CBCS SCHEME

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

15EC34

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Network Analysis

Time: 3 hrs. Max. Marks: 80

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. Missing data, if any, may be suitably assumed.

Module-1

1 a. Derive expression for converting star to delta. **(08 Marks)**

b. Using Mesh current find V_2 which result a zero current in 4 ohm resistor in the network shown in Fig.Q1(b). **(08 Marks)**

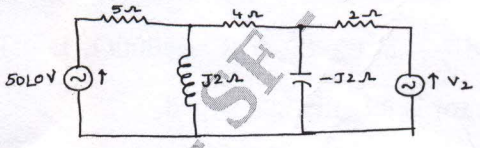

Fig.Q1(b)

OR

2 a. For the network of Fig.Q2(a), determine the v_1 and v_2 by nodal analysis. **(08 Marks)**

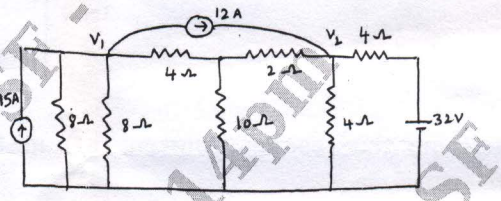

Fig.Q2(a)

b. Find the current I in 28Ω resistor by Mesh analysis in Fig.Q2(b). **(08 Marks)**

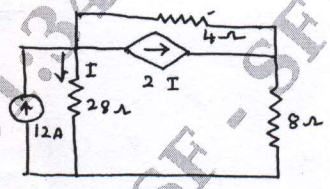

Fig.Q2(a)

Module-2

3 a. State and prove superposition theorem. **(06 Marks)**

b. Using Milliman's theorem, find I_L through R_L for the network shown in Fig.Q3(b). **(04 Marks)**

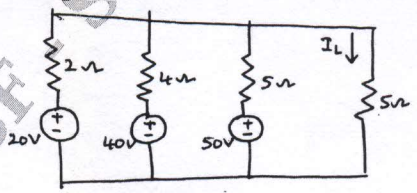

Fig.Q3(b)

c. Obtain Norton equivalent of the network of Fig.Q3(c) between terminals A and B. **(06 Marks)**

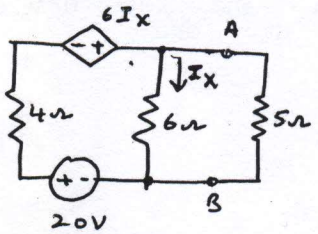

Fig.Q3(c)

OR

4 a. State maximum power transfer theorem. Prove that $Z_L = Z_0^*$ for AC circuits. **(08 Marks)**

b. Verity reciprocity theorem to find value of V_X in the circuit shown Fig.Q4(b). **(08 Marks)**

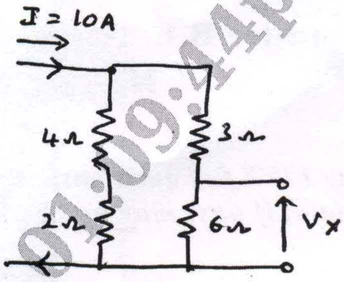

Fig.Q4(b)

Module-3

5 a. In the network shown in Fig.Q5(a), K is changed from position a to b at t = 0. Solve for i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$, if R = 1000Ω, L = 1H, C = 0.1μF and V = 100V. Assume that the capacitor is initially uncharged. **(08 Marks)**

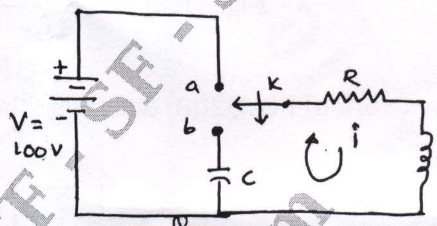

Fig.Q5(a)

b. Determine the response current i(t) in the circuit shown in Fig.Q5(b) using Laplace transform. **(08 Marks)**

