

CBCS SCHEME

15EC34

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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.

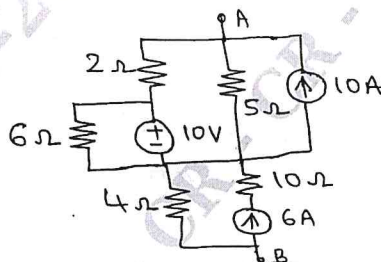


Fig.Q1(a)

(06 Marks)

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

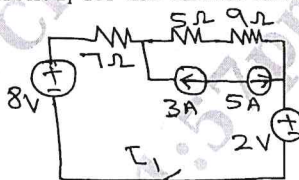


Fig.Q1(b)

(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.

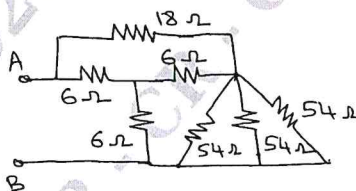


Fig.Q2(a)

(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.

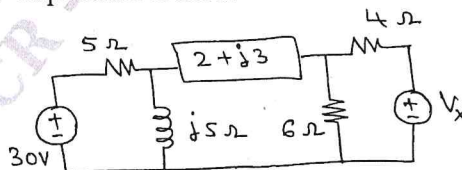


Fig.Q2(b)

(06 Marks)

- c. Explain the Dependent sources.

(04 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-2

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

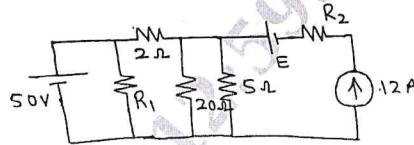


Fig.Q3(a)

(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} – Thevenin’s equivalent resistance.

(08 Marks)

OR

- 4 a. State the Millman’s theorem. Using Millman’s theorem, determine the current through $(2+j2)\Omega$ impedance for the network shown in Fig.Q4(a).

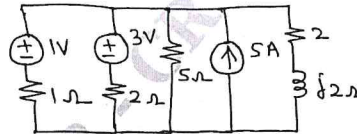


Fig.Q4(a)

(08 Marks)

- b. State the Thevenin’s Theorem and obtain the Thevenin’s equivalent circuit for the circuit shown in Fig.Q4(b).

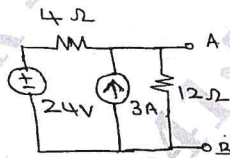


Fig.Q4(b)

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(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).

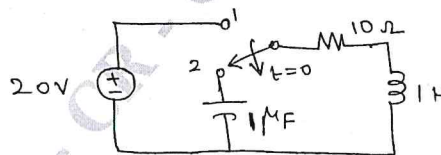


Fig.Q5(b)

(08 Marks)

OR

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

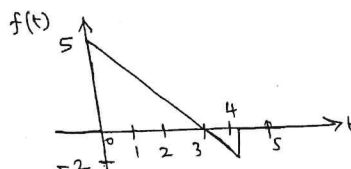


Fig.Q6(a)

(08 Marks)

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

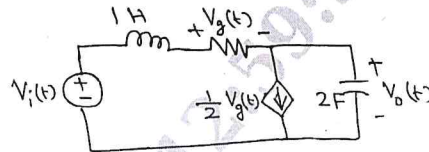


Fig.Q6(b)

(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.

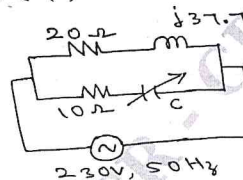


Fig.Q7(b)

(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?

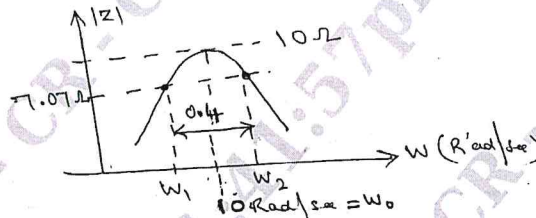


Fig.Q8(a)

(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.

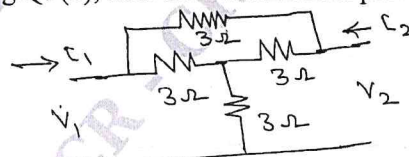


Fig.Q9(b)

(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).

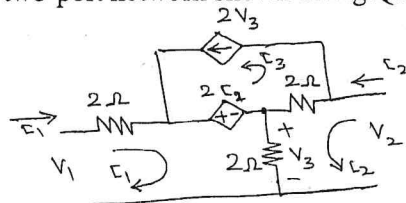


Fig.Q10(b)

(08 Marks)

** 3 of 3 **

