Name of the Student: _____

Question No. 1. Encircle the correct option.   **(20)**

1. The most suitable material for making permanent magnet is
   (a) soft iron   (b) steel   (c) aluminum   (d) cobalt
2. The magnetic force on an electron traveling with 10^7 m/s parallel to a magnetic field of strength 5 W/m^2 is
   (a) 10^5 N   (b) 10^{-10} N   (c) 10^8 N   (d) zero
3. The magnetic lines of force
4. (a) can cross each other   (b) cannot cross each other   (c) always cross each other (d) sometime cross each other
5. The magnetic force experienced by a charge particle is maximum when particle moves
   (a) perpendicular to magnetic field   (b) parallel to magnetic field
   (c) at 60° with magnetic field   (d) at 30° with magnetic field
6. CRO is used to
   (a) measure power   (b) measure current   (c) plot high speed graph   (d) measure resistance
7. In lamp scale arrangement of sensitive galvanometer the lamp is placed at _____ from mirror
   (a) 1 mm   (b)   1 cm   (c)   10 m   (d)   1 m
8. Magnetic flux will be maximum when angle b/w **B** and **A** is:
   (a) 0^0 (b) 45^0 (c) 90^0 (d) 180^0
9. A charged particle moving in a magnetic field experiences a magnetic force given by
   (a) $F_m = q\,v \times B$ (b) $F_m = q\,v \cdot B$ (c) $F_m = v \times B /q$ (d) $F_m = v \cdot B /q$
10. A current carrying conductor moving in a magnetic field experiences maximum force when it moves
    (a) perpendicular to field   (b) parallel to field   (c) at 45° to field   (d) at 60° to field
11. To convert a galvanometer into ammeter small resistance is connected in
    (a) series   (b) parallel   (c) both a&b   (d) no resistance is connected
12. When a proton enters into the magnetic field perpendicularly, then it moves
    (a) straight   (b) anticlockwise (Circular path)   (c) clockwise (circular path)   (d) comes to rest
13. Work done by the magnetic force is
    (a) positive   (b) negative   (c) maximum   (d) zero
14. The S.I unit of magnetic induction is tesla which is also equal to
    (a) N /A m   (b) N m / A   (c) N / A^2 m   (d) N / A^2 m^2
15. Sensitivity of the galvanometer depends upon
    (a) no. of turns of coil   (b) area of coil   (c) magnetic filed   (d) all of these
16. Magnetic field due to a current carrying coil is given by
    (a) $\mu_0 n/I$ (b) μ_0/nI (c) $\mu_0 nI$ (d) $\mu_0 nI^2$
17. When a charge particle moves through a magnetic field, it changes
    (a) speed of particle   (b) mass of particle   (c) energy of particle   (d) velocity of particle
18. ohmmeter is used to measure
    (a) current   (b) resistance   (c) temperature   (d) voltage
19. In order to increase the range of voltmeter, the high resistance connected in series is
    (a) decreased   (b) increased   (c) remain constant   (d) no resistance is connected
20. The force $F = F_e + F_m$ is called
    (a) deflecting force   (b) restoring force   (c) frictional force   (d) Lorentz force

Question No. 2 Write short answers of any six.   **2x6=12**

i. Why the work done on the charged particle by the magnetic force is zero?
ii. Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate? Explain.
iii. Define sensitivity of Galvanometer. How can it be increased?
iv. What should be the orientation of a current carrying coil in a magnetic field so that torque acting on it is (a). maximum, (b). minimum
v. Why the resistance of am ammeter should be very low?
vi. Define magnetic flux and flux density. Also give their mathematical expression.
vii. Describe the change in the magnetic field inside a solenoid carrying a steady current I, if (a) the length of the solenoid is doubled by the number of turns remains the same and (b) the number of turns is doubled but the length remains the same.
viii. What can you conclude about the magnetic field due to stationary charges? What about moving charges?

Question No. 3 a. State Ampere's law. Calculate magnetic field **B** due to current passing through a long solenoid. **(5)**
  b. Find the radius of the orbit of an electron moving at a rate of 2.0 x 10^7 m/s in a uniform magnetic field of 1.20 x 10^{-3} T? **(3)**

OR

Question No. 4 a. Derive an expression for the force on a charged particle moving in a magnetic field. What is the direction of the force? **(5)**
b. A solenoid 15 cm long has 300 turns of wire. A current of 5 A flows through it. What is the   magnitude of magnetic field inside the solenoid? **(3)**