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

Question Paper Code: 31054

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

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

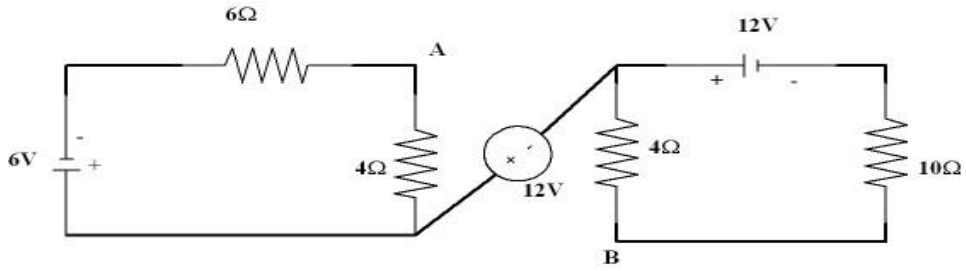
Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

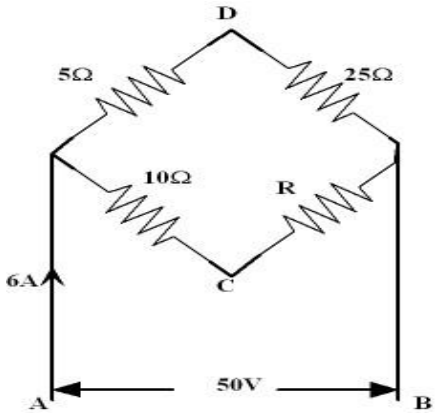
1. State Kirchhoff's law.
2. How to find the current through any branch by using current division rule?
3. State reciprocity theorem.
4. State the condition to find the maximum power using maximum power transfer theorem.
5. Define coefficient of coupling.
6. State quality factor and bandwidth.
7. What is meant by transient response?
8. State the time constant of the DC response of an *RL* circuit.
9. Define power and power factor.
10. List the types of unbalanced load in three phase circuits.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) What is the voltage across *A* and *B* in the circuit shown below? (8)

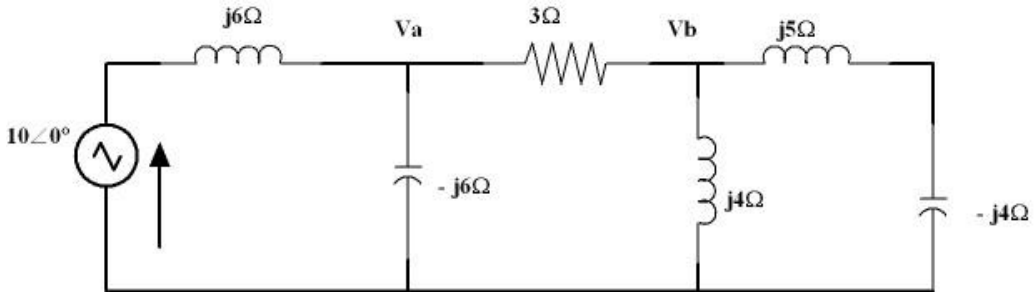


(ii) Determine the value of resistance *R* and current in each branch when the total current taken by the circuit shown below is 6*A*. (8)

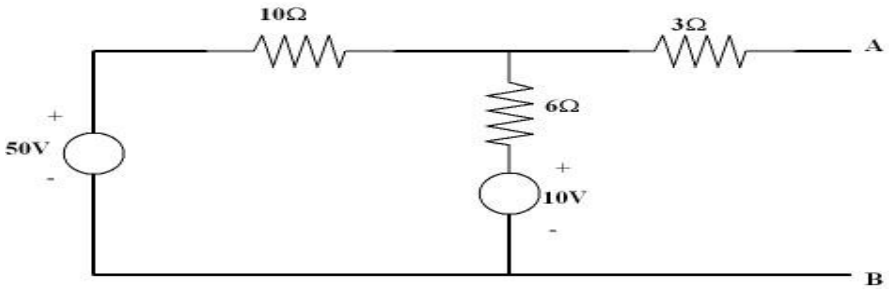


Or

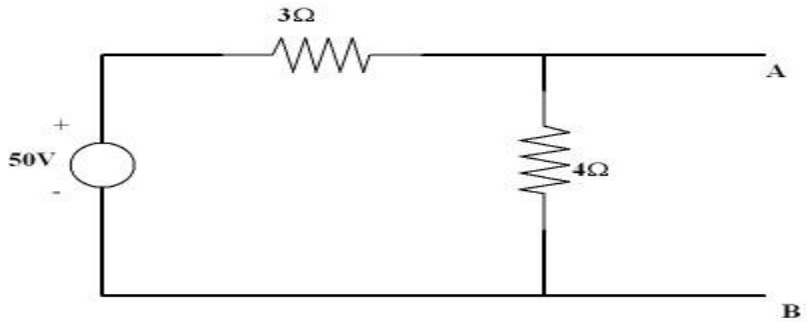
(b) In the network shown below, determine V_a and V_b. (16)



