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

Question Paper Code: 31343

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Electronics and Communication Engineering

01UEC303 – CIRCUIT THEORY

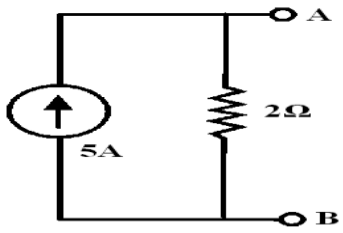
(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define ideal voltage source and current source.
2. Express the following circuit in its equivalent form using the voltage source between terminals *A* and *B*.



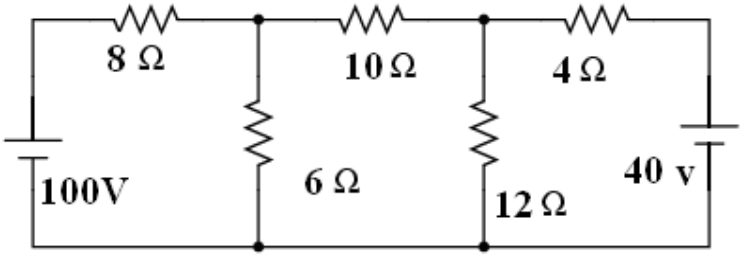
3. State Norton's theorem.
4. State Tellegen's theorem.
5. Define selectivity of a resonant circuit.
6. What is the time constant of RL series circuit and RC series circuit?
7. Define coefficient of coupling.
8. A three-phase delta connected load having $(3+j4)\ \Omega$ impedance per phase is connected across a 400 *V* three phase source. Calculate the magnitude of the line current through the load?
9. Draw the equivalent *T* and π Models of two port network.

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

PART - B (5 x 16 = 80 Marks)

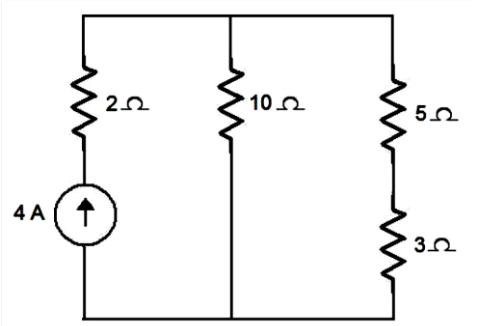
11. (a) (i) Construct a circuit which consist of three resistances of 12 Ω, 18 Ω and 36 Ω joined in parallel is connected in series with a fourth resistance. The whole circuit is applied with 60 volt and it is found that the power dissipated in 12 Ω resistor is 36 Watt. Determine the value of fourth resistance and total power dissipated in the circuit. (8)

(ii) Solve by using mesh current method and determine the current in 12 Ω resistor and also find the voltage drop across it for the circuit show below. (8)

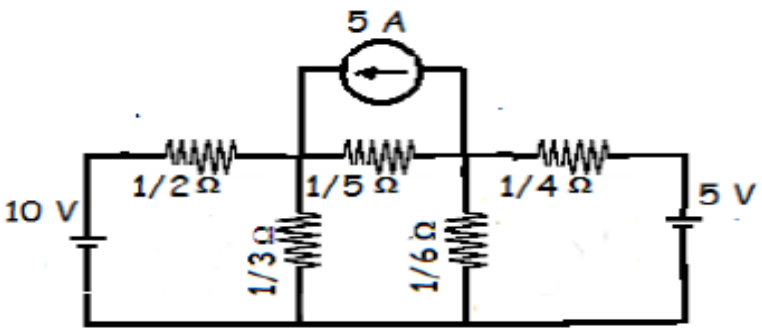


Or

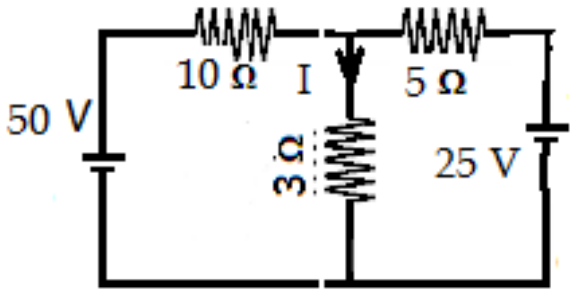
(b) (i) Calculate the current through each resistor for the following circuit. (6)



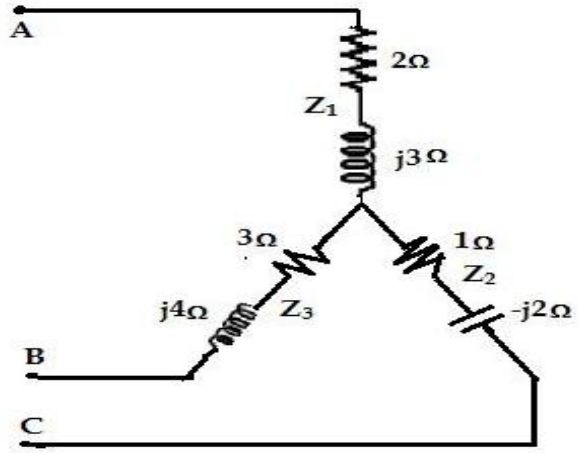
(ii) Find all the node voltages and currents in 1/3 Ω and 1/5 Ω using nodal analysis. (10)



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

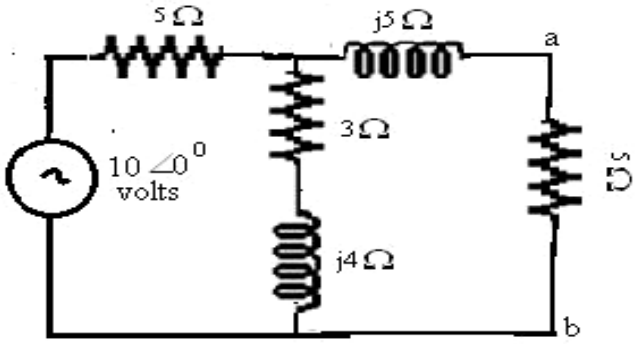


(ii) Obtain the delta connected equivalent for the star connected circuit shown in below figure. (8)



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) Find (i) resonant frequency (ii) Quality Factor (iii) bandwidth (iv) current at resonance (v) voltage across inductance at resonance with R=10Ω, L=0.54H and C=40μF when connected in series with applied voltage of 100 V. (10)

(ii) Discuss the tank circuit with neat diagram and obtain an expression for the resonant frequency. (6)

Or

(b) Express the current response of RL series circuit with an excitation of $V_m \sin\omega t$ and obtain the complete solution. (16)

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

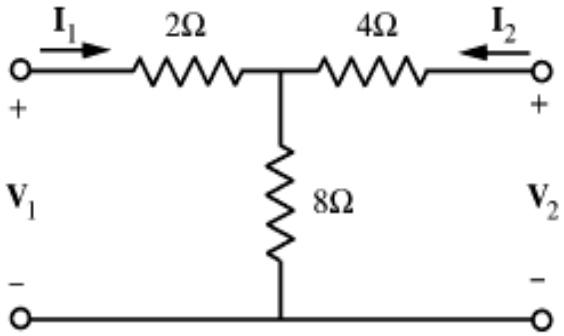
(ii) Define mutual inductance and derive the coefficient of coupling. (6)

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) (i) Find the hybrid parameter for the two port network shown in below figure. (8)



(ii) Explain the impedance and admittance parameter in detail with neat diagram. (8)

Or

(b) (i) Derive the equations for image parameters in terms of ABCD parameter. (8)

(ii) Explain in detail the characteristics of ideal low pass filter and high pass filter. (8)

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