CBCS SCHEME

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

18EC32

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Network Theory

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Determine current through 12Ω resistor shown in Fig.Q1(a), using source transformation.

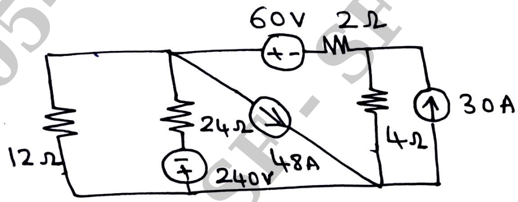

Fig.Q1(a) **(08 Marks)**

b. Find the equivalent resistance of the circuit shown in Fig.Q1(b), using star delta transformation.

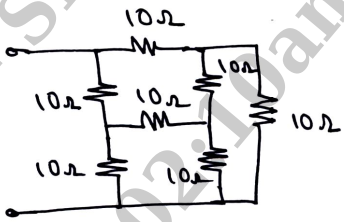

Fig.Q1(b) **(08 Marks)**

c. Discuss the dependent sources. **(04 Marks)**

OR

2 a. Using loop analysis, find the current through 10Ω resistor for the circuit shown in Fig.Q2(a).

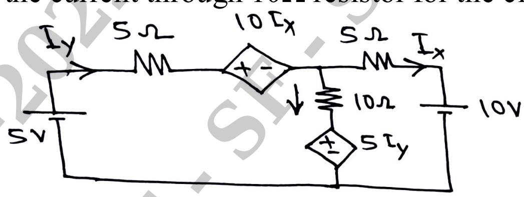

Fig.Q2(a) **(08 Marks)**

b. For the network shown in Fig.Q2(b), determine node voltages V_1, V_2, V_3 and V_4 using nodal analysis.

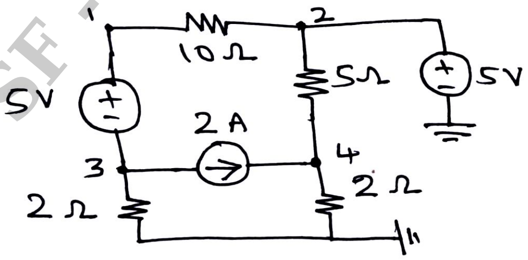

Fig.Q2(b) **(08 Marks)**

c. Explain the super Mesh with example. **(04 Marks)**

Module-2

3 a. Using super position theorem, find the current through 20Ω resistor shown in Fig.Q3(a).

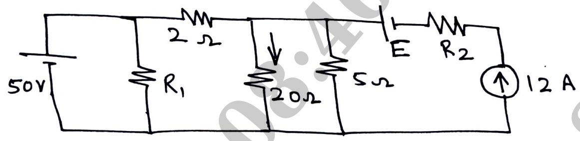

Fig.Q3(a) **(08 Marks)**

b. Using Millman's theorem, determine the current through (2 + j2)Ω impedance for the network shown in Fig.Q3(b).

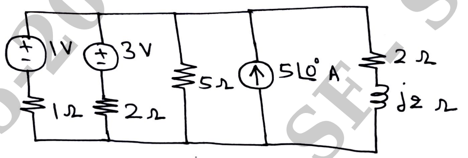

Fig.Q3(b) **(08 Marks)**

c. State the Norton's theorem and also write the procedure to be followed for solving the problem. **(04 Marks)**

OR

4 a. What should be the value of R such that maximum power transfer can takes place from the rest of the network to R. Obtain the amount of this power for circuit shown in Fig.Q4(a).

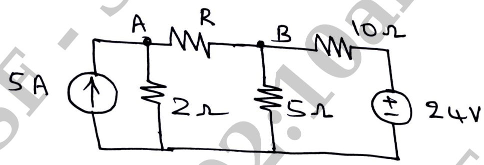

Fig.Q4(a) **(08 Marks)**

b. Obtain the Thevinin's equivalent circuit cross AB for the circuit shown in Fig.Q4(b).

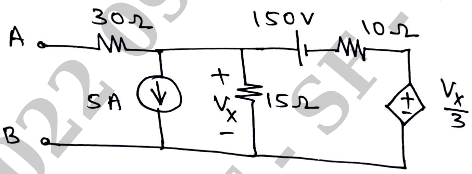

Fig.Q4(b) **(08 Marks)**

c. State the maximum power transfer theorem and also write equation of P_{max} for both DC and AC circuits. **(04 Marks)**

Module-3

5 a. Explain the transient behavior of the resistance, inductance and capacitor. Also write the procedure for evaluating transient behavior. **(10 Marks)**

b. In the network shown in Fig.Q5(b), a steady state is reached with the swatch 'K' open. At t = 0 the switch is closed. Determine the value of $V_a(0^+)$ and $V_a(0^-)$.

