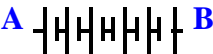## CLASS : XII
PHYSICS ASSIGNMENT

Unit II - Current Electricity

Question number 1-13 are V. Short answer questions, carrying 1 mark each.
**Question number 14-25 are short answer questions, carrying 2 marks each.**
Question number 26-34 are also short answer questions each carrying 3 marks.
**Question number 35-39 are long answer questions, each carrying 5 marks.**

1.   A carbon resister of 4.7Ω is to be marked with rings of different colours for its identification write the sequence of colours if tolerance is $\pm$ 5%.
2.   What is the resistance of an ideal ammeter & An ideal voltmeter.
3.   How would resistively of semiconductor change with increasing temperature.
4.   Manganin is used for making standard resistance. Why?
5.   How does the drift velocity of electrons in a metallic conductor vary with increase in temperature?
6.   A wire of resistivety ρ is stretched to double of its length what is the new resistivity?
7.   Show the voltage current relationship for (i) Metals,   (ii) Junction diodes.
8.   A wire is carrying current. Is it charged?
9.   What is the direction of flow of electrons in a conductor when a potential difference is applied?
10.   A current flowing through a conductor is 1 ampere. Calculate the number of electrons flowing per second?
11.   A current of 4.5 ampere is flowing in copper wire of cross – sectional area $8 \times 10^{-4} m^2$. calculate the current density in the wire.
12.   What is the emf of the following battery if the emf of each cell is 2V.

13.   What are the SI units of electrical energy & electric power.
14.   How can a moving coil galvanometer be converted into an ammeter?
15.   Calculate the equivalent resistance between A & B of the given network.
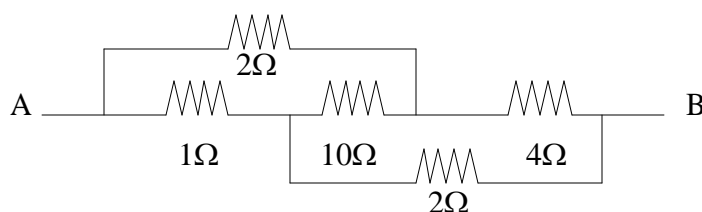
16.   Two cells of emf E_1 & E_2 ($E_1 > E_2$) are connected as shown in figure. When a potentiometer is connected between A & B, the balancing length of potentiometer is 300cm. On connecting the same potentiometer between A & C, the balancing length is 100cm. Calculate the ratio of E_1 & E_2.
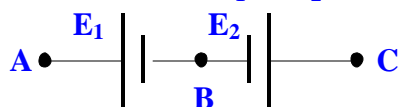
17. V-I graph for parallel & series combination of two metallic resistors are an shown in figure which graph represents parallel combination justify.
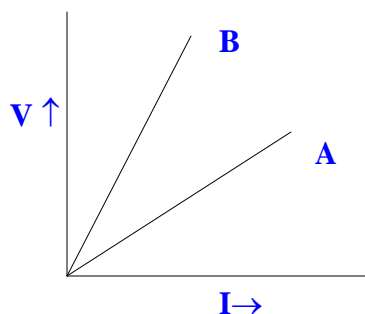

18. Is electric current a vector or a scalar quantity? Justify.
19. Arrange iron, silicon, copper, aluminium in decreasing order of conductivity.
20. The election drift arises due to the force experienced by electrons in the electric field inside the conductor. But force should cause acceleration. Why then do the electrons acquire steady arrange drift velocity?
21. If the electron drift speed in so small, the electrons charge is small, how can we still obtain large amounts of current in a conductor.
22. Are the paths of electron straight lines between successive collisions in the (i) absence of electric field (ii) presence of electric field.
23. Choose the correct alternative
     (i)   Alloys of metals usually have (greater / less) resistivity than that of their constituent metals
     (ii) Alloys usually have much (lower / higher) temperature coefficients of resistance than pure metals.
     (iii) The resistivity of alloy magnanin is nearly independent of / increase rapidly with increase of temperature.
     (iv) Mobility of electrons is (greater / less) than holes.
24. An electric motor operating on a 50V d.c. supply draws a current of 12A. if efficiency of motor is 30%, estimate the resistance of windings of the motor.
25. Two wires made of tinned copper having identical cross section & length 10cm & 15cm are to be used as fuse. Show that the fuses will melt at the same value of current in each case.
26. What is meant by sensitivity of a potentiometer. A battery E_1 of 4V & a variable resistance Rh are connected in series with the wire AB of the potentiometer. The length of the potentiometer wire is 1 meter. When a cell E_2 of emf 1.5 volt is connected between points A & C, no current flows through E_2. Length of AC = 60cm.
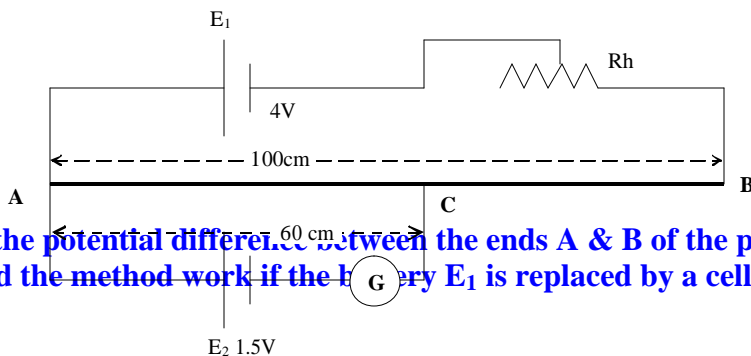

     (i)   Find the potential difference between the ends A & B of the potentiometer.
     (ii) Would the method work if the battery E_1 is replaced by a cell of emf of IV?

