Introduction to Electrical Systems

EE 111

Assignment – 1

Q1. Consider the circuit shown in Figure 1. Perform nodal analysis and hence determine VA, VB, VC. Also determine the power delivered by the current source.



Figure 1

Q2. In the circuit shown in Figure 2, Vs1= -10 V, Is2 = 1 A, and all resistors are 10 Ω. Apply nodal analysis to determine VA, VB, VC.



Figure 2

Q3. Consider the circuit shown in Figure 3 along with the defined loops 1, 2 and 3. Determine I1, I2, I3 and hence determine, v.



Figure 3

Q4. Consider the circuit shown in Figure 4, wherein Vs1 = 250 V and Is2 = 0.75 A. Write two mesh equations and hence determine VB.



Figure 4

Q5. Consider the linear network of Figure 5. Two separate dc measurements are taken. In the first experiment, it is found that when Va = 7 V and Ib = 3 A, the load current is Iload = 3 A. In the second experiment, it found that when Va = 7 V and Ib = 1 A, then Iload = 3 A. Compute Iload when Va = 15 V and Ib = 9 A.



Figure 5

Q6. Find the Thevenin equivalent circuit of the network shown in Figure 6 as viewed from A - B



Figure 6

Q7. Find Thevenin equivalent of the circuit shown in Figure 7 as viewed from A – B. What is the Norton’s equivalent?



Figure 7

Q8. Find the Norton and Thevenin equivalent of the circuit shown in Figure 8.



Figure 8

Q9. For the circuit shown in Figure 9, find the load resistance, RL needed for maximum power transfer. Also determine the maximum power delivered to the load resistor, RL.



Figure 9