Visvesvaraya Technological University, Belagavi

MODEL QUESTION PAPER

3rd Semester, B.E (CBCS) EC/TC

Course: Network Analysis

Time: 3 Hours | Max. Marks: 100

Note: (i) Answer Five full questions selecting any one full question from each Module.
(ii) Question on a topic of a Module may appear in either its 1st or 2nd question.

Module 1

1 a) Derive the expression for i) Δ to Y transformation ii) Y to Δ transformation.(10 Marks)

b) For the network shown in Fig. Q1(b), find the current through 4 Ω and 6 Ω resistors using mesh analysis. (10 Marks)

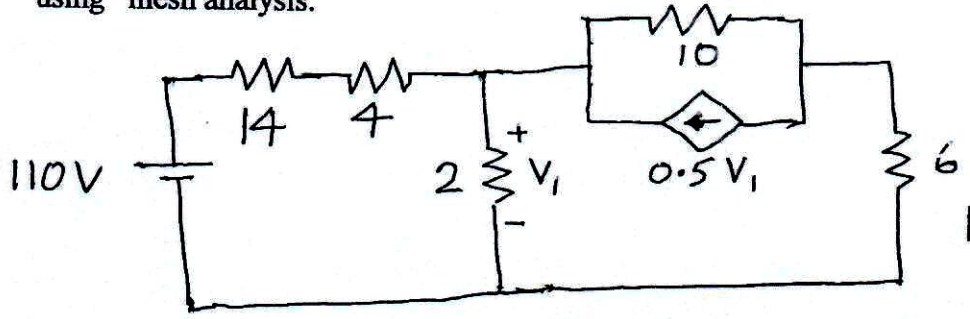


Fig Q1(b)

OR

2 a) Using node voltage method, find V_1, V_2 & V_3 and branch currents i_1 to i_6. In Fig. Q2(a) (10 Marks)

b) Using source transformation and source shifting techniques, find voltage across 2 Ω resistor in Fig. Q2(b). (10 Marks)

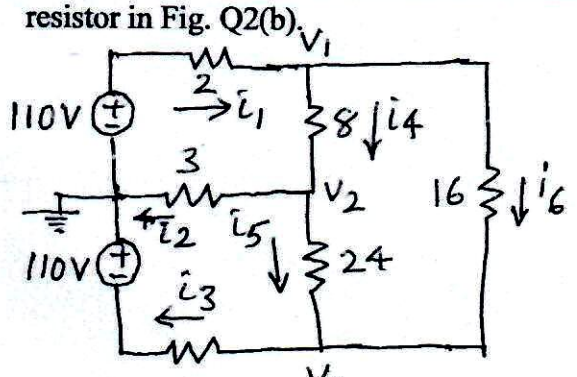


Fig Q2(a)

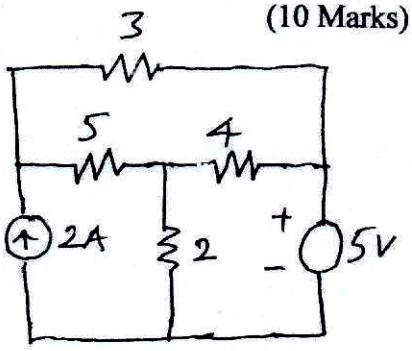
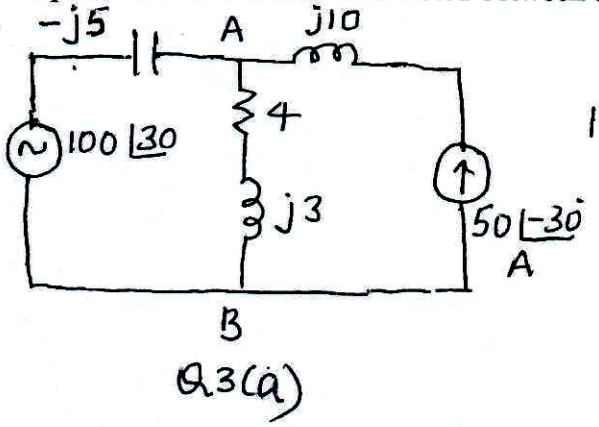


