

CBCS Scheme

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15EC34

Third Semester B.E. Degree Examination, Dec.2016/Jan.2017 Network Analysis

Time: 3 hrs.

Max. Marks: 80

Note: Answer 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. Using source Transformation, find power delivered by 50V source. Shown in Fig Q1(b). (06 Marks)

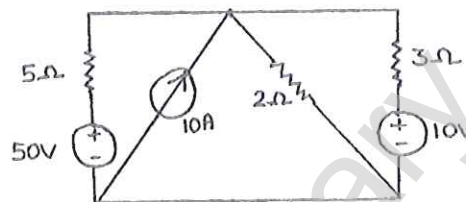


Fig Q1(b)

OR

- 2 a. Find the voltage across 20Ω resistor in the Network. Shown in Fig Q2(a) by Mesh analysis. (08 Marks)
- b. Find i , using nodal analysis for the circuit shown in Fig Q2(b). (08 Marks)

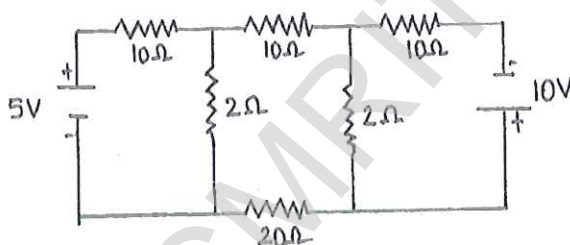


Fig Q2(a)

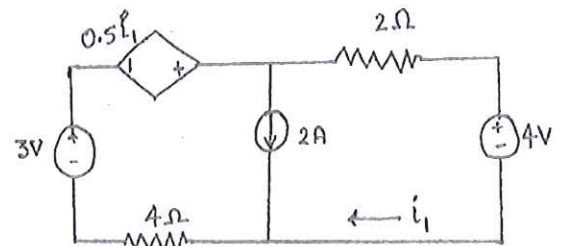


Fig Q2(b)

Module-2

- 3 a. State and prove maximum power transfer Theorem for AC circuits. (08 Marks)
- b. For the network shown in Fig Q3(b), obtain the Thevenin's equivalent as seen from terminals p and q. (08 Marks)

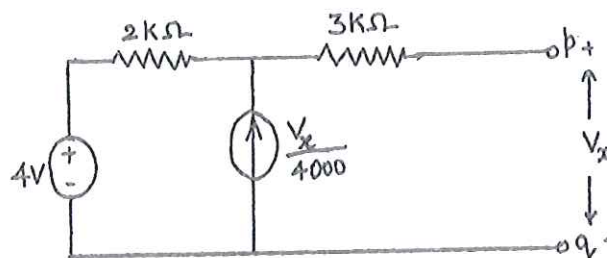


Fig Q3(b)

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. State and explain Millman's theorem. (08 Marks)
 b. Verify reciprocity theorem for the circuit shown in Fig Q4(b). (08 Marks)

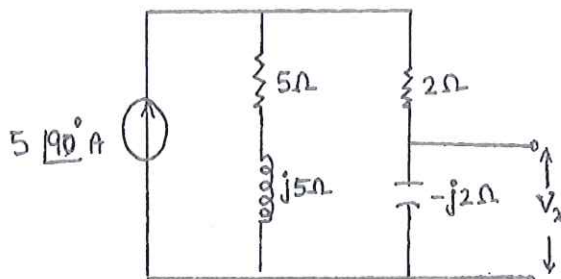


Fig Q4(b)

Module-3

- 5 a. State and prove initial value Theorem and final value theorem. (08 Marks)
 b. In the circuit shown in Fig Q5(b) $V = 10V$, $R = 10\Omega$, $L = 1H$, $C = 10\mu F$ and $V_c = 0$. Find $i(0^+)$, $\frac{di}{dt}(0^+)$ and $\frac{d^2i}{dt^2}(0^+)$, if switch K is closed at $t = 0$. (08 Marks)

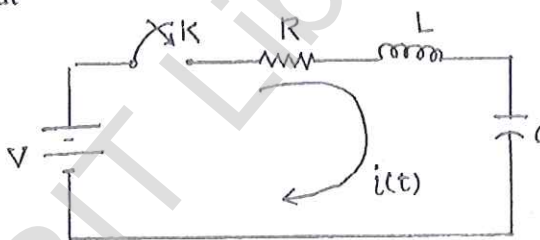


Fig Q5(b)

OR

- 6 a. In the network shown in Fig Q6(a), a steady state is reached with the switch K open. At $t = 0$, the switch is closed. For the element values given, determine the values of $V_a(0^-)$ and $V_a(0^+)$. (08 Marks)
 b. Obtain the Laplace Transform of saw tooth waveform shown in Fig Q6(b). (08 Marks)

