

# SARALA BIRLA PUBLIC SCHOOL

Birla Knowledge City, Mahilong, Ranchi

CLASS-XII, (2020-21)

Sub: Physics

Assignment-5

## MCQ

1. Biot-Savart law indicates that the moving electrons ( velocity  $v$ ) produce a magnetic field  $B$  such that
  - (a)  $B$  is perpendicular to  $v$
  - (b)  $B$  is parallel to  $v$
  - (c) it obeys inverse cube law
  - (d) it is along the line joining the electron and point of observation
2. The sensitivity of a moving coil galvanometer increases with the decrease in
  - (a) number of turns
  - (b) area of the coil
  - (c) magnetic field
  - (d) torsional rigidity
3. A circular coil of 50 turns and radius 7 cm is placed in a uniform magnetic field of 4 T normal to the plane of the coil. If the current in the coil is 6 A then total torque acting on the coil is
  - (a) 14.78 N
  - (b) 0 N
  - (c) 7.39 N
  - (d) 3.69 N
4. A current carrying loop is placed in a uniform magnetic field. The torque acting on it does not depend upon the
  - (a) shape of the loop
  - (b) area of the loop
  - (c) value of current
  - (d) magnetic field
5. A voltmeter of range 2V and resistance 300 ohm cannot be converted to an ammeter of range
  - (a) 5 mA
  - (b) 8 mA
  - (c) 1 A
  - (d) 10 A
6. An electron is projected with uniform velocity along the axis of a current carrying long solenoid. Which of the following is true?
  - (a) The electron will be accelerated along the axis
  - (b) The electron path will be circular about the axis
  - (c) The electron will experience a force at  $45^\circ$  to the axis and hence execute a helical

path

(d) The electron will continue to move with uniform velocity along the axis of the solenoid

7. A circular current loop of magnetic moment  $M$  is in an arbitrary orientation in an external magnetic field  $B$ . The work done to rotate the loop by  $30^\circ$  about an axis perpendicular to its plane is

(a)  $MB$       (b)  $\sqrt{3} MB/2$       (c)  $MB/2$       (d) zero

8. A cyclotron's oscillator frequency is 20 MHz. If the radius of its 'dees' is 40 cm, what is the kinetic energy (in MeV) of the proton beam produced by the accelerator.

(a) 7 MeV      (b) 13.25 MeV      (c) 28 MeV      (d) 3.5 MeV

9. A helium nucleus moves in a circle of 0.8 m radius in one second. The magnetic field produced at the centre of circle will be

(a)  $\mu_0 \times 10^{-19}$       (b)  $\mu_0 \times 10^{+19}$       (c)  $2\mu_0 \times 10^{-19}$       (d)  $(2 \times 10^{-19}) / \mu_0$

10. A magnetic field can be produced

(a) only by moving charge  
(b) only by changing electric field  
(c) both (a) and (b)  
(d) none of these

11. There is a thin conducting wire carrying current. What is the value of magnetic field induction at any point on the conductor itself?

(a) 1      (b) zero      (c) -1      (d) either (a) or (b)

12. In a uniform magnetic field, an electron ( or charge particle) enters perpendicular to the field. The path of electron will be

(a) ellipse      (b) circular      (c) parabolic      (d) linear

13. If the velocity of charge particle is doubled and value of magnetic field is reduced to half, then the radius of path of charged particle will be

(a) 8 times      (b) 4 times      (c) 3 times      (d) 2 times

14. A galvanometer of resistance 25 ohm shows full scale deflection for current of 10 mA. To convert it into 100 V range voltmeter, the required series resistance is

(a) 9975  $\Omega$       (b) 10025  $\Omega$       (c) 10000  $\Omega$       (d) 975  $\Omega$

15. An electron is travelling horizontally towards east. A magnetic field in vertically downward direction exerts a force on the electron along

(a) east      (b) west      (c) north      (d) south

16. An electron is moving in a cyclotron at a speed of  $3.2 \times 10^7$  m/s in a magnetic field of  $5 \times 10^{-4}$  T perpendicular to it. What is the frequency of this electron? ( $q = 1.6 \times 10^{-19}$  C,  $m_e = 9.1 \times 10^{-31}$  kg)

(a)  $1.4 \times 10^5$  Hz      (b)  $1.4 \times 10^7$  Hz      (c)  $1.4 \times 10^6$  Hz      (d)  $1.4 \times 10^9$  Hz

17. The coil of galvanometer consists of 100 turns and effective area of  $1 \text{ cm}^2$ . The restoring couple is  $10^{-8} \text{ Nm rad}^{-1}$ . The magnetic field between poles is of 5 T. Current

sensitivity of this galvanometer is

(a)  $5 \times 10^4$  rad/ $\mu$  amp (b)  $5 \times 10^6$  per amp (c)  $2 \times 10^{-7}$  per amp (d) 5 rad /  $\mu$  amp

18. An electron of charge ( $e$ ) is moving parallel to uniform magnetic field  $B$  with constant

velocity  $v$ . The force acting on electron is

(a)  $Bev$  (b)  $Be/v$  (c)  $B/ev$  (d) zero

19. A circular loop of area  $A$ , carrying current  $I$ , is placed in a magnetic field  $B$  perpendicular to

the plane of the loop. The torque on the loop due to magnetic field is

(a)  $BIA$  (b)  $2 BIA$  (c)  $\frac{1}{2} BIA$  (d) zero

20. The area of a circular ring is  $1\text{cm}^2$  and current of 10 A is passing through it. If a magnetic

field of intensity 0.1 T is applied perpendicular to the plane of the ring. The torque due to

magnetic field on the ring will be

(a) Zero (b)  $10^{-4}$  N-m (c)  $10^{-2}$  N-m (d) 1 N-m