Fig Q2(b)

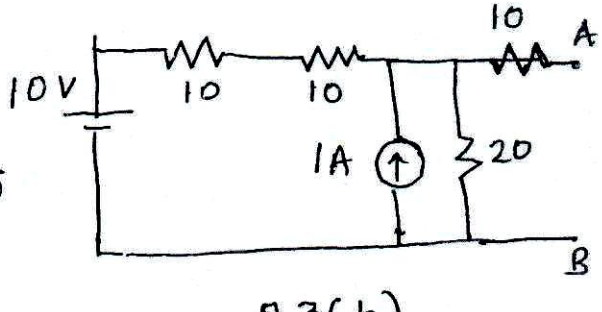
Module 2

3 a) Using Superposition theorem, find the current through (4+j3) Ω for the circuit shown in Fig. Q3(a). (10 Marks)

b) For the circuit shown in Fig. Q3(b), find Thevenin's equivalent circuit and power dissipated in a 5 Ω resistor connected between terminals A and B. (10 Marks)



Q3(a)



Q3(b)

OR

4 a) State and prove Maximum Power Transfer theorem for AC circuits. (10 Marks)

b) Find the current I_x in the j2 Ω impedance in Fig. 4b and hence verify Reciprocity theorem. (10 Marks)

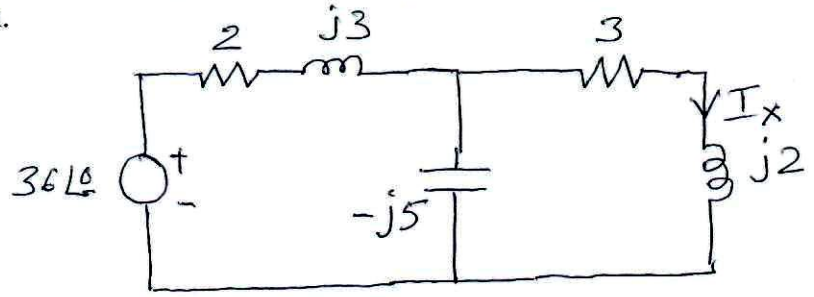


Fig 4(b)

Module 3

5 a) Refer the circuit in Fig. Q5(a). The switch K is changed from position 1 to position 2 at t = 0, steady state condition having been reached in position 1. Find the value of i, di/dt, d^2i/dt^2 at $t=0^+$. (10 Marks)

b) Refer the circuit shown in Fig. Q5(b). The circuit is in steady state with switch K closed. At t=0, the switch is opened. Determine the voltage across the switch V^K and dv^k at $t=0^+$ (10 Marks)

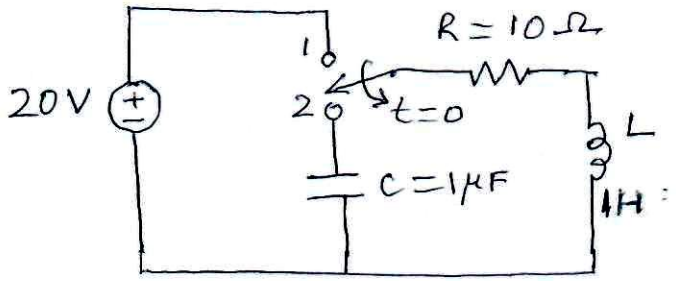


Fig. Q5(a)

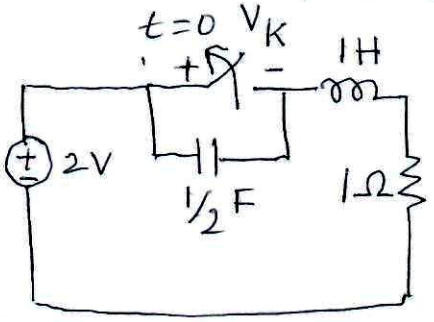


Fig Q5(b)