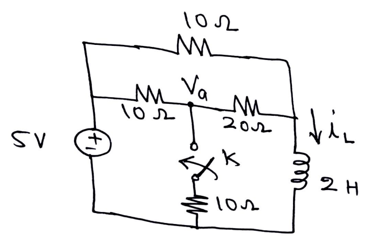

Fig.Q5(b) **(10 Marks)**

OR

6 a. For the network shown in Fig.Q6(a) $V_1(t) = e^{-t}$ for $t \geq 0$ and is zero for all $t < 0$. If the capacitor is initially uncharged determine the value of $\frac{d^2v_2}{dt^2}$ and $\frac{d^3v_2}{dt^3}$ at $t = 0^+$.

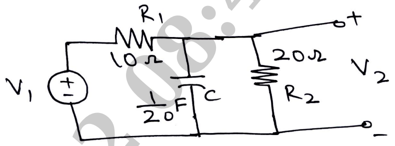

Fig.Q6(a) **(10 Marks)**

b. The switch 'S' is changed from position 1 to position 2 at t = 0. Steady state conditions have been reached in position 1. Find the value of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$ for the circuit shown in Fig.Q6(b).

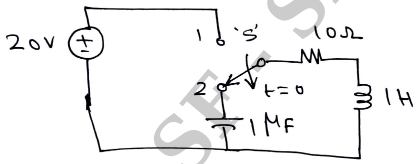

Fig.Q6(b) **(10 Marks)**

Module-4

7 a. Find the Laplace transform of f(t) shown in Fig.Q7(a).

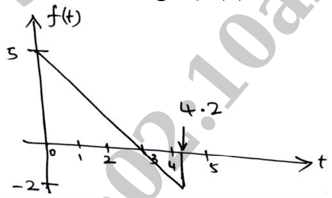

Fig.Q7(a) **(10 Marks)**

b. Find the Lapalce transform of the pulse shown in Fig.Q7(b).

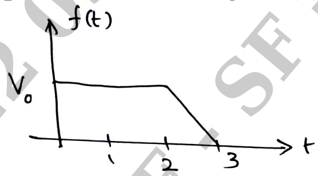

Fig.Q7(b) **(10 Marks)**

OR

8 a. Find i(t) for the circuit shown in Fig.Q8(a).

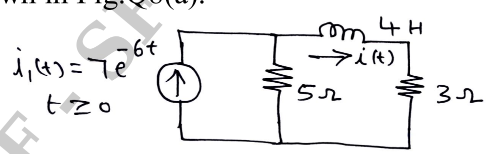

Fig.Q8(a) **(10 Marks)**

b. A voltage pulse of 10V and 5μsec duration is applied to the RC network shown in Fig.Q8(b). Find the current i(t).

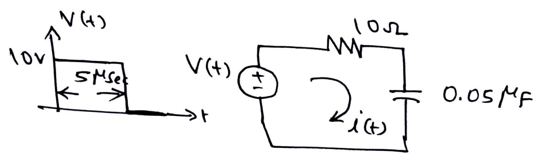

Fig.Q8 (b) **(10 Marks)**

Module-5

9 a. Obtain y-parameters interms of z-parameters and h-parameters. **(10 Marks)**

b. For the network shown in Fig.Q9(b), find the T-parameters.

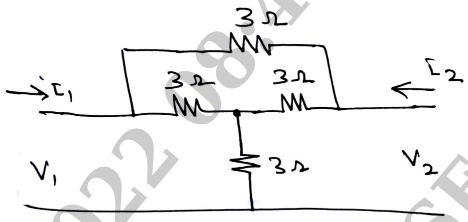

Fig.Q9(b) **(10 Marks)**

OR

10 a. Derive the expression of bandwidth, half power frequencies and selectivity of a series resonance circuit. **(10 Marks)**

b. For the parallel resonant circuit shown in Fig.Q10(b), find I_0, I_L, I_C, f_0 and dynamic resistance.

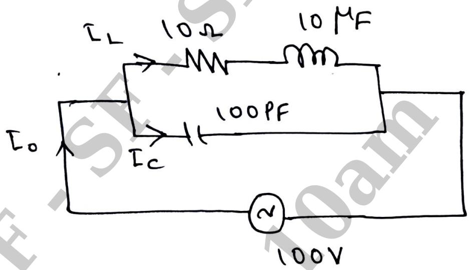

Fig.Q10(b) **(10 Marks)**

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