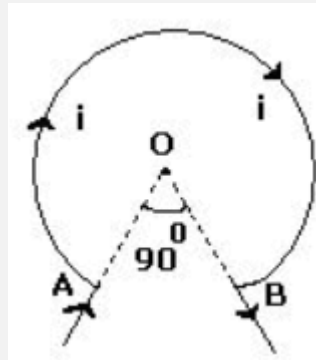


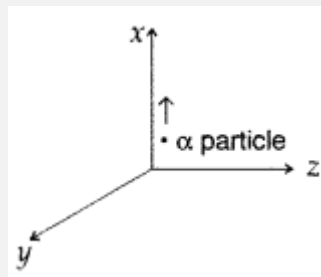


Assignment of Chapter - 4

- 1) The magnetic field at the centre of the circular coil of radius 1 cm and carrying current of 4 A is

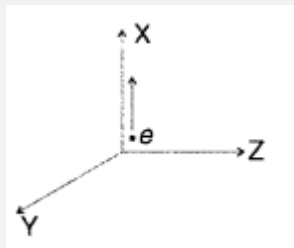


- 2) Magnetic moment of a single-turn current loop of aluminium wire of area A, carrying a current I in a wire of diameter d is.
- 3) Write equation for Ampere's circuital law.
- 4) The scale of a galvanometer of resistance 100Ω contains 25 divisions. It gives a deflection of one division on passing a current of $4 \times 10^{-4} \text{A}$. The resistance in ohms to be added to it so that it may become a voltmeter of range 2.5 volt is:
- 5) A wire of length L carrying current i is placed perpendicular to the magnetic induction B. The total force on the wire is
- 6) Under what conditions is the force acting on a charge moving through a uniform magnetic field minimum?
- 7) A long straight wire carries a current of 35 A. What is the magnitude of the field B at a point 20 cm from the wire?
- 8) Two long parallel straight wires X and Y separated by a distance of 5 cm in air carry currents of 10 A and 5 A respectively in opposite directions. Calculate the magnitude and direction of the force on a 20 cm length of the wire Y.
- 9) An electron is moving along +ve x-axis in the presence of uniform magnetic field along +ve y-axis. What is the direction of force acting on it?
- 10) An electron does not suffer any deflection while passing through a region of uniform magnetic field. What is the direction of the magnetic field? (All India 2009)
- 11) A beam of a particles projected along +x-axis, experiences a force due to a magnetic field along the +y-axis. What is the direction of the magnetic field? (All India 2009)

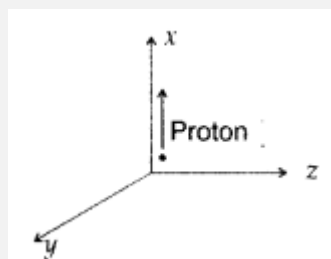




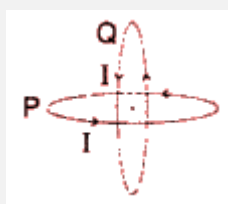
- 12) A beam of electrons projected along +x-axis, experiences a force due to a magnetic field along the +y/-axis. What is the direction of the magnetic field? (All India 2010)



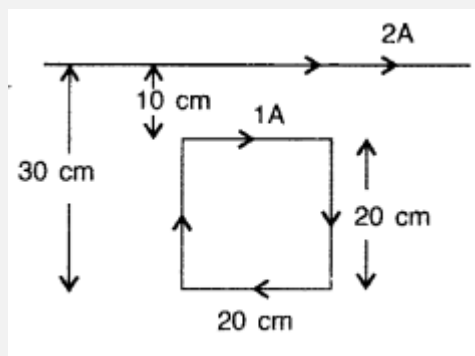
- 13) A beam of protons, projected along + x-axis, experiences a force due to a magnetic field along the – y-axis. What is the direction of the magnetic field? (All India 2010)



- 14) Write the expression in vector form, for the magnetic force \vec{F} acting on a charged particle moving with velocity \vec{V} in the presence of a magnetic field B. (Comptt. All India 2012)
- 15) An ammeter of resistance 0.6Ω can measure current upto 1.0 A. Calculate
(i) The shunt resistance required to enable the ammeter to measure current upto 5.0 A
(ii) The combined resistance of the ammeter and the shunt. (Delhi 2013)
- 16) Write the condition under which an electron will move undeflected in the presence of crossed electric and magnetic fields.(Comptt. All India 2013)
- 17) Two identical circular wires P and Q each of radius R and carrying current 'I' are kept in perpendicular planes such that they have a common centre as shown in the figure. Find the magnitude and direction of the net magnetic field at the common centre of the two coils.(Delhi2011)

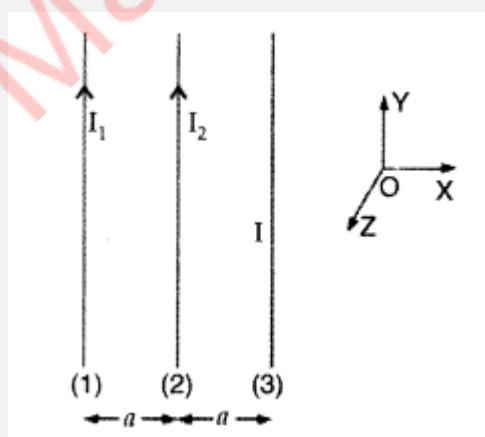


- 18) An ammeter of resistance 0.80Ω can measure current upto 1.0 A.
(i) What must be the value of shunt resistance to enable the ammeter to measure current upto 5.0A?
(ii) What is the combined resistance of the ammeter and the shunt? (Delhi 2013)
- 19) A square loop of side 20 cm carrying current of 1A is kept near an infinite long straight wire carrying a current of 2A in the same plane as shown in the figure.



Calculate the magnitude and direction of the net force exerted on the loop due to the current carrying conductor. (Comptt. All India)

- 20) A square shaped plane coil of area 100 cm^2 of 200 turns carries a steady current of 5A. It is placed in a uniform magnetic field of 0.2 T acting perpendicular to the plane of the coil. Calculate the torque on the coil when its plane makes an angle of 60° with the direction of the field. In which orientation will the coil be in stable equilibrium? (Comptt. All India 2014)
- 21) Find the condition under which the charged particles moving with different speeds in the presence of electric and magnetic field vectors can be used to select charged particles of a particular speed. (All India 2015)
- 22) An electron moves around the nucleus in a hydrogen atom of radius 0.51 A, with a velocity of $2 \times 10^5 \text{ m/s}$. Calculate the following :
- (i) the equivalent current due to orbital motion of electron
 - (ii) the magnetic field produced at the centre of the nucleus
 - (iii) the magnetic moment associated with the electron. (All India 2015)
- 23) Three long straight parallel wires are kept as shown in the figure. The wire (3) carries a current I



- (i) The direction of flow of current I in wire (3), is such that the net force, on wire (1), due to the other two wires, is zero.
- (ii) By reversing the direction of I, the net force, on wire (2), due to the other two wires, becomes zero. What will be the directions of current I, in the two cases?