CBCS SCHEME

USN | | | | | | | | | | **17EC35**

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

Time: 3 hrs. Max. Marks: 100

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

Module-1

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

b. Calculate the voltage across the 6Ω resistor in the network of Fig.Q1(b) using source shifting technique.

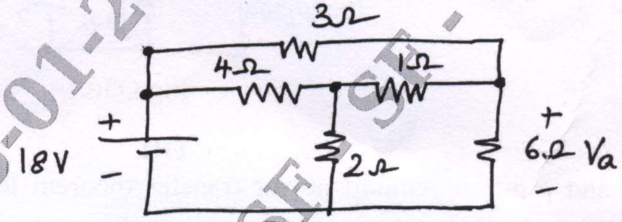

Fig.Q1(b) **(10 Marks)**

OR

2 a. Determine the resistance between the terminals A and B of the network shown in Fig.Q2(a).

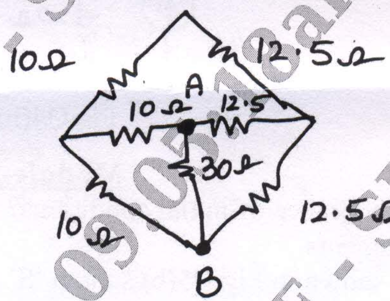

Fig.Q2(a) **(10 Marks)**

b. Find currents in all the branches of the network shown in Fig.Q2(b) using mesh analysis.

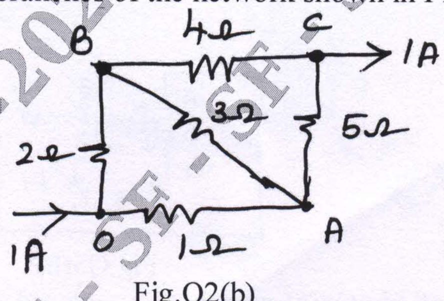

Fig.Q2(b) **(05 Marks)**

c. Find voltages V_1 and V_2 in the network shown in Fig.Q2(c) using node analysis method.

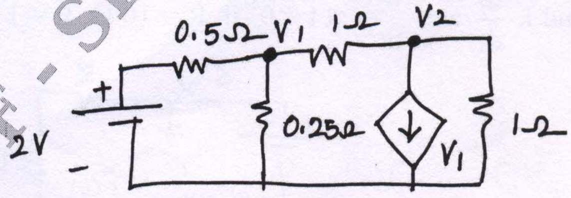

Fig.Q2(c) **(05 Marks)**

Module-2

3 a. Obtain Thevenin's equivalent network for Fig.Q3(a).

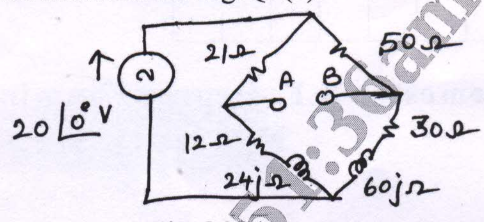

Fig.Q3(a) **(08 Marks)**

b. State and prove Millman's theorem. **(06 Marks)**

c. For the circuit shown in Fig.Q3(c), find the voltage V_x and verify reciprocity theorem.

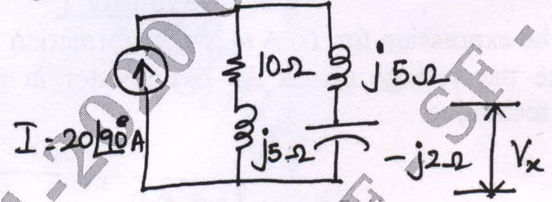

Fig.Q3(c) **(06 Marks)**

OR

4 a. State and prove maximum power transfer theorem for AC circuits (when R_L and X_L are varying) **(10 Marks)**

b. Find 'V' in the circuit shown in Fig.Q4(b) using super position theorem.

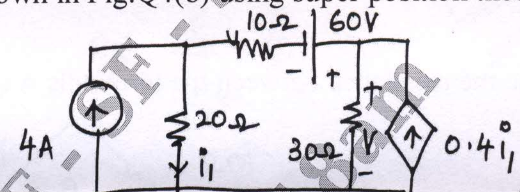

Fig.Q4(b) **(10 Marks)**

Module-3

5 a. What is the significance of initial conditions? Write a note on initial and final conditions for basic circuit elements. **(05 Marks)**

b. In the network shown in Fig.Q5(b) switch 'S' is changed from A to B at t = 0 having already established a steady state in position A shown that at $t = 0^+$, $i_1 = i_2 = \dfrac{-V}{R_1 + R_2 + R_3}$ and $i_3 = 0$.