OR

6 a) Obtain Laplace transform of i) Step function ii) Ramp function iii) Impulse function. (10 Marks)

b) Obtain the Laplace Transform of saw tooth waveform shown in Fig. Q6(b). (10 Marks)

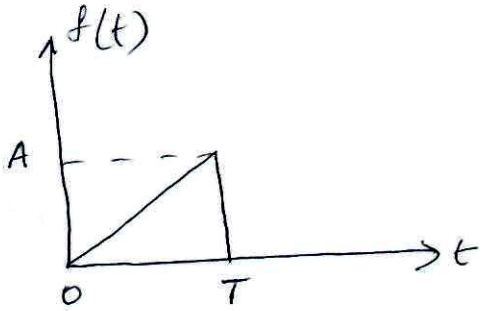


Fig Q6(b)

Module 4

7 a) Derive the equation for two half – power frequencies f_1 and f_2 and also bandwidth of a series resonant circuit. (10 Marks)

b) A series RLC circuit consists of R = 10 Ω, L=0.01H and C = 0.01μF is connected across a supply of 10mV. Determine i) f_0 ii) Q - factor iii) BW iv) f_1 and f_2 v) I_o (10 Marks)

OR

8 a) Derive the expressions of a resonance frequency and dynamic impedance of a parallel resonance circuit. (10 Marks)

b) Find the value of C in Fig. Q8(b) for which the circuit resonates at f_r = 750 HZ. (10 Marks)

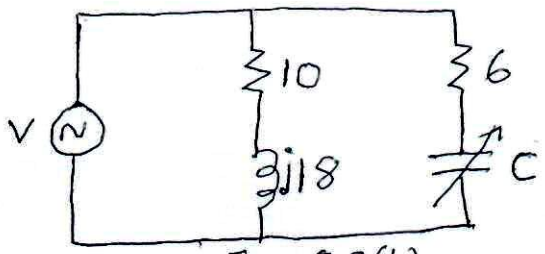


Fig. Q8(b)

Module 5

9 a) Derive the expression of Z - parameters in terms of h - parameters. (10 Marks)

b) Find the ABCD parameters for the network shown in Fig. Q9(b). (10 Marks)

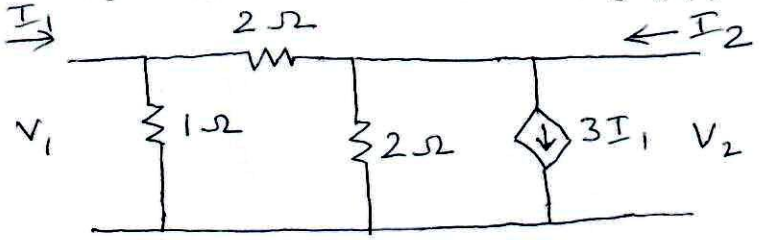


Fig Q9(b)

OR

10 a) The bridges T-RC network is shown in Fig. Q10(a). For the values given, find Z parameters. (10 Marks)

b) Determine the admittance parameters of the T network shown in Fig. Q10(b) (10 Marks)

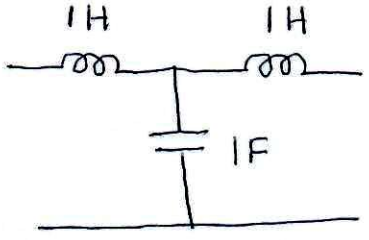


Fig Q10(a)

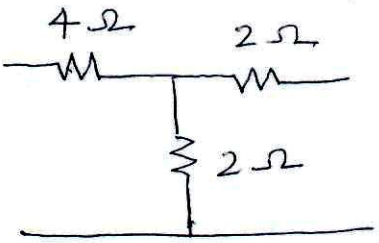


Fig Q10(b)