Reg. No. : | | | | | | | | | | |

Question Paper Code: 31433

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Electronics and Communication Engineering

01UEC303 - CIRCUIT THEORY

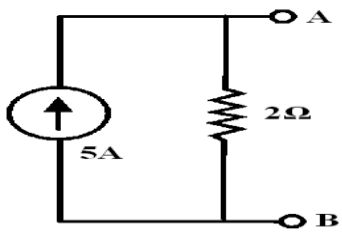
(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State Kirchoff's voltage and current law.
2. Express the following circuit in its equivalent form using the voltage source between terminals *A* and *B*.



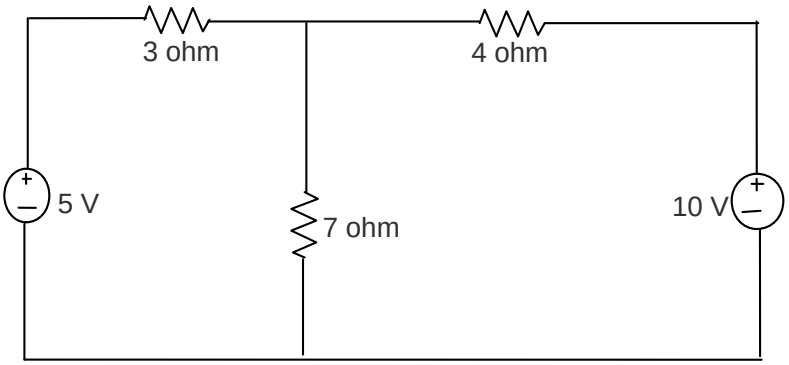
3. State Tellegen's theorem.
4. State Norton's theorem.
5. When the current is maximum in the series resonance circuit? Why?
6. What is the time constant of RL series circuit and RC series circuit?
7. Identify the applications of coupled tuned circuits?
8. A three-phase delta connected load having $(3+j4)\ \Omega$ impedance per phase is connected across a 400 *V* three phase source. Calculate the magnitude of the line current through the load?

9. Define driving point and transfer point impedance.

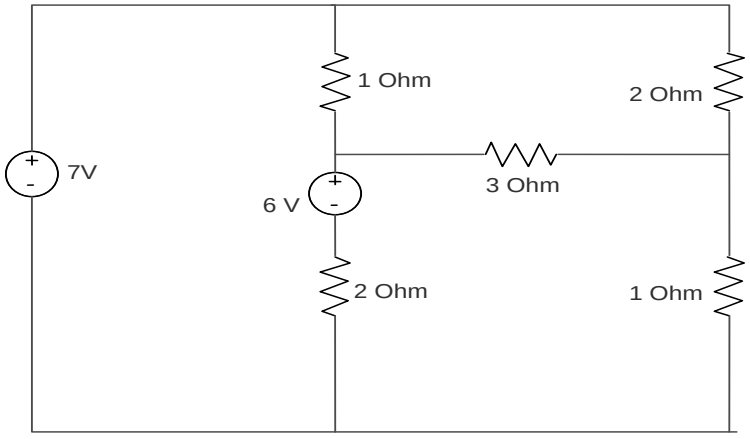
10. List down the difference between single port network and dual port network.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Draw the dual network of the given circuit. (6)

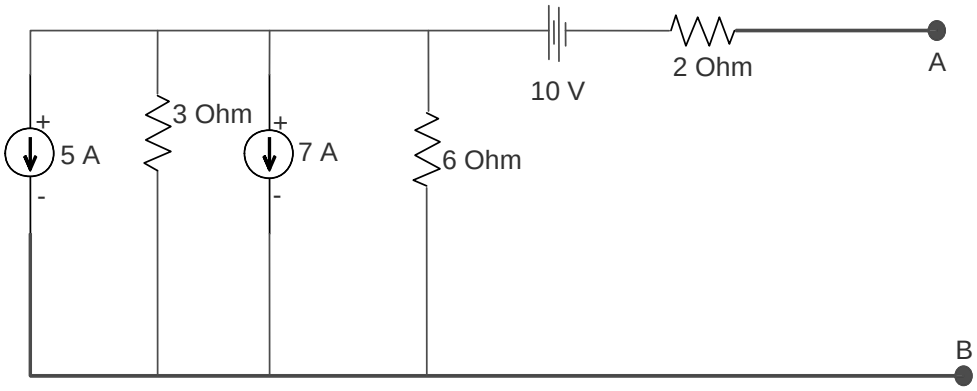


(ii) Determine the mesh currents of the given network using mesh analysis. (10)