27. State & derive Ohm's law on the basis of the theory of electron drift.

28. Find the value of unknown resistance X, in the following circuit, if no current flows through the section AO. Also calculate the current drawn by the circuit from the battery of emf 6V & negligible internal resistance.
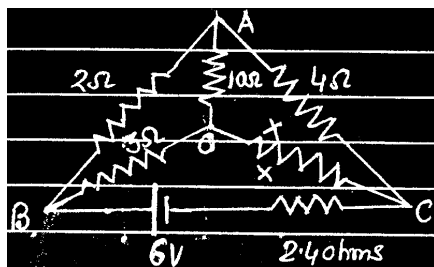
29. Find the value of resistance X & current drawn by the ckt, If no current flows through galvanometer. Assume the resistance / length of the wire AB to be 0.01 dohm/cm.
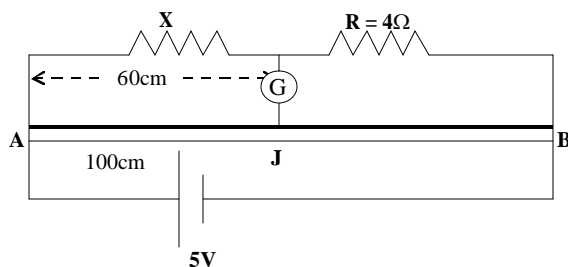

30. Galvanometer & cell are interchanged at the balance point of the wheatstone's bridge. Will the galvanometer show null deflection? Justify your answer.

31. A resistance of R Ω is powered from a potentiometer of resistance Ro Ω as shown in the figure (i) A voltage V is supplied to the potentiometer. Derive an expression for the voltage fed into the circuit when the slide is in the middle of the potentiometer.

32. Determine the current drawn from 12V supply with internal resistance 0.5Ω by the infinite network shown in figure (ii) Each resistor has 1Ω resistance.
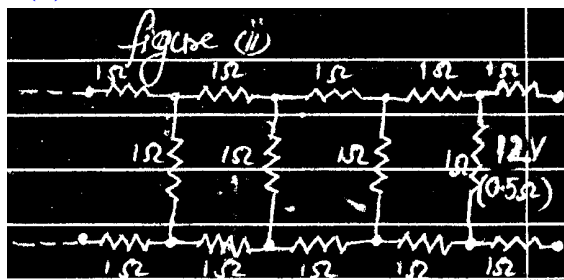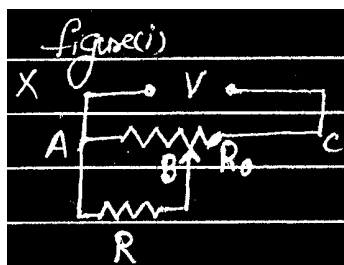
33. A galvanometer with a coil of resistance 12.0Ω shows a full scale deflection for a current of 2.5mA. how will you convert the galvanometer into (a) an ammeter of range 0 to 7.5 A

(b) a voltmeter of range 0 to 10.0 V

determine the net resistance of the meter in each case. When an ammeter is put in a circuit, does it read (slightly) less or more than the actual current in the original circuit? When a voltmeter is put across a part of the circuit, does it read (slightly) less or more than the original voltage drop? Explain.

34. **Three identical resistors, each of resistance. R, when connected in series with a d.c. source dissipate power X. If the resistors are connected in parallel to the same d.c source, how much power will be dissipated.**

35. **State Kirchoff's laws for an electrical network. A battery of 10V & negligible internal resistance in connected across the diagonally opposite corners of a cubical network consisting of 12 resistors each of resistance 1Ω as shown in figure (ii) Determine the equivalent resistance of the network and the current along each edge of the cube.**
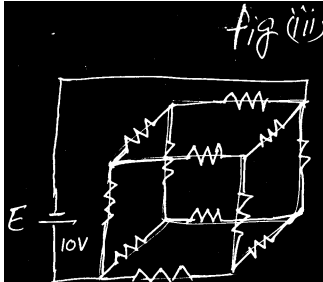
36. **Deduce the condition for balance for whetstone's Bridge. Using the principle of Wheatstone's Bridge describe the method of determine the specific resistance of a wire in the laboratory. Draw the circuit diagram & write the formula used.**

37. **Explain the principle of a potentiometer? Draw a circuit diagram & explain how would you use a potentiometer for comparing the emf's of two primary cells. Why is the use of potentiometer preferred over that of a voltmeter for measurement of emf of a cell?**

38. **A battery of emf E & internal resistance r is connected across a pure resistive device of resistance R. Show that the power output of the device is maximum when there is perfect matching between the external resistance & the source resistance ie r = R. Determine this maximum output power.**

39. (i) **Three resistances R_1, R_2 & R_3 are connected in parallel obtain an expression for their equivalent resistance.**

    (ii) **The length of a resistance wire is increased by 0.2% what is the percentage change in its resistance.**