

CBCS SCHEME

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17EC35

Third Semester B.E. Degree Examination, June/July 2019 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. Define the following terms with examples:
 - i) Active elements
 - ii) Passive elements
 - iii) Linear and non linear elements
 - iv) Lumped node
 - v) Unilateral and bilateral elements. (10 Marks)
- b. Use the node analysis and find the value of V_x in the circuit shown in below Fig.Q.1(b). Such that the current through the impedance $(2 + j3)\Omega$ is zero.

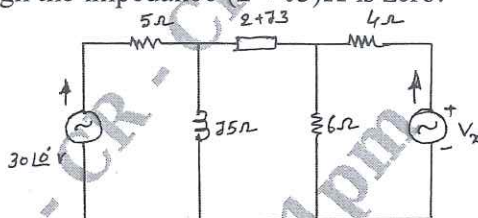


Fig.Q.1(b)

(10 Marks)

OR

- 2 a. Derive an expression for i) Δ to Y transformation ii) Y to Δ transformation. (10 Marks)
- b. Find the voltage across 20Ω resistor in the network shown in Fig.Q.2(b) below by using Mesh analysis method. (10 Marks)

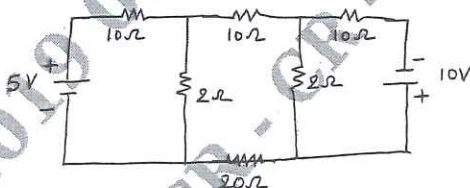


Fig.Q.2(b)

Module-2

- 3 a. State and prove Millman's theorem with an example. (10 Marks)
- b. Find the Thevenin's equivalent circuit of Fig.Q.3(b) shown below: (10 Marks)

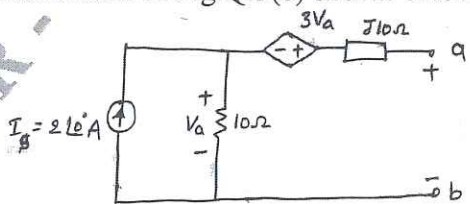


Fig.Q.3(b)

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.

OR

- 4 a. Prove that the maximum power transferred from source to load when,
 i) $R_L = R_o$ ii) $R_L = |Z_o|$ iii) $Z_L = Z_o^*$ (10 Marks)
- b. Find the value of i_b using Norton's equivalent circuit when $R = 667\Omega$, refer Fig.Q.4(b). (10 Marks)

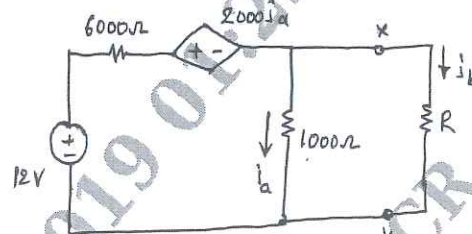


Fig.Q.4(b)

Module-3

- 5 a. Determine i , $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$, when the switch is closed at $t = 0$, from the Fig.Q.5(a) shown below. (10 Marks)

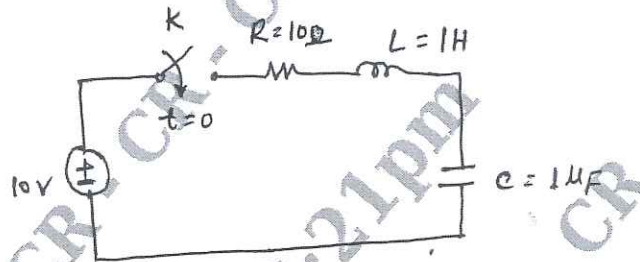


Fig.Q.5(a)

- b. Find :
 i) $i(0^+)$ and $v(0^+)$
 ii) $\frac{di(0^+)}{dt}$ and $\frac{dv(0^+)}{dt}$
 iii) $I(\infty)$ and $v(\infty)$
 from the circuit shown in Fig.Q.5(b) below. (10 Marks)

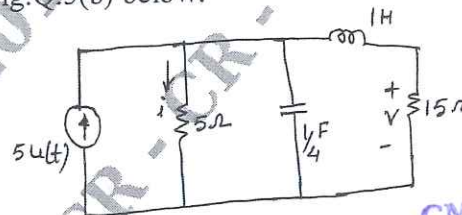


Fig.Q.5(b)

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OR

- 6 a. Deduce the Laplace transform of the following:
 i) $\sin^2 t$ ii) $\cos^2 t$ iii) $\sin wt$ iv) $\int_0^t i(t).dt$ (10 Marks)
- b. State and prove Initial and Final value theorems. (10 Marks)

Module-4

- 7 a. Demonstrate the terms: i) Resonance ii) Q-factor iii) Band width iv) Selectivity (10 Marks)
 v) Half power frequency pertaining to a R-L-C series circuit.
 b. Prove that the Resonating frequency in a R-L-C series circuit is geometrical mean of half power frequencies i.e. $f_0 = \sqrt{f_1 f_2}$. (10 Marks)

OR

- 8 a. Evaluate ω_0 , Q, BW and half power frequencies and the output voltage V at ω_0 , refer Fig.Q.8(a). (10 Marks)

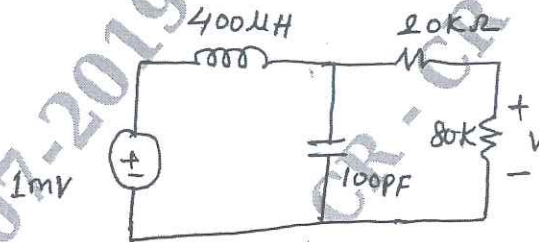


Fig.Q.8(a)

- b. Derive an expression for resonance by varying R_L in parallel RLC circuit. (10 Marks)

Module-5

- 9 a. Express Z parameters in terms h parameters and what are hybrid parameters. (10 Marks)
 b. Determine the transmission parameters for the network shown Fig.Q.9(b) below. (10 Marks)

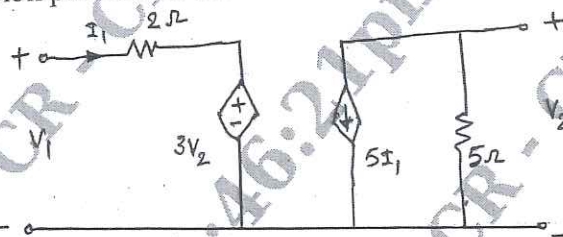


Fig.Q.9(b)

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OR

- 10 a. Obtain the condition of transmission parameters for two networks connected in cascade. (10 Marks)
 b. Determine the Z-parameters for the circuit shown in Fig.Q.10(b) below. (10 Marks)

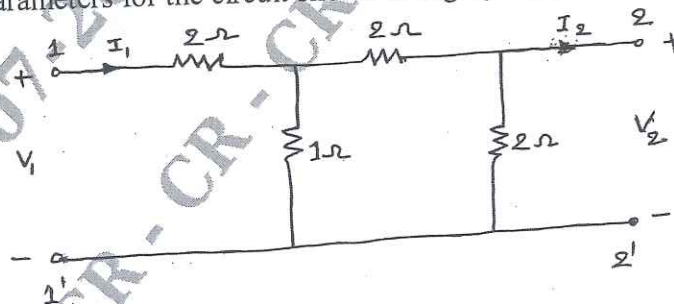


Fig.Q.10(b)
