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15EC34

Third Semester B.E. Degree Examination, Aug./Sept.2020
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. Reduce the circuit shown in Fig.Q1(a) into single voltage source with series resistance between terminals A and B.

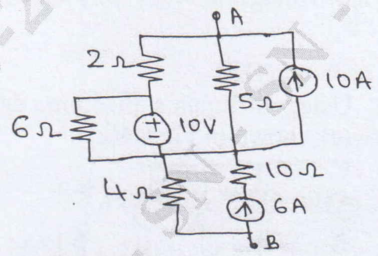

Fig.Q1(a) **(06 Marks)**

b. Using Mesh analysis, find the current I_1 for the circuit shown in Fig.Q1(b).

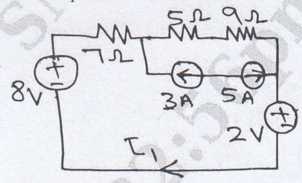

Fig.Q1(b) **(06 Marks)**

c. Explain the concept of Super node. **(04 Marks)**

OR

2 a. Determine the resistance between terminals A and B of the circuit shown in Fig.Q2(a) using Star to Delta conversion.

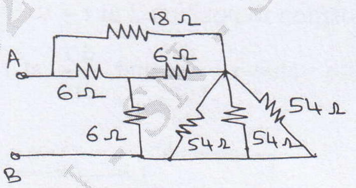

Fig.Q2(a) **(06 Marks)**

b. Using Nodal analysis, find the value of V_x in the circuit shown in Fig.Q2(b), such that the current through $(2 + j3)\Omega$. Impedance is zero.

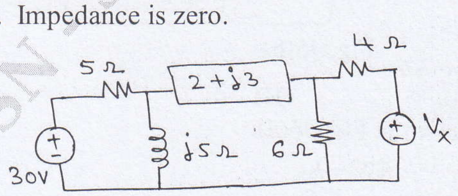

Fig.Q2(b) **(06 Marks)**

c. Explain the Dependent sources. **(04 Marks)**

Module-2

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

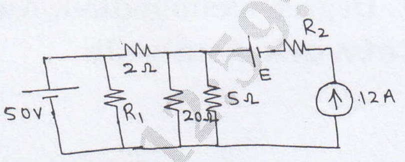

Fig.Q3(a) **(08 Marks)**

b. For ac circuits, prove that the maximum power deliver to load is $\frac{(V_{th})^2}{8R_{th}}$, where V_{th} – Thevenin's equivalent voltage and R_{th} – Thevenins equivalent resistance. **(08 Marks)**

OR

4 a. State the Millman's theorem. Using Millman's theorem, determine the current through (2+j2)Ω impedance for the network shown in Fig.Q4(a).

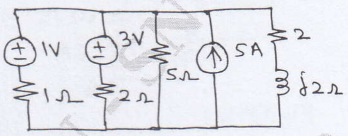

Fig.Q4(a) **(08 Marks)**

b. State the Thevinin's Theorem and obtain the Thevinin's equivalent circuit for the circuit shown in Fig.Q4(b).

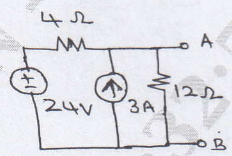

Fig.Q4(b) **(08 Marks)**

Module-3

5 a. Explain the behavior of a inductor and capacitor under switching conditions in detail. **(08 Marks)**

b. The switch is changed from position to position 2 at t = 0. Steady State condition have been reached in position 1. Find the value i , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$ for the circuit shown in Fig.Q5(b).

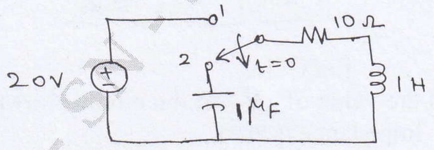

Fig.Q5(b) **(08 Marks)**

OR

6 a. Find the Laplace of f(t) shown in Fig.Q6(a).

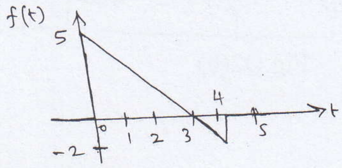

Fig.Q6(a) **(08 Marks)**

b. Find the impulse response of the circuit shown in Fig.Q6(b). Assuming that all initial conditions to be zero.

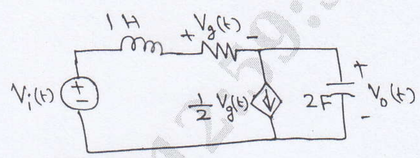

Fig.Q6(b) **(08 Marks)**

Module-4

7 a. Derive the expression for frequency at which voltage across the capacitor is maximum of a series resonance circuit. **(08 Marks)**

b. Show that the circuit shown in Fig.Q7(b) can have more than one resonant condition.

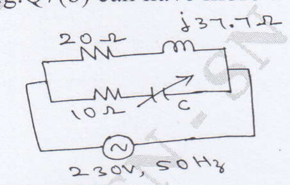

Fig.Q7(b) **(08 Marks)**

OR

8 a. Determine the parallel resonance circuit parameters whose response curve is shown in Fig.Q8(a). What are the new values of W_r and bond width if 'c' is increased 4 times?

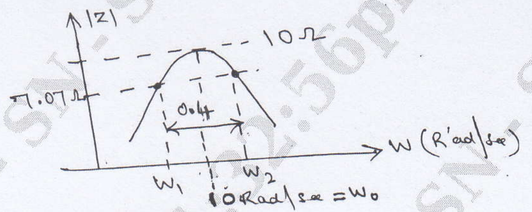

Fig.Q8(a) **(08 Marks)**

b. Prove that the bandwidth of a series resonance circuit $f_2 - f_1 = \frac{R}{2\pi L}$. **(08 Marks)**

Module-5

9 a. Express the z-parameters in terms of Y-parameter. **(08 Marks)**

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

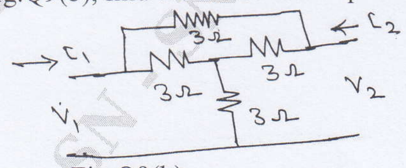

Fig.Q9(b) **(08 Marks)**

OR

10 a. Express the h-parameter in terms of Z-parameters. **(08 Marks)**

b. Find the z-parameter for the two-port network shown in Fig.Q10(b).

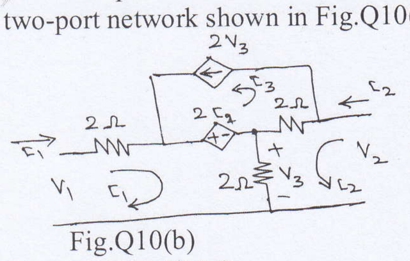

Fig.Q10(b) **(08 Marks)**