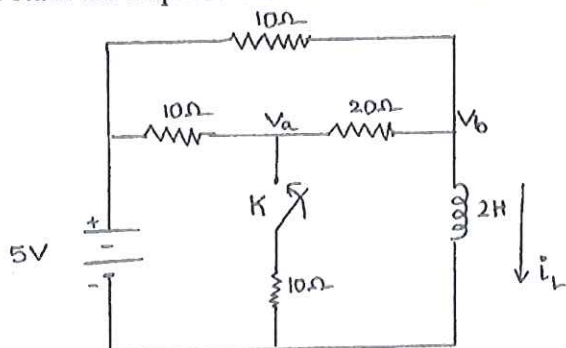


Fig Q6(a)

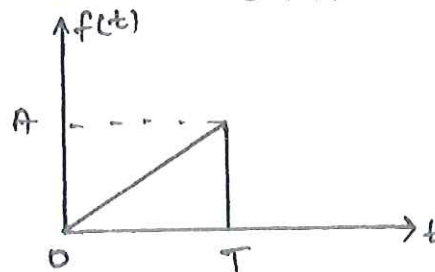


Fig Q6(b)

Module-4

- 7 a. Prove that $f_0 = \sqrt{f_1 f_2}$ where f_1 and f_2 are the two half power frequencies of a resonant circuits. (08 Marks)
 b. A series RLC circuit consists of $R = 10\Omega$, $L = 0.01H$ and $C = 0.01\mu F$ is connected across a supply of $10mV$. Determine, i) f_0 ii) Q-factor iii) BW iv) f_1 and f_2 and v) I_0 . (08 Marks)

OR

- 8 a. Obtain the expression for the resonant frequency for the circuit shown in Fig Q8(a) (08 Marks)

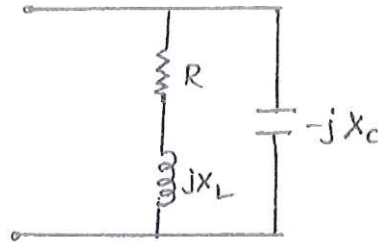


Fig Q8(a)

- b. An RLC series circuit has an inductive coil of 'R' Ω resistance and inductance of 'L' H is in series with a capacitor 'C' F. The circuit draws a maximum current of 15A when connected to 230V, 50Hz supply. If the Q-factor is 5, find the parameter of the circuit. (08 Marks)

Module-5

- 9 a. Derive the z-parameters in terms of Y parameters. (08 Marks)
 b. Determine Y parameter of the two – port network shown in Fig Q9(b). (08 Marks)

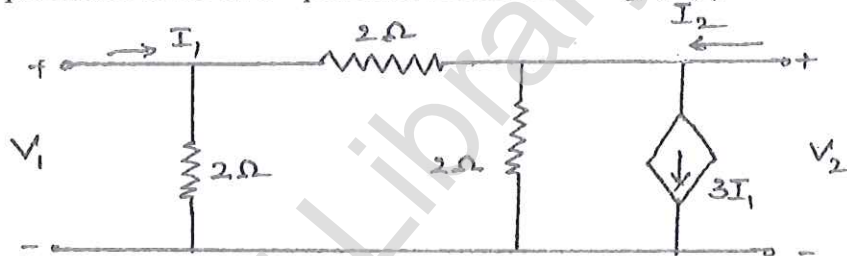


Fig Q9(b)

OR

- 10 a. Obtain hybrid parameters (h) in terms of impedance parameters (z). (08 Marks)
 b. Find the Y parameters for the circuit shown in Fig Q10 (b). Then use the parameter relationship to find ABCD parameters. (08 Marks)

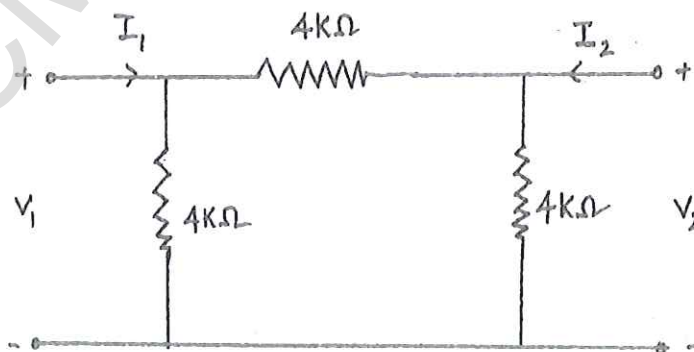


Fig Q10(b)