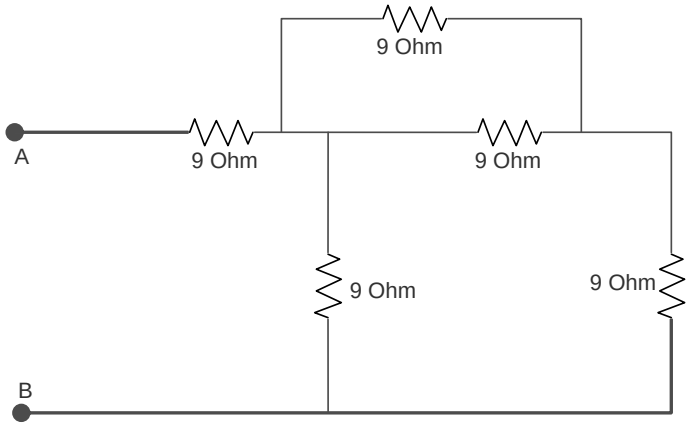


Or

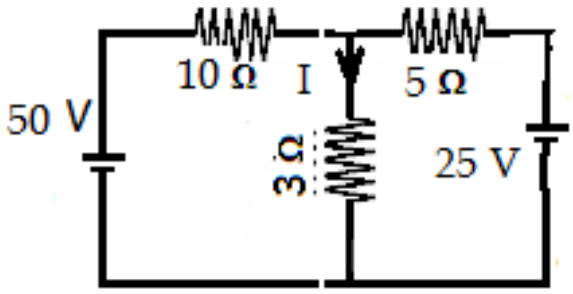
(b) (i) Reduce the following to a single source equivalent. (8)



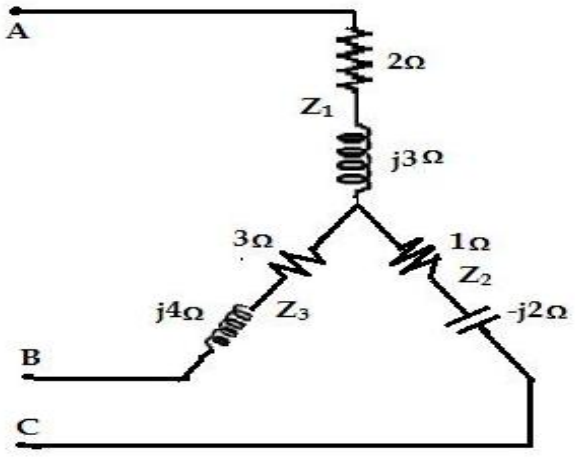
(ii) Determine the equivalent resistance between A and B. (8)



12. (a) (i) Calculate the current in 3Ω resistor by applying superposition theorem. (8)

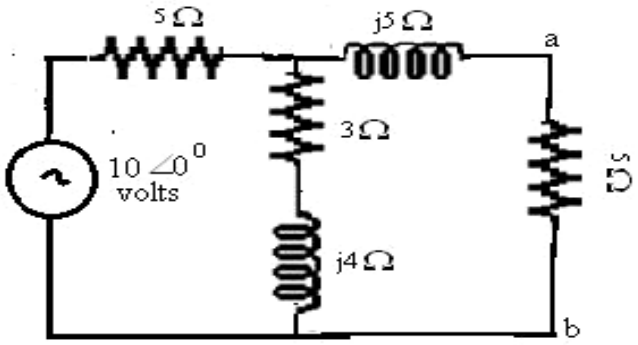


(ii) Obtain the delta connected equivalent for the star connected circuit shown in below figure. (8)



