Assignment 1

Institute: DEPSTAR

Branch: CSE Div:2

1. The resistance of a certain length of wire is 4.6 Ω at 20 °C and 5.68 Ω at 80 °C. Determine
   (a) temperature co-efficient of resistance of the material of wire at 0°C
   (b) resistance of wire at 60 °C.
2. The resistance of a wire of 3 mm^2 cross sectional area and 6 m length is 0.15 Ω at 0 °C. When the temperature of the wire is raised to 65 °C the resistance is found to be 0.2 Ω. Calculate the temperature co-efficient of resistance of the wire and its resistivity at 0 °C.
3. A copper wire has a resistivity of 1.6 x 10^{-6} Ω-cm at 0 °C and at 20 °C, the temperature co efficient of resistance is 1/254.5°C^{-1} Find the resistivity and temperature co-efficient of resistance at 60 °C.
4. Find the current supplied by the battery in the network shown below in figure-1 by using star delta transformation.

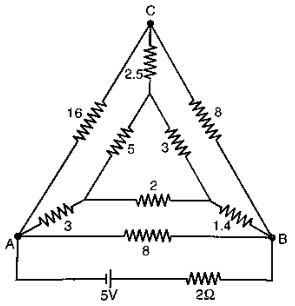

Figure -1

5. Determine equivalent resistance between terminal A and B shown in network (figure-2) by using star delta transformation.

