

24/10/13

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B.E / B.Tech ( Full Time ) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

16

EEE

Semester II

**EE 131 / EE 181/EE9151 BASIC ELECTRIC CIRCUIT ANALYSIS**  
(Regulation 2002/2004/2008.)

Time: 3 Hours

Answer ALL Questions

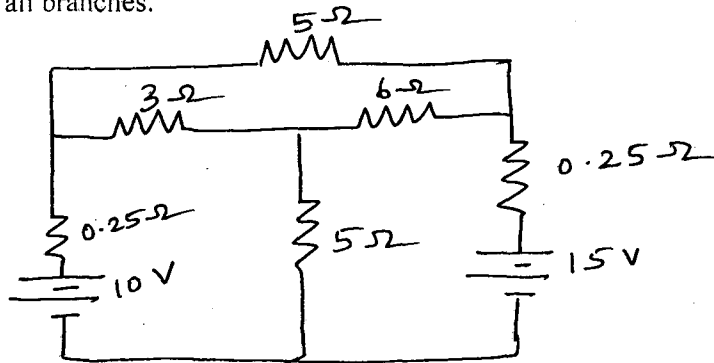
Max. Marks 100

**PART-A (10 x 2 = 20 Marks)**

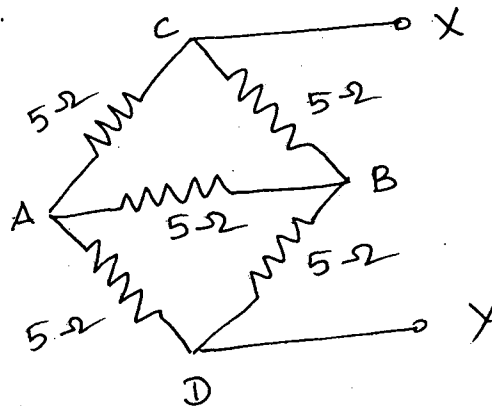
1. State Kirchoff's current law.
2. Differentiate dependent sources and independent sources.
3. Define form factor.
4. Define time constant of an RC series circuit.
5. What would be the response of a series RLC circuit when its excited by a sinusoidal voltage source of pole frequency and zero frequency.
6. Define lagging power factor and leading power factor with the help of phasor diagrams .
7. Define bandwidth of series resonance.
8. State superposition theorem
9. Define coefficient of coupling.
10. Distinguish three phase balanced currents and three phase unbalanced currents?

**Part - B ( 5 x 16 = 80 marks)**

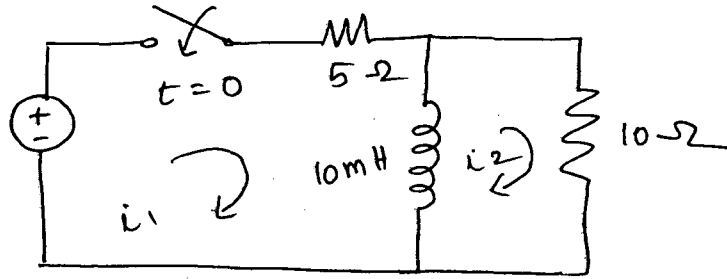
11. i) For the network shown in the figure write down the loop current equations and determine the currents in all branches. (10)



- ii) Determine the equivalent resistance across the terminals X and Y of the network shown in figure below. (6)



- 12 a) In a network shown in the figure assume initially relaxed condition and find the currents  $i_1$  and  $i_2$  in the two meshes by Laplace Transformation. The switch is under closed at  $t=0$ . (16)



(OR)

- 12 b) Derive the response of RLC series-circuit and deduce the expression for current in the circuit. (8)

List the conditions for

- i) over damped circuit.
- ii) under damped circuit
- iii) critically damped circuit. (8)

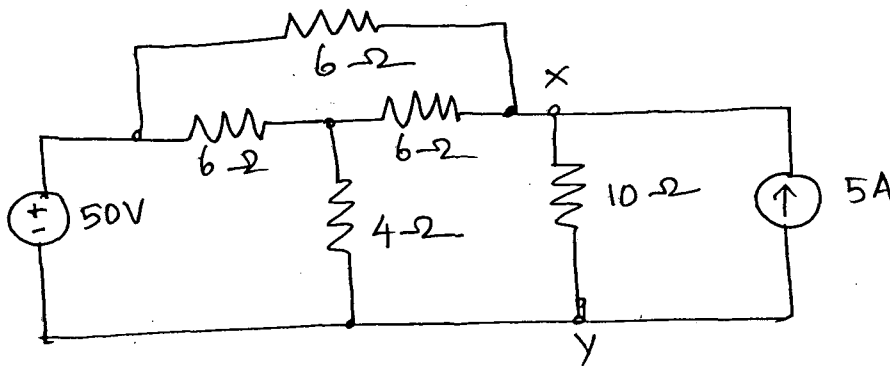
- 13 a) A coil of resistance 50 ohm and inductance 100 mH is connected in series with a 200 micro farad capacitor across a 220 V, 50 Hz supply. Calculate