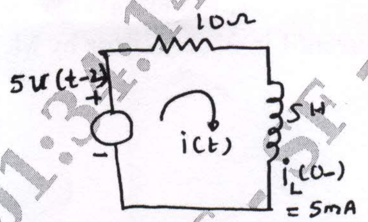

Fig.Q5(b)

OR

6 a. Synthesis the waveform shown in Fig.Q6(a) and find the Laplace transform of the periodic waveform. **(08 Marks)**

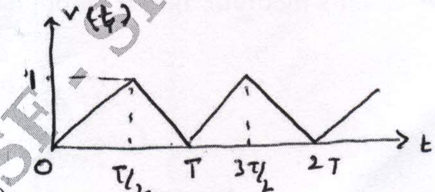

Fig.Q6(a)

b. Determine v, $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t = 0^+$ when the switch k is opened at t=0 in Fig.Q6(b). **(08 Marks)**

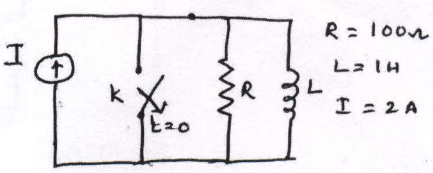

Fig.Q6(b)

Module-4

7 a. What is resonance? Show that $f_0 = \sqrt{f_1 f_2}$ for series resonance circuit. **(08 Marks)**

b. Find the values of c for which the circuit given in Fig.Q7(b) resonates at 750Hz. **(08 Marks)**

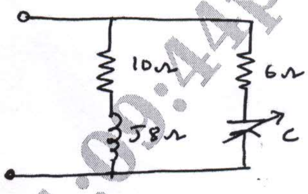

Fig.Q7(b)

OR

8 a. A series RLC circuit has R = 4Ω, L = 1mH, and C = 10μF, calculate Q – factor, bandwidth, resonant frequency and the half power frequencies f_1 and f_2. **(08 Marks)**

b. Derive expression for fr, Q and bandwidth of a parallel resonant circuit with lossless capacitor in parallel with a coil of resistance R and inductance L. **(08 Marks)**

Module-5

9 a. Derive Y parameters and transmission parameters of a circuit interms of its z-parameters. **(08 Marks)**

b. Find the z-parameters for the network shown in Fig.Q9(b). **(08 Marks)**

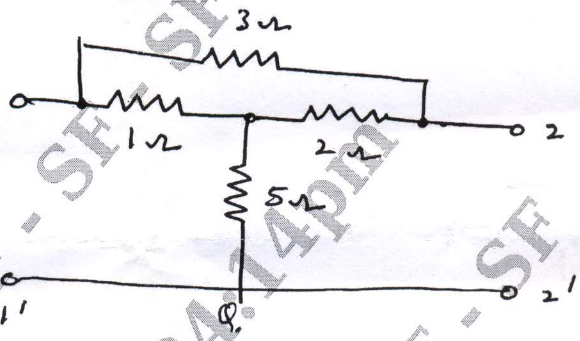

Fig.Q9(b)

OR

10 a. The z parameters of a two port network are z_{11} = 20Ω, z_{22} = 30Ω, z_{12} = z_{21} =10Ω. Find Y and ABCD parameters. **(08 Marks)**

b. Determine Y parameters of the two port network shown in Fig.Q10(b). **(08 Marks)**

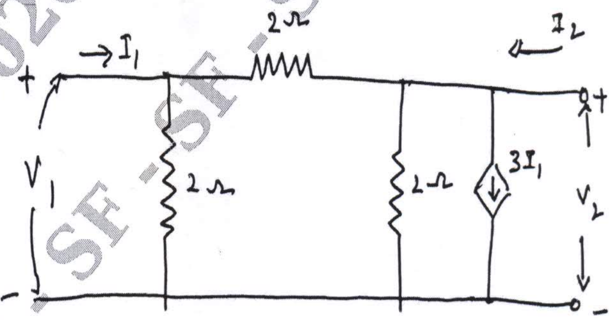

Fig.Q10(b)

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