
(2) Low retentivity and low coercivity
(3) High retentivity and low coercivity
(4) Low retentivity and high coercivity

40. The given figure represents a material which is



(1) Paramagnetic
(2) Diamagnetic
(3) Ferromagnetic
(4) None of these

41. For substances hysteresis *(B - H)* curves are given as shown in figure. For making temporary magnet which of the following is best.

(1) $(B - M) = \mu_0 H$
(2) $M = \mu_0 (H + M)$
(3) $H = \mu_0 (H + M)$
(4) $B = \mu_o (H + M)$

42. The magnetic susceptibility of any paramagnetic material changes with absolute temperature *T* as

(1) Directly proportional to T
(2) Remains constant
(3) Inversely proportional to T
(4) Exponentially decaying with T

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

(1) 1
(2) 2
(3) 3
(4) 4

44. Which of the following is diamagnetism

(1) Aluminium
(2) Quartz
(3) Nickel
(4) Bismuth

45. **If a ferromagnetic material is inserted in a current carrying solenoid, the magnetic field of solenoid**

(1) Largely increases

(2) Slightly increases

(3) Largely decreases

(4) Slightly decreases

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

(1) Retentivity

(2) Coercive force

(3) Lorentz force

(4) None of the above

47. **If the magnetic dipole moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material denoted by μ_d, μ_p, μ_f respectively then**

(1) $\mu_d \neq 0$ and $\mu_f \neq 0$

(2) $\mu_p = 0$ and $\mu_f \neq 0$

(3) $\mu_d = 0$ and $\mu_p \neq 0$

(4) $\mu_d \neq 0$ and $\mu_p = 0$

48. **Among the following properties describing diamagnetism identify the property that is wrongly stated**

(1) Diamagnetic material do not have permanent magnetic moment

(2) Diamagnetism is explained in terms of electromagnetic induction

(3) Diamagnetic materials have a small positive susceptibility

(4) The magnetic moment of individual electrons neutralize each other

49. **Susceptibility of ferromagnetic substance is**

(1) > 1

(2) < 1

(3) 0

(4) 1

50. **When a ferromagnetic material is heated to temperature above its Curie temperature, the material**

(1) Is permanently magnetized

(2) Remains ferromagnetic

(3) Behaves like a diamagnetic material

(4) Behaves like a paramagnetic material

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PHYSICS	
XII – MAGNETIC EFFECT OF CURRENT	
SECTION A	
1.	2
2.	4
3.	2
4.	1
5.	3
6.	3
7.	4
8.	4
9.	2
10.	1
11.	3
12.	4
13.	3
14.	2
15.	1
16.	1
17.	2
18.	3
19.	4
20.	2
21.	3
22.	3
23.	3
24.	3
25.	1
26.	1
27.	3
28.	1
29.	1
30.	1
31.	4
32.	1
33.	3
34.	2
35.	2
SECTION B	
36.	4
37.	2
38.	2
39.	3
40.	2
41.	4
42.	3
43.	4
44.	4
45.	1
46.	2
47.	3
48.	3
49.	1
50.	4