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

Question Paper Code: 31534

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Electronics and Instrumentation Engineering

01UEI304 - ELECTRICAL CIRCUITS AND NETWORKS

(Common to Instrumentation and Control Engineering)

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

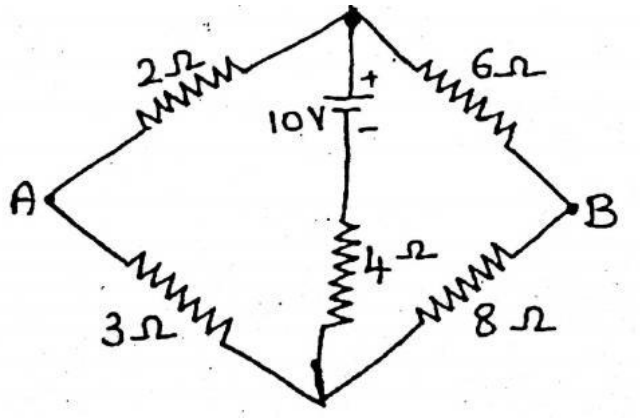
Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. State Ohm's law.
2. Distinguish between series connected and parallel connected circuit.
3. Three resistors Rab, Rbc and Rca are connected in delta. Re-writethe expression for resistors in equivalent star.
4. Define Maximum power transfer theorem.
5. Define quality factor of a series resonant circuit.
6. Give the expression which relates the self and mutual inductance
7. Design the equivalent circuit at t=0+ for a capacitor with initial charge of q=0.
8. Summarize h parameter and give its applications.
9. Compare three-phase star connected system with delta connected system.
10. Calculate the power factor if $V(t)=V_m \sin \omega t$ and $I(t)=I_m \sin(\omega t - 450)$.

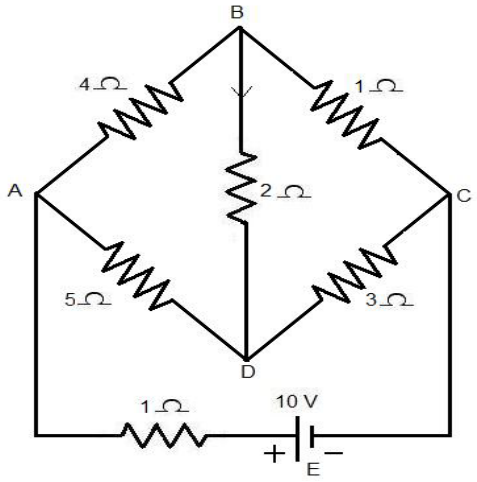
PART - B (5 x 16 = 80 Marks)

11. (a) For the circuit, find the (i) currents in different branches (ii) current supplied by the battery (iii) potential difference between terminals A and B. (16)

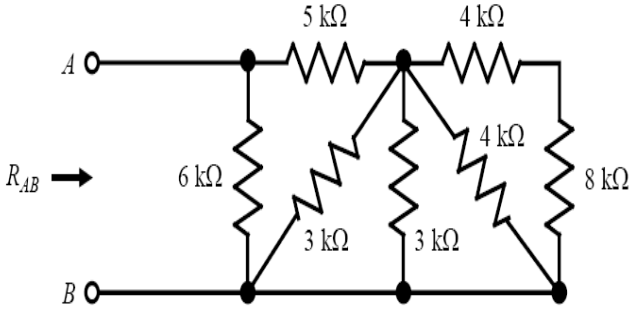


Or

(b) In the network shown below, identify the voltage across 2Ω resistor and the total current delivered by the battery using Kirchoff's laws. (16)

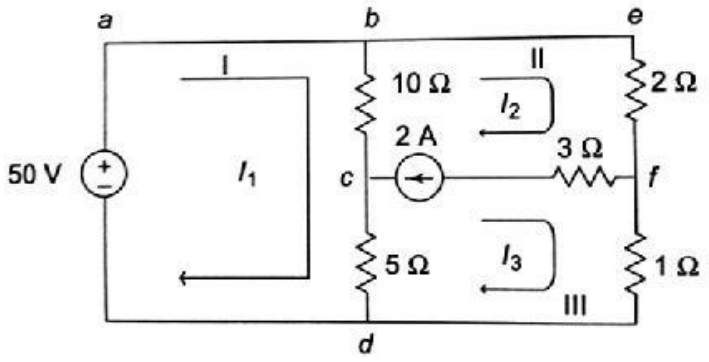


12. (a) Derive and show the expressions for converting the star connected network into delta and delta connected network into star. (16)



Or

(b) Examine and identify the current in the 5Ω resistor in the network given in figure. (16)



13. (a) Describe the condition for resonance in a series RLC circuit and derive an expression for resonant frequency and frequency at which voltage across capacitor is maximum. Also draw the resonance curve and explain the values for the following parameters at resonance (i) phase angle (ii) current (iii) impedance (iv) admittance and (v) power factor. (16)

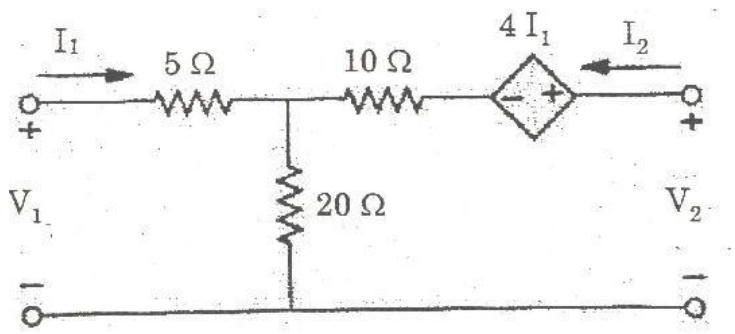
Or

(b) Impedance Z1and Z2 are parallel and this combination is in series with an impedance Z3 connected to a 100V, 50Hz ac supply. Z1=(5-jXc) ohm, Z2=(5+j0) ohm,Z3=(6.25+j1.25) ohm. Analyze the value of capacitance such that the total current of the circuit will be in phase with the total voltage. Find the circuit current and power. (16)

14. (a) A series RLC circuits has R = 50 *ohm*, L = 0.2*H*, and C = 50 μF. Constant voltage of 100*V* is impressed upon the circuit at t = 0. Find the expression for the transient current assuming initially relaxed conditions. (16)

Or

(b) Determine the impedance (Z) parameter of the given two port network shown in fig. (16)



15. (a) Explain the three phase power and power factor measurement by two wattmeter method with neat circuit and phasor diagrams. (16)

Or

(b) The two wattmeter produces wattmeter readingsP1=1560W and P2=2100W When connected to delta connected load. If the line voltage is 220V, Calculate (1) the per phase average power (2) total reactive power. (3) power factor (4) the phasor impedance. Is the impedance inductive or Capacitive? Justify. (16)

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