CBCS Scheme

USN | | | | | | | | | | |

15EC34

Third Semester B.E. Degree Examination, June/July 2017
Network Analysis

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Calculate the current through 2Ω resistor for the circuit shown in Fig.Q1(a) using source transformation. **(08 Marks)**

b. Use mesh analysis to determine the three mesh currents I_1, I_2 and I_3 in the circuit shown in Fig.Q1(b). **(08 Marks)**

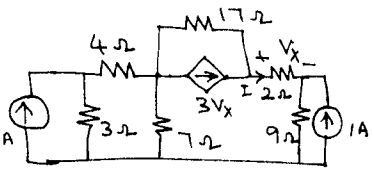

Fig.Q1(a)

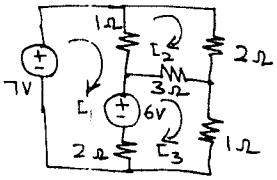

Fig.Q1(b)

OR

2 a. Find the equivalent resistance R_{AB} using star and delta transformation for network shown in Fig.Q2(a). **(08 Marks)**

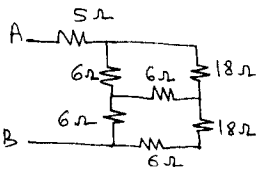

Fig.Q2(a)

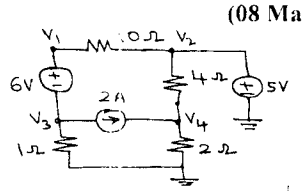

Fig.Q2(b)

b. For the circuit shown in Fig.Q2(b), determine all node voltages. **(08 Marks)**

Module-2

3 a. Using Millman's theorem, find the current through load resistance R_L for the circuit shown in Fig.Q3(a). **(08 Marks)**

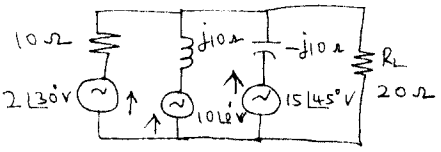

Fig.Q3(a)

b. State the maximum power transfer theorem and also prove that $P_{max} = \frac{V_{th}^2}{4R_L}$, where V_{th} = thevenins voltage. **(08 Marks)**

OR

4 a. Obtain the Thevenin's equivalent of the circuit shown in Fig.Q4(a). **(08 Marks)**

b. Using superposition theorem, find the current in 6Ω resistor in the network shown in Fig.Q4(b). **(08 Marks)**

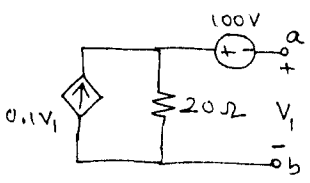

Fig.Q4(a)

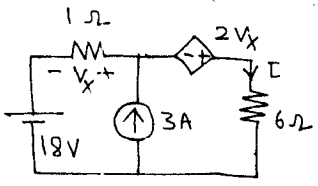

Fig.Q4(b)

Module-3

5 a. In the network shown in Fig.Q5(a), the switch is closed at t = 0, determine i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at t = 0⁺. **(08 Marks)**

b. For the network shown in Fig.Q5(b), the switch 's' is opened at t = 0 solve for V, DV and D^2V at t = 0⁺. **(08 Marks)**

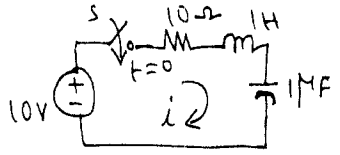

Fig.Q5(a)

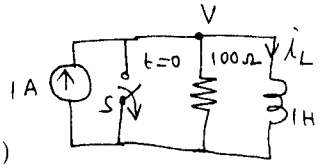

Fig.Q5(b)

OR

6 a. Find the Laplace transform of the periodic signal x(t) shown in Fig.Q6(a). **(08 Marks)**

b. Given the signal $x(t) = \begin{cases} 3, & t < 0 \\ -2 & 0 < t < 1 \\ 2t - 4 & t > 1 \end{cases}$

Express x(t) interms of singularity functions. Also find the Laplace transform of x(t). **(08 Marks)**

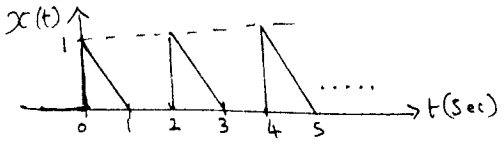

Fig.Q6(a)

Module-4

7 a. Derive the expressions of half power frequencies W_1 and W_2 and also bandwidth of a series resonance circuit. **(09 Marks)**

b. Find the values of L at which the circuit shown in Fig.Q7(b) resonates at a frequency of 500 r/s. **(07 Marks)**

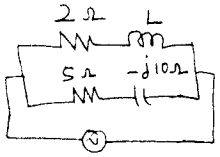

Fig.Q7(b)

OR

8 a. Derive the expressions of a resonance frequency and dynamic impedance of a parallel resonance circuit. **(09 Marks)**

b. A coil has a R = 20Ω, L = 80mH and C = 100pF are connected in series. Determine : i) impedance at resonance ii) resonance frequency iii) quality factor iv) circuit current if supply voltage is 50V. **(07 Marks)**

Module-5

9 a. Derive the expression of Z-parameters in term of h-parameter. **(07 Marks)**

b. Find the ABCD – parameters for the network shown in Fig.Q9(b). **(09 Marks)**

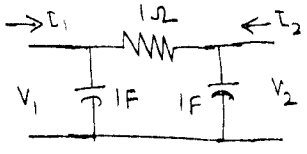

Fig.Q9(b)

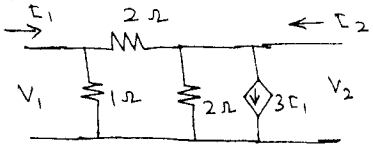

Fig.Q10(a)

OR

10 a. Find the Y-parameter for the two port network shown in Fig.Q10(a). **(08 Marks)**

b. Obtain the expression of h-parameters interms of Y-parameters. **(08 Marks)**