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15EC34

## Third Semester B.E. Degree Examination, June/July 2019 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. Explain E-shift and I-shift with an example. (08 Marks)
- b. Find the voltage across the capacitor of  $10 \Omega$  reactance of the network shown in Fig.Q1(b) by loop current method.

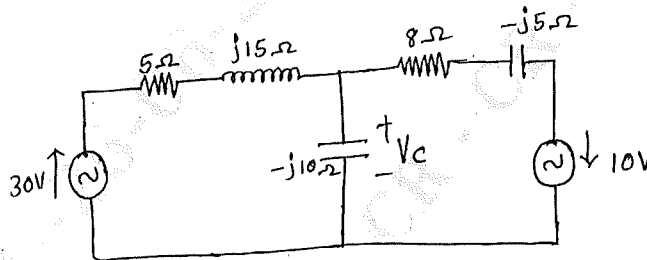


Fig.Q1(b)

(08 Marks)

OR

- 2 a. Determine the equivalent resistance between the terminals A and B in the network of Fig.Q2(a) using star-delta transformation.

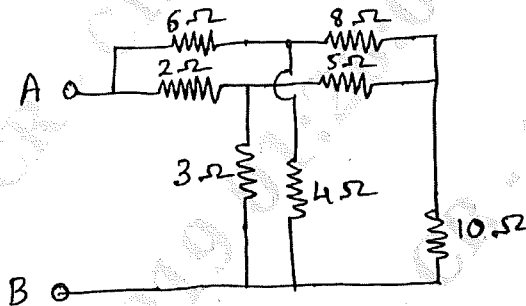


Fig.Q2(a)

(08 Marks)

- b. Find the voltages at nodes 1, 2, 3 and 4 for the network shown in Fig.Q2(b) using nodal analysis.

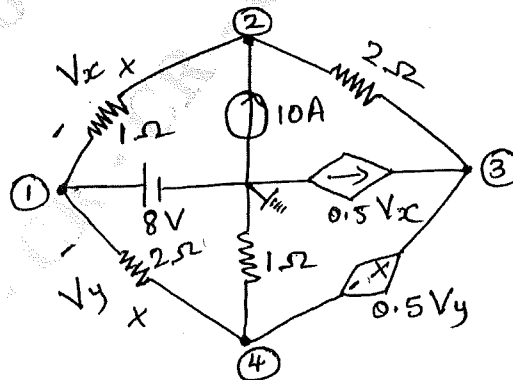


Fig.Q2(b)

(08 Marks)

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. State and explain superposition theorem. (08 Marks)  
 b. Obtain Thevenin's equivalent circuit across A and B for the network shown in Fig.Q3(b).

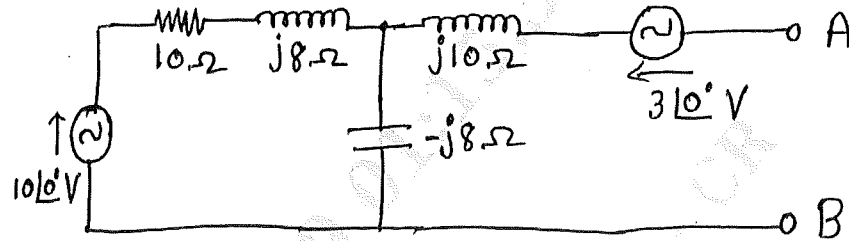


Fig.Q3(b)

(08 Marks)

OR

- 4 a. State and explain Millman's theorem. (08 Marks)  
 b. Find the value of  $Z_L$  in the circuit shown in Fig.Q4(b) using maximum power transfer theorem and hence the maximum power.