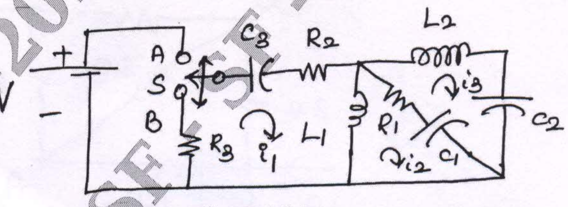

Fig.Q5(b) **(10 Marks)**

c. In the network of Fig.Q5(c) switch 'S' is closed at t = 0 with zero initial current in the inductor. Find i, $\dfrac{di}{dt}$ and $\dfrac{d^2i}{dt^2}$ at $t = 0^+$ if R = 10 Ω, L = 1 H and V = 10 Volts.

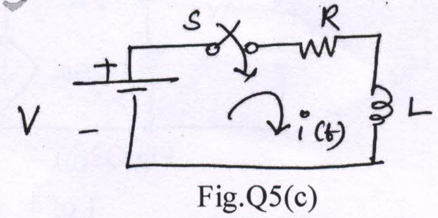

Fig.Q5(c) **(05 Marks)**

OR

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

b. Find the Laplace transform of the waveform shown in Fig.Q6(b).

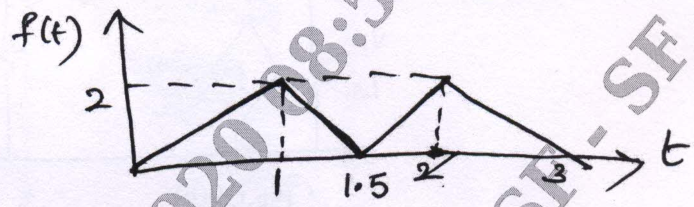

Fig.Q6(b) **(10 Marks)**

Module-4

7 a. Derive the relation between bandwidth and quality factor B.W = f_0/Q. **(10 Marks)**

b. Show that the value of capacitance for max voltage across the capacitor in case of capacitor tuning series resonance is given by $C = \frac{L}{R^2 + X_L^2}$.

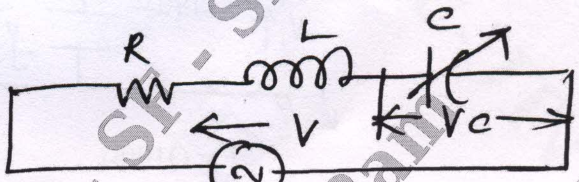

Fig.Q7(b) **(10 Marks)**

OR

8 a. Derive for f_0 for parallel resonance circuit when the resistance of the capacitance is considered.

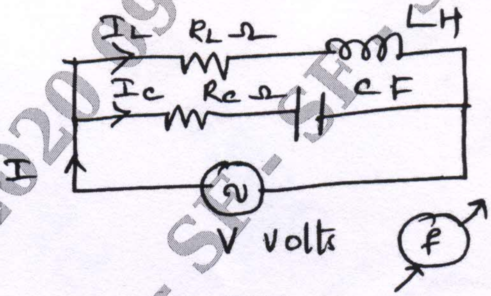

Fig.Q8(a) **(10 Marks)**

b. Find the value of L for which the circuit in Fig.Q8(b) resonates at ω = 5000 rad/sec.

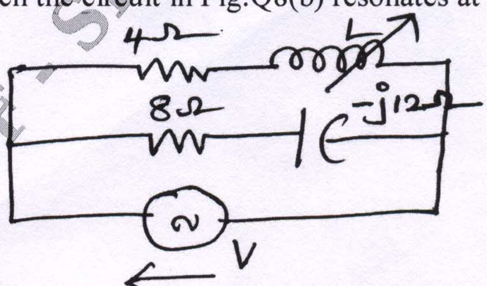

Fig.Q8(b) **(10 Marks)**

Module-5

9 a. Derive the expression of Z parameters in terms of Y parameters. **(10 Marks)**

b. Determine Y and Z parameters for the network shown in Fig.Q9(b).

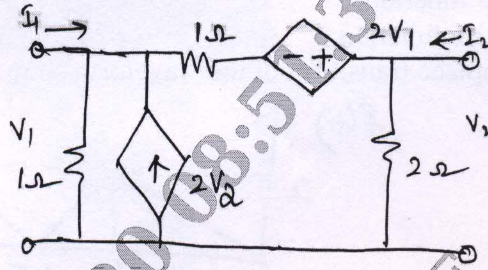

Fig.Q9(b) **(10 Marks)**

OR

10 a. Derive the expression of h parameters in terms of ABCD parameters. **(10 Marks)**

b. Find ABCD constants and show that AD – BC = 1 for the network shown in Fig.Q10(b).

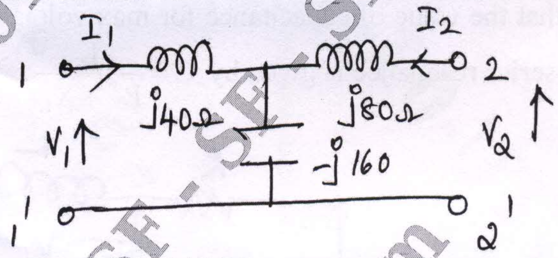

Fig.Q10(b) **(10 Marks)**

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