**Assignment 1 D.C. Circuits**

1. Define temperature co-efficient of resistance. How resistances of different materials vary with temperature? Prove that αt = α0/ (1+ α0t).
2. Explain the following terms: (i) Magneto motive force (ii) Magnetic field Intensity (iii) Reluctance.
3. Two inductive coils are connected in parallel. Derive the expression for total inductance when (i) coils are in parallel aiding connection (ii) coils are in parallel opposing connection.
4. Explain the method of transforming a star network of resistances into delta network and vice versa
5. For the network shown in figure 1, determine the current supplied by the battery using star-delta transformation. (All resistances are in ohms).
6. State and explain Kirchoff’s voltage and current laws.
7. Draw Wheatstone’s bridge network ABCD as follows: Resistance between terminals A-B, B-C, C-D, D-A and B-D are 10, 30, 15, 20 and 40 ohms respectively. A 2 volt battery of negligible resistance is connected between terminals A and C. Determine the value and direction of the current in the 40 Ω resistor.
8. The resistance of tungsten filament of a lamp is 20 Ω at the room temperature of 20º C. What is the operating temperature of the filament if the resistance temperature co-efficient of tungsten is 0.005/º C at 20º C. The base of the lamp is marked 120 Volt, 50 W.
9. Give the comparison between electric and magnetic circuit.
10. Determine the equivalent resistance between the terminals A and B of network shown in figure 2.
11. State and explain Faraday’s laws of electromagnetic induction.
12. Find current flowing through 5 Ω resistor of the following figure -3 using mesh analysis.
13. Determine equivalent resistance between points X and Y using star-delta transformation for fig.4. All resistances are in Ω.
14. Determine mesh currents I1, I2 and I3 for fig.5. All the resistances are in Ω.
15. Explain Thevenin, Norton and superposition theorems.
16. Explain time domain analysis of first order R-L series circuit.
17. Explain time domain analysis of first order R-C series circuit.
18. A 100 A current is shared by three resistances connected in parallel. The resistor wires are of the same material and have their length in the ratio 2:3:4 and their cross sectional area in the ratio 1:2:3.Determine the current in each resistor.
19. Find resistance between terminals AB of network shown in figure 6. using star-delta transformation.
20. Determine the current in 17 Ω resistor in the network shown in Figure 7.
21. Find the resistance between terminals A and B as shown in figure 8. All values are in ohms.