COMPETENCY BASED QUESTIONS

1. You are given two sets of potentiometer circuit to measure the emf E1 of a cell.

   Set A: consists of a potentiometer wire of a material of resistivity ρ_1, area of cross-section A_1 and length l.

   Set B: consists of a potentiometer of two composite wires of equal lengths l/2 each, of resistivity ρ_1, ρ_2 and area of cross-section A_1, A_2 respectively.

   (i) Find the relation between resistivity of the two wires with respect to their area of cross section, if the current flowing in the two sets is same.

   Compare the balancing length obtained in the two sets.
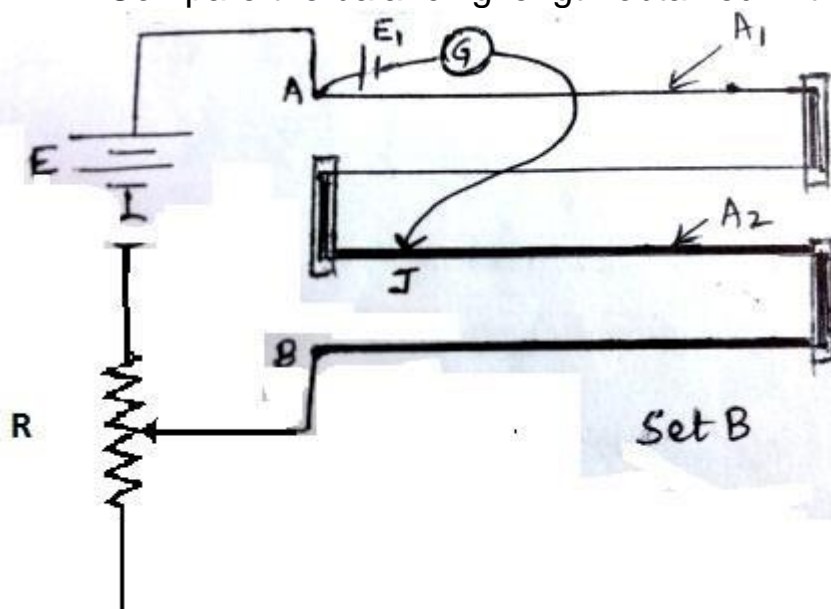
2, The following table gives the length of three copper wires, their diameters, and the applied potential difference across their ends. Arrange the wires in increasing order according to the following:

   (a) The magnitude of the electric field within them,
   (b) The drift speed of electrons through them, and
   (c) The current density within them.

Wire no.	Length	Diameter	Potential Difference
1	L	3d	V
2	2L	d	V
3	3L	2d	2V

3. (a) State the working principle of a potentiometer. With the help of the circuit diagram, explain how a potentiometer is used to compare the emf of two primary cells. Obtain the required expression used for comparing the emfs.

    (b) Write two possible causes for one sided deflection in a potentiometer experiment.

4. A uniform wire of resistance 20 Ω is cut into two equal parts. These parts are now connected in parallel. What will be the resistance of the combination?

5. What do you understand by sensitivity of a potentiometer? How can you increase the sensitivity of a potentiometer?