CODE: 17CA02203

B. Tech I Year II Semester (R17) Supplementary Examinations, July/August - 2018

NETWORK ANALYSIS

(ECE)

Time: 3 hours Max Marks: 70

PART – A

1. Answer any **TEN** questions (10 x 2 = 20 Marks)

(a) A voltage source of 150 V has internal resistance of 4Ω and supplies a load having a resistance of 6Ω. What is the power absorbed by the load?

(b) If I_a=5 A and I_b=15 A and the 25 V voltage source supplies 10 A current, find the value of Rx in Figure 1.

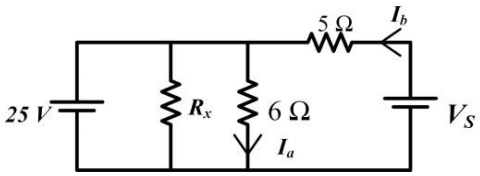

Figure 1

(c) Define tree and co-tree with suitable example.

(d) Write the expression for star-delta and delta-star transformation.

(e) Calculate the power factor, if v(t) = Vm sinωt and i(t)=Im sin(ωt-30°)

(f) Define peak factor and form factor.

(g) Why series resonant circuit is called acceptor circuit? Justify.

(h) Two inductively coupled coils having self-inductance L1 = 25 mH and L2 = 100 mH. If coefficient of coupling is 0.5, find the value of mutual inductance between the coils.

(i) Define bandwidth of a resonant circuit.

(j) A source is having an impedance of (6-j8) Ω at certain frequency, what should be the load impedance for maximum power transfer?

(k) State compensation theorem.

(l) Find the thevenin's equivalent across the terminal A-B for the circuit shown in Figure 2.

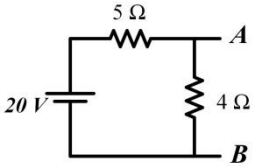

Figure 2

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PART - B

Answer all **FIVE** units (5 x 10 = 50 Marks)

UNIT-I

2. (a) Explain Ohm's Law

(b) By using network reduction technique, determine the equivalent resistance seen by the source in the circuit shown in Figure 4. Find the overall dissipated power.

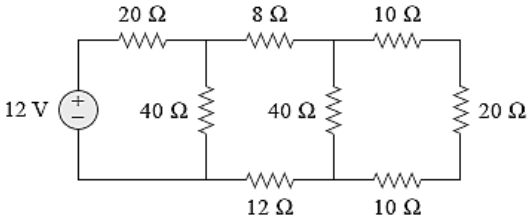

Figure 4

OR

3. (a) State Kirchhoff's voltage and current law with suitable example

(b) Determine the value of the resistance R and current in each branch when the total current taken by the circuit shown in Figure 5 is 6 A.

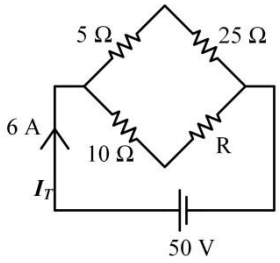

Figure 5

UNIT-II

4. (a) Draw the dual of the network shown in Figure 6.

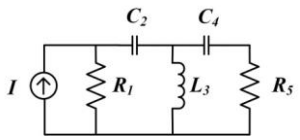

Figure 6

(b) In the circuit shown in Figure 7, find the current through 30 Ω resistor using mesh analysis.

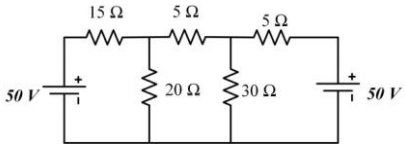

Figure 7

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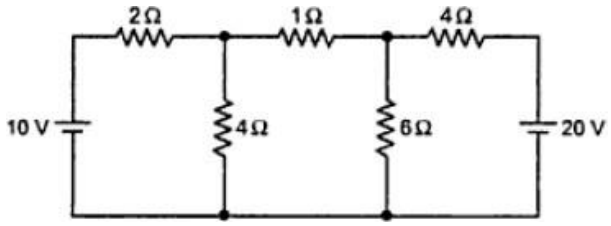
OR

5. (a) Calculate the current in 6 ohm resistor using super position theorem as shown in fig



UNIT-III

6. (a) Find the average and effective values of the sawtooth waveform shown in Figure 9.

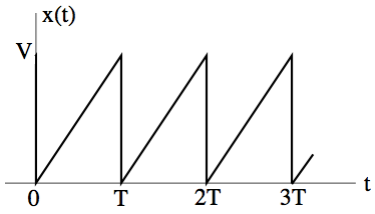


Figure 9

(b) In an ac series circuit, a 50 V, 50 Hz supply is applied across the series combination of R, L and C having the values of 10 Ω, 0.5 H and 10 μF respectively. Determine the total impedance, current, phase angle and voltage across each element.

OR

7. (a) Explain the relationship between real power, reactive power and apparent power with the help of power triangle

(b) Find the power absorbed by the 10 Ω resistor in the network shown in Figure 10.

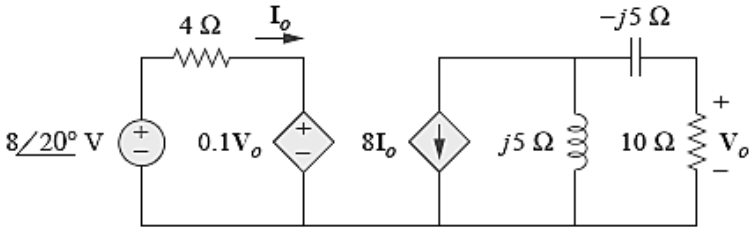


Figure 10

UNIT-IV

8. (a) Determine the value of Q at resonance and bandwidth of a series RLC circuit with R = 100 Ω, L = 5 H and C = 100μF

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(b) Find the value of L for which the circuit shown in Figure 11 is in resonance at ω=2000 rad/s.

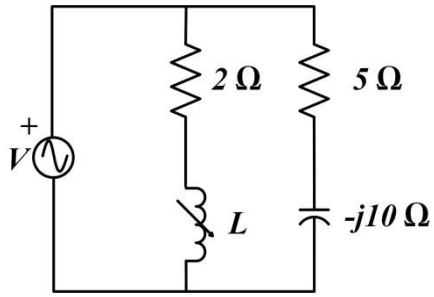


Figure 11

OR

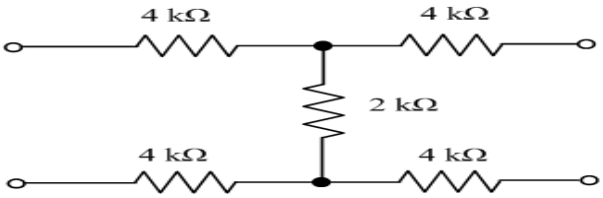
9. (a) In a coupled circuit L2 = 16 L1 and coupling coefficient, k = 0.6. When L1 and L2 are connected in series opposing, the equivalent inductance is 73.2 mH. Find L1, L2 and mutual inductance.

(b) Derive the coefficient of coupling.

UNIT-V

10. (a) Express Y – parameters in terms of Z -parameters.

(b) Find the Y parameters as shown in fig



OR

11 Explain types of filters

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