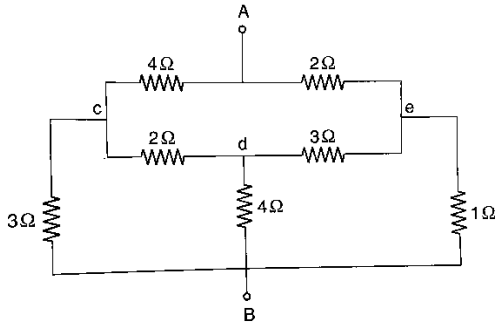

Figure -2

6. Determine current in XXΩ resistor shown in network (figure-3) by using star delta transformation.

   NOT: XXΩ resistor would be unique/specific for each student,

   example: for roll no **20TDCS024** then value of **XXΩ = 24 Ω**

   example: for roll no **20TDCE126** then value of **XXΩ = 126 Ω**

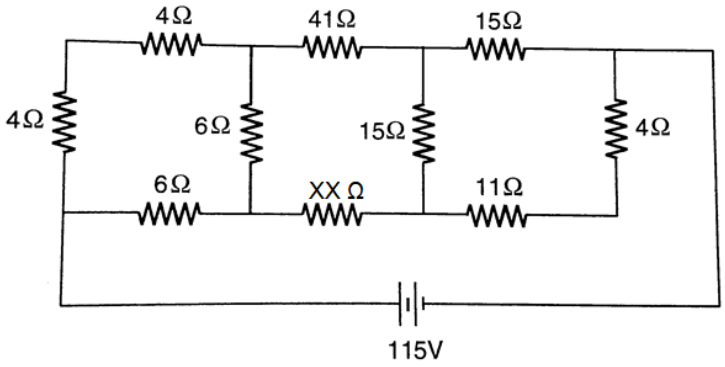

Figure-3

7. For the Circuit in Figure-4 determine the voltage across the 20Ω resistor using mesh analysis.

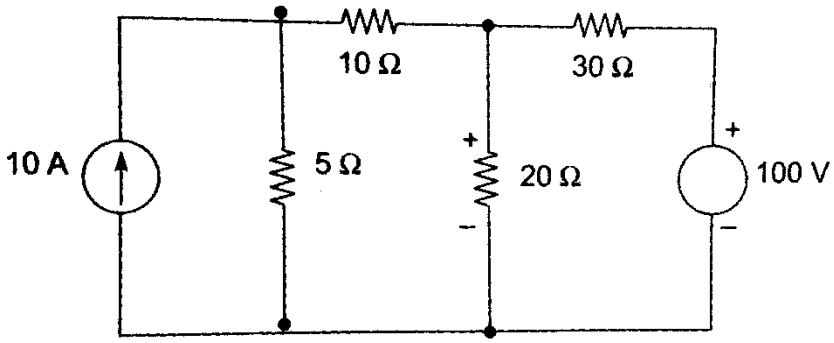

Figure-4

8. Using mesh analysis find currents I_1, I_2 and I_3 for given circuit in figure-5.

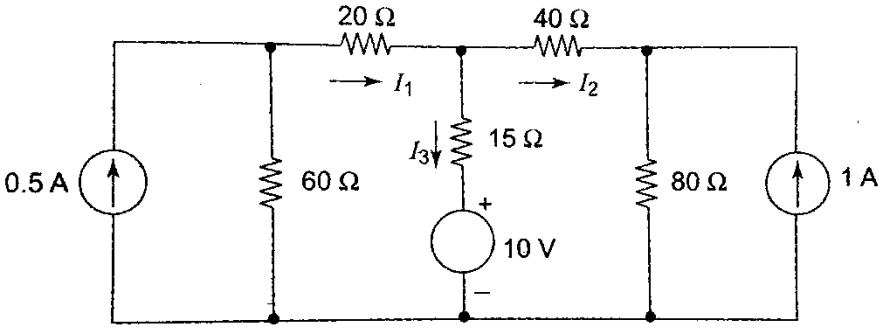

Figure-5

9. For the circuit of figure-6 determine the nodal voltages and current through 2Ω resistor.

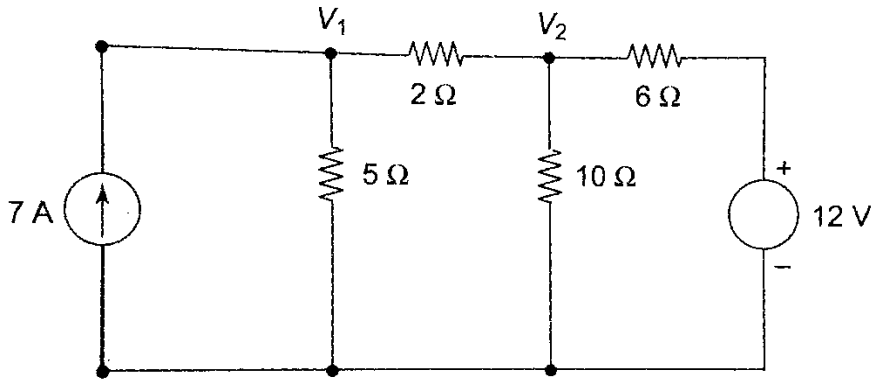

Figure-6

10. For the circuit of figure-7 determine the V_1 and V_2 nodal voltages.

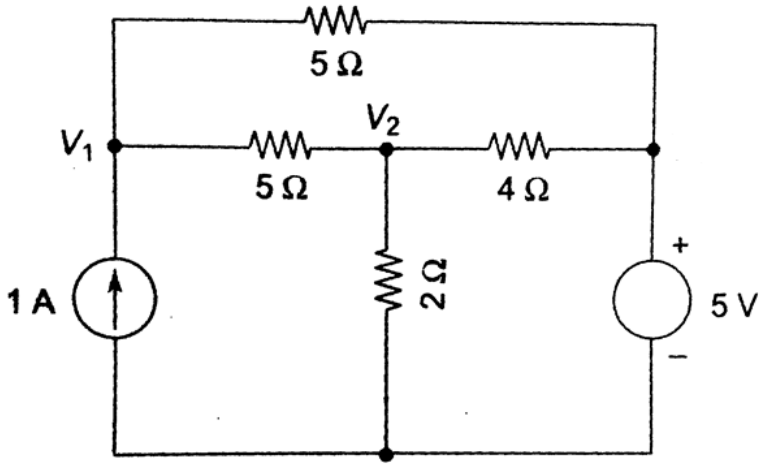

Figure-7

11. Two metal plates of area 100 cm^2 are separated by a dielectric of 2 mm having a relative permittivity of 5. When a dc voltage of 500V is applied across the capacitor plates, find (i) capacitance (ii) charge on the capacitor (iii) electric field strength and (iv) electric flux density.
12. A capacitor is made up of two plates with an area of 11 cm^2 which are separated by a mica sheet 2 mm thick. If the relative permittivity of mica is 6, find its capacitance. Now, if one plate is moved further to give an air gap 0.5 mm wide between the plate and mica, find the new capacitance.
13. Two plates are kept 1.5 cm apart in air and 1 kV supply is connected across them. Calculate the electric field strength in air when a glass sheet 0.5 cm thick with relative permittivity 3 is introduced between the plates without changing the previous distance between the plates.