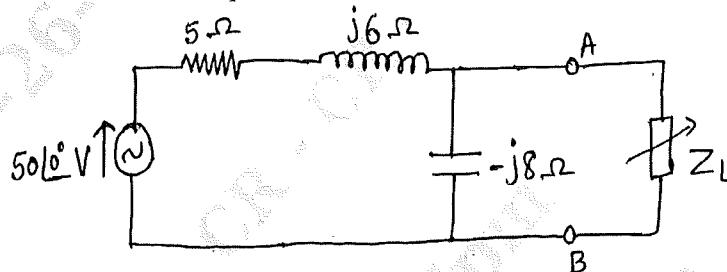


Fig.Q4(b)

(08 Marks)

Module-3

- 5 a. State and prove initial value theorem and final value theorem. (08 Marks)  
 b. In the network shown in Fig.Q5(b), K is changed from position a to b at  $t = 0$ . Solve for  $i$ ,  $\frac{di}{dt}$  and  $\frac{d^2i}{dt^2}$  at  $t = 0^+$ , if  $R = 100 \Omega$ ,  $L = 0.1 \text{ H}$  and  $C = 0.25 \mu\text{F}$  and  $V = 100 \text{ V}$ . Assume that the capacitor is initially uncharged.

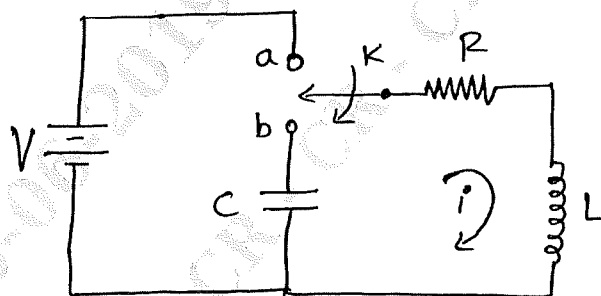


Fig.Q5(b)

(08 Marks)

OR

- 6 a. What is the significance of initial conditions? Write a note on initials and final conditions in basic circuit elements. (08 Marks)  
 b. Find the Laplace transform of (i)  $f(t) = u(t)$  (ii)  $f(t) = t$ . (08 Marks)

**Module-4**

- 7 a. Derive an expression for half power frequencies for a series resonant circuit, (08 Marks)  
 b. For the network shown in Fig.Q7(b), find the value of L at which circuit resonates at a frequency of 600 rad/sec.

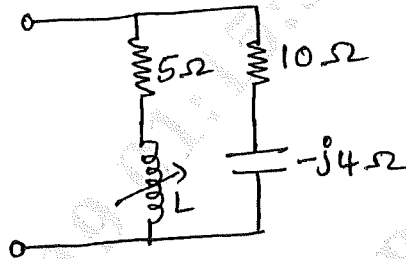


Fig.Q7(b)

(08 Marks)

OR

- 8 a. Obtain the expression for the resonant frequency and the dynamic impedance of a parallel resonant circuit. (08 Marks)  
 b. An RLC series resonant circuit draws a maximum current of 10 Amps, when connected to 230 V, 50 Hz supply. If the Q-factor is 5, find the parameters of the circuit. (08 Marks)

**Module-5**

- 9 a. Derive the Y-parameters in terms of ABCD parameters. (08 Marks)  
 b. Obtain the h-parameters for the circuit shown in Fig.Q9(b).

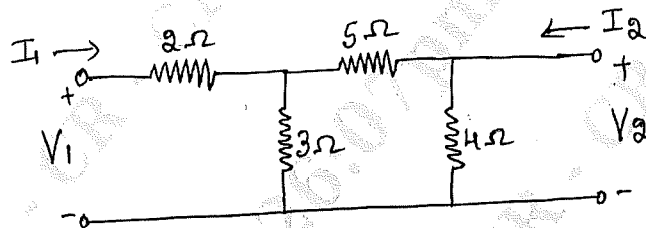


Fig.Q9(b)

(08 Marks)

OR

- 10 a. Express h-parameters in terms of z-parameters. (08 Marks)  
 b. Find the y-parameters for the circuit shown in Fig.Q10(b). Use parameter relationships to find h-parameter.

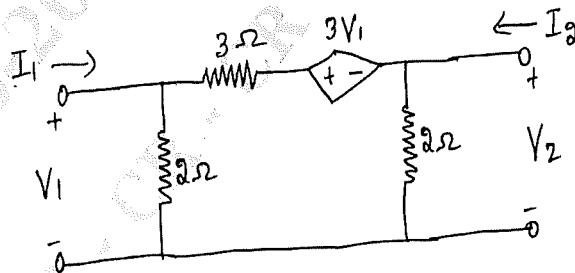


Fig.Q10(b)

(08 Marks)

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