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

Question Paper Code: 33504

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Electronics and Instrumentation Engineering

01UEI304 - ELECTRICAL CIRCUITS AND NETWORKS

(Common to Instrumentation and Control Engineering)

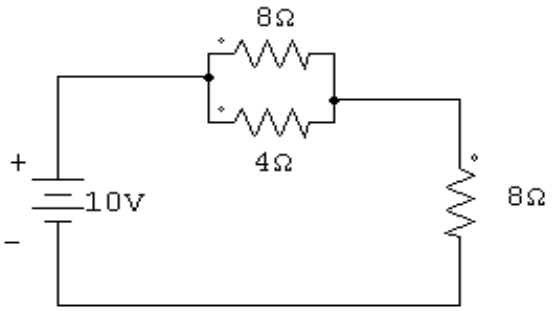
(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Calculate the current in 4 Ω resistor.



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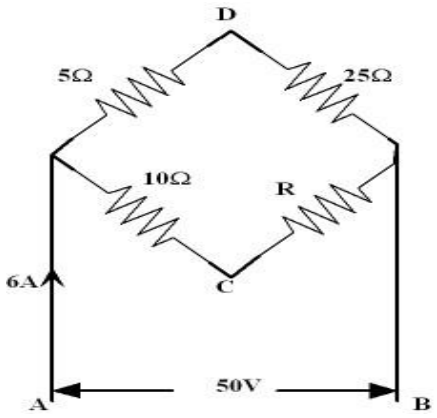
2. State Kirchhoff's law.
3. State reciprocity theorem.
4. Define Maximum power transfer theorem.
5. Define quality factor of a series resonant circuit.
6. Define coefficient of coupling.
7. A series RC circuit has a constant voltage V applied at t=0. Predict the time to reach the condition $V_R=V_C$.
8. Summarize h parameter and give its applications.

9. Compare three-phase star connected system with delta connected system.

10. Define power and power factor.

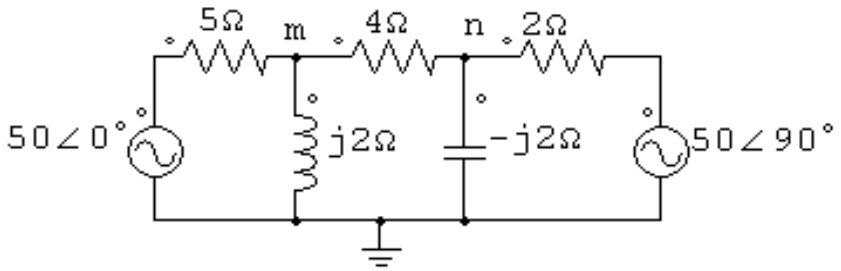
PART - B (5 x 16 = 80 Marks)

11. (a) Determine the value of resistance *R* and current in each branch when the total current taken by the circuit shown below is 6*A*. (16)

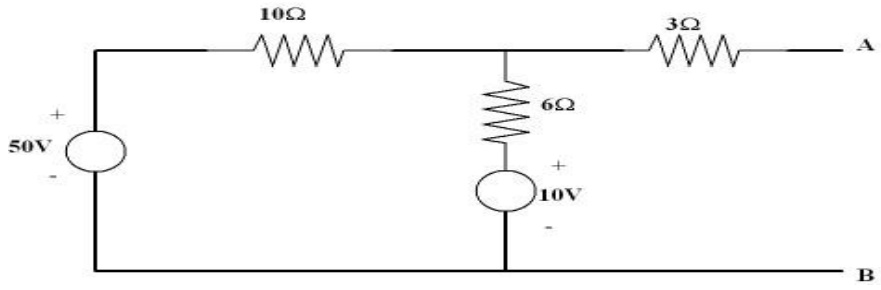


Or

(b) Using nodal voltage method, calculate the voltages of nodes '*m*' and '*n*' and currents through *j2Ω* and - *j2Ω* reactance in the network. (16)

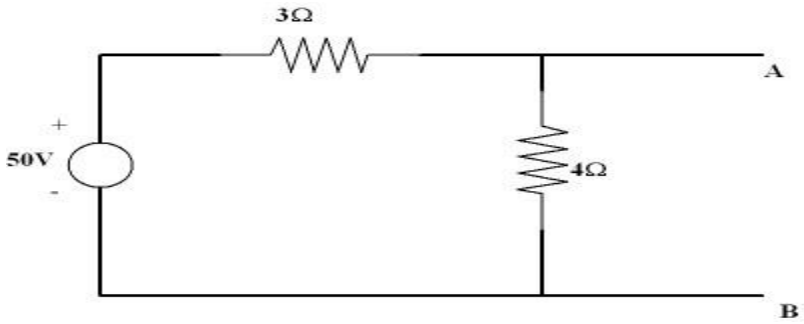


12. (a) Find Thevenin's equivalent circuit for the circuit shown below. (16)



Or

(b) Determine Norton's equivalent circuit for the circuit shown below. (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)

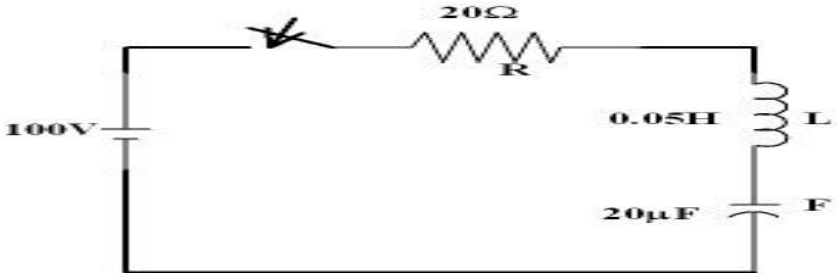
Or

(b) Explain how to derive the amplification factor and to show the variation of the output voltage with frequency for different coupling coefficients of double tuned coupled circuits. (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) The circuit shown below consists of resistance, inductance and capacitance in series with a 100*V* constant source when the switch is closed at *t*=0. Find the current transient. (16)



15. (a) (i) Using phasor diagram, formulate the relationship between line current and phase current related to delta connected load. (8)

(ii) A symmetrical 3 phase 400*V* system supplies a balanced delta connected load. The current in each branch circuit is 20*A* and phase angle 40^o (lag). Calculate the line current, power factor and total power of the circuit. (8)

Or

(b) The wattmeter shows the readings 400*W* and -35*W*. Calculate (i) total active power (ii) power factor and (iii) reactive power by using two wattmeter method for three phase load. (16)