**Contents for EEE, EVE (MID)**

**Short questions:**

Electricity, charge, quantization of charge, conservation of charge, electric field, electric flux, gauss’s law, coulomb’s law, electric potential, electric dipole, current, current density, drift velocity, capacitor, shunt, resistance, capacitance, types of capacitor, Biot-savart law, Ohm’s law, Magnetic field, magnetic flux.

**Broad questions:**

Coulomb’s law from Gauss’s law.

Electric potential due to a point a charge.

Electric potential due to electric dipole.

Relationship between drift velocity and current density.

Explain series and parallel combination of capacitor.

Capacitance for spherical capacitor.

Capacitance for cylindrical capacitor.

Expression of Shunt current or shunt resistance, galvanometer current or resistance.

Magnetic field for a straight wire carrying current.

Magnetic field for a circular coil carrying current.

**Mathematical problems:**

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(4.5nt). how far apart must they have ? (Charge of the copper penny is 1.3\*105 coul)

What must the magnitude of an isolated positive point charge be for the electric potential at 10 cm from the charge to be +100 volts?

Calculate the electric field intensity at a point 1m from the charge 100C in air.

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?

What is the electric potential at the surface of a gold nucleus? The radius is 6.6×10-15 m and the atomic number Z=79.

Two charges of 10x10-8 C and 30x10-8 C are placed into a free space and create force 4.2x10-6 N to each other. Find the separation between them.

A plastic ball of mass 8.4 × 10-16 kg is kept hanging in an electric field of 2.6 × 104 N/C. Calculate the charge in the ball. (g = 10 ms-2)

A pith ball of mass 0.002 kg is charged with 10-4 C. What is the magnitude of the electric field needed to keep the ball at rest in gravitational field?

What is the equivalent capacitance when two capacitors of capacitances 16 F and 22 F are connected in series?

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.

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

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?

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.

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?