Or

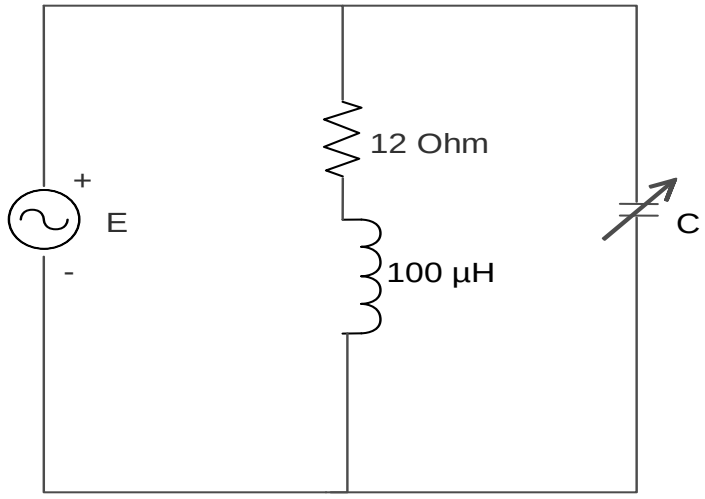
(b) (i) State the Thevenin's theorem and find the current through branch a-b of the network shown in below figure. (10)



(ii) State and prove maximum power transfer theorem. (6)

13. (a) (i) Derive the expression for the resonance frequency of a RLC series circuit. (6)

(ii) Determine the maximum and minimum resonance for the given circuit if the capacitor is adjustable over the range of 200pf to 300pf. Also calculate the Q factor and bandwidth of the circuit at the two resonance frequency extremes.



(10)

Or

(b) A step voltage v (t) = 100 u(t) is applied to a series RLC circuit with L = 10H, R = 2Ω and C = 5F. The Initial current in the circuit is zero but there is a initial voltage of 50V on the capacitor in a direction which opposes the applied source. Find the expression for the current in the circuit. (16)

14. (a) (i) Explain the single tuned circuit with neat diagram and obtain the gain and mutual inductance. (10)

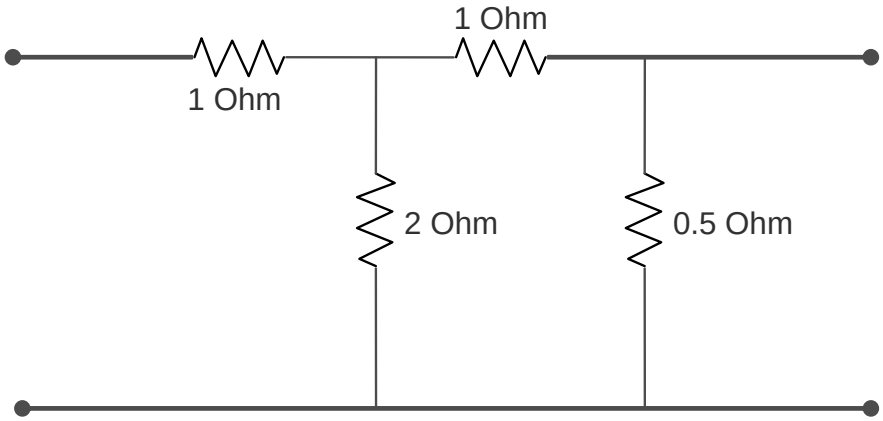
(ii) Define mutual inductance and derive the coefficient of coupling. (6)

Or

(b) (i) Show that two Watt meters are sufficient to measure power in a balanced or unbalanced three-phase load connected to a balanced supply. (8)

(ii) Find the (1) line current (2) neutral current for the unbalanced four wire star connected load has a balanced supply voltage of 400 *V*. The load impedance are $Z_R=4+j8\Omega$, $Z_Y=+j4\ \Omega$, $Z_B=15+j10\ \Omega$. (8)

15. (a) Find Y- Parameters for the network shown in Figure. (16)



Or

(b) Find transmission parameters for the low pass filter network shown in figure. (16)