12. (a) (i) Find Thevenin's equivalent circuit for the circuit shown below. (8)

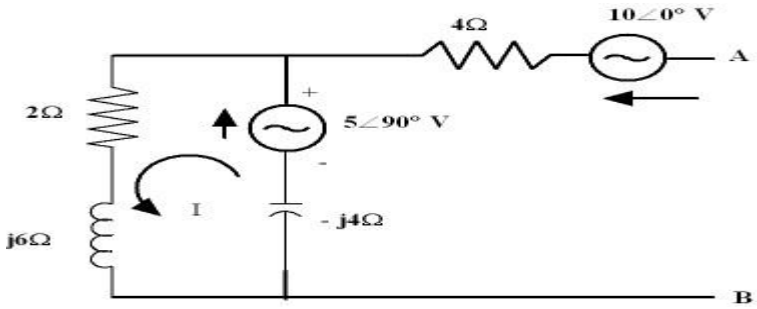


(ii) Determine Norton's equivalent circuit for the circuit shown below. (8)



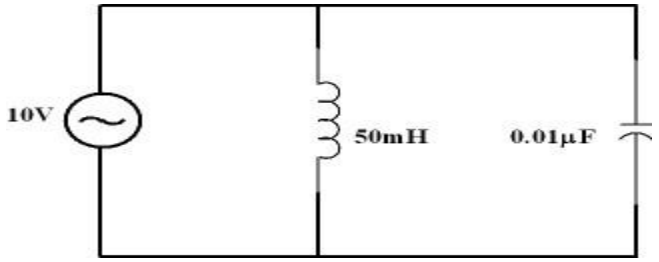
Or

(b) For the circuit shown below, determine Thevenin's equivalent circuit. (16)



13. (a) (i) A series *RLC* circuit consists of a 50Ω resistance, 0.2*H* inductance and 10μF capacitor with an applied voltage of 20*V*.Determine the resonant frequency, *Q* factor of the circuit. Compute the lower and upper frequency limits and also find the bandwidth of the circuit. (12)

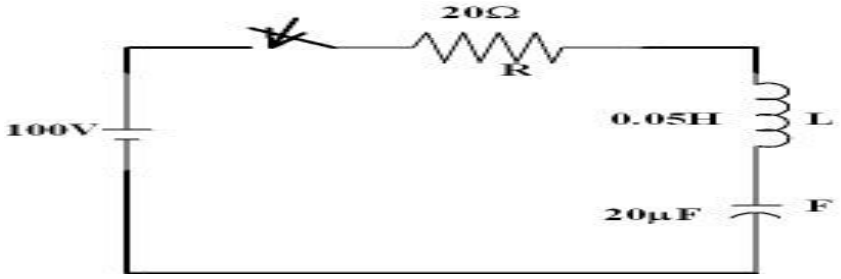
(ii) Find the resonant frequency in the ideal parallel *LC* circuit shown below. (4)



Or

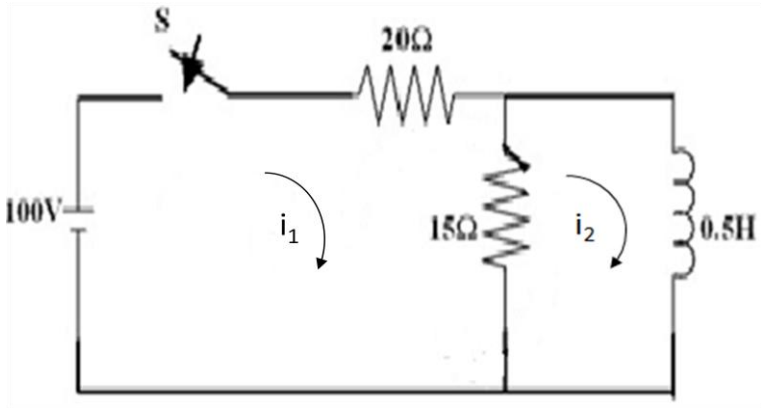
(b) Explain how to derive the amplification factor and to show the variation of the output voltage with frequency for different coupling coefficients of double tuned coupled circuits. (16)

14. (a) 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)



Or

(b) In the circuit shown below, determine the current equations for i_1 and i_2 when the switch is closed at *t=0*. (16)



15. (a) (i) 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. (8)

(ii) The input power to a three phase load is 10*kW* at 0.8 *pf*. Two wattmeters are connected to measure the power, find the individual readings of the wattmeters. (8)

Or

(b) (i) Explain about a balanced three phase system star connected load. (8)

(ii) Explain about a unbalanced three phase system delta connected load. (8)