**Mathematical Problems:**

1. What is the magnetic field 5.55 cm away from a long wire carrying a current of 12.3 ampere?
2. Find the radius of a circular coil having 200 turns and carrying current 2 amp create magnetic field at the center of 3×10-3 web/m2.
3. Let the total positive and the total negative charges in a copper penny be separated to a distance such that their force of attraction is 1.0 lb (4.5 Newton). How far apart must they have? (Charge of the copper penny is 1.3×105 coulomb)
4. A flat coil of 20 turns and area 100cm2 is rotated with an angular speed of ɷ=10 rad/sec in a magnetic field B= 0.5 weber/m2. Calculate the average electromotive force induced in the coil for a quarter period starting from t= 0.
5. Calculate the electric field intensity at a point 1m from the charge 100C in air.
6. If the equation of an alternating current is, I = 50 sin 628 t, then find (i) peak value (ii) frequency and (iii) root mean square value of the current.
7. What is the magnitude of the electric field strength E such that an electron placed in the field would experience an electric force equal to its weight
8. The resistance of a wire of length of 0.48 m and diameter of 0.12 mm is 15 ohm. Calculate the specific resistance of the material of the wire.
9. If a wire of resistance 6 ohm is elongated three times, its area of cross-section becomes one third. What will be its final resistance?
10. The resistances of two resistors of the same material are same. If the ratio of the lengths of the two resistors is 4:9, what is the ratio of their diameter?
11. If an electron is moving with velocity of 105 ms-1 making an angle of 600 with a uniform magnetic field of 0.50 T, calculate the force acting on it.
12. What shunt resistance is to be added to a galvanometer of resistance of 20 Ω so that 10 % of total current flows through the galvanometer?
13. The diameter of a circular coil is 31.4 ×10-2 m and its number of turns is 400. For what amount of current flow in the coil, the magnetic field at the centre of the coil will be 4×10-4 Wb-2
14. The area of each plate of a parallel plate capacitors is 1.5 m2 and distance between the plates in air medium is 0.02 m. calculate the capacitance in micro farad.
15. What is the equivalent capacitance when two capacitors of capacitances 16$μ$F and 22$μ$F are connected in series?
16. Series parallel Connection related circuit by using capacitor and resistor.
17. A pith ball of mass 0.002Kg is charged with 10-4 C. What is the magnitude of the electric field needed to keep the ball at rest in gravitational field?
18. How many electrons are contained in 5C of charges? What is the total mass of these electrons?
19. A series combination of two resistors of 2 and 3 ohms is connected across a cell of electromotive force of 3V. Calculate the potential difference between each resistor.
20. The specific resistance of a wire of diameter of 1 mm is 48×10 -8 ohm. What length of the wire is needed to make a coil of 100 ohm resistance?