- a) the inductive reactance and capacitive reactance
  - b) impedance of the whole circuit in complex form
  - c) the current
  - d) the power factor and total power
  - e) voltages across the coil and the capacitor. (10)
- Draw and illustrate phasor diagram depicting the voltages and currents. (6)

(OR)

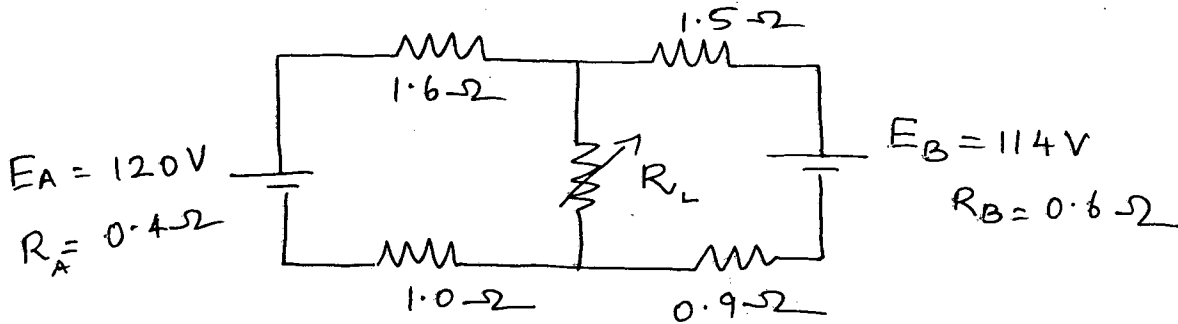
- 13 b) A series RLC circuit with  $L=0.4$  H has an applied voltage given by  $v=100 \sin(500t + 60^\circ)$  volts. The current in the circuit is  $i=2.0 \sin 500t$  Amp. Find the R and C values. At what frequency will the circuit be resonant? (16)

- 14a) Obtain the Thevenin's equivalent circuit for the network shown in figure at the terminals X and Y and determine the current through the 10 ohm resistance across X,Y. (16)

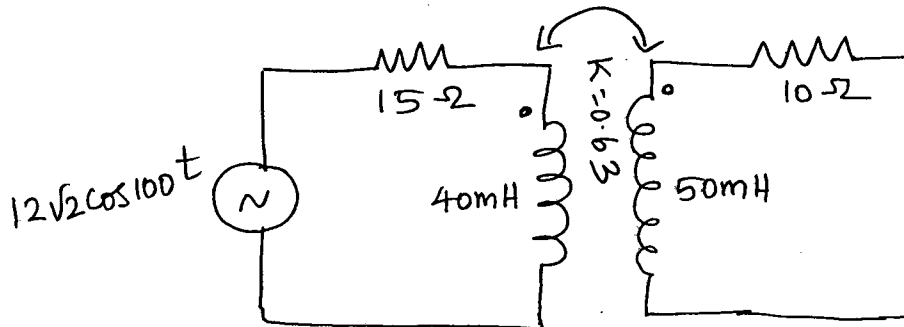


(OR)

14 b) For the circuit shown in the figure calculate i) the value of  $R_L$  for maximum power transfer. The power dissipated in  $R_L$  power supplied by the battery. The overall efficiency. (16)



15 a) A circuit comprising of 15-ohms resistance and 40 mH inductance is coupled to a secondary circuit comprising a 10 ohms resistance and 50 mH inductance as shown in the figure. Determine the current in the secondary circuit. The coefficient of mutual coupling between the two-coils is 0.63. The primary is excited by a voltage source of  $12\sqrt{2}\cos 100t$  volts. (16)



(OR)

15 b) A symmetrical three phase 440 V system supplies a balanced delta connected load. The current in each branch circuit is 25 A and the phase angle is  $45^\circ$  lag. Find the line current, power factor and the total power. (16)