

Reg. No. \_\_\_\_\_

# Karunya University

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

## End Semester Examination – November / December 2009

Subject Title: **ELECTRIC CIRCUIT ANALYSIS**

Time : 3 hours

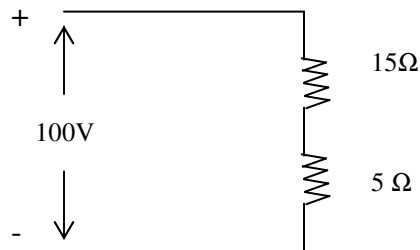
Subject Code: **EE201**

Maximum Marks: 100

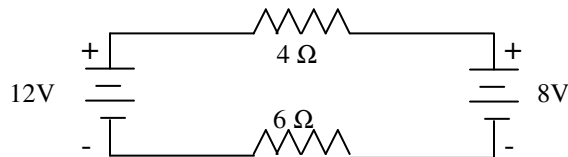
### Answer ALL questions

### PART – A (10 x 1 = 10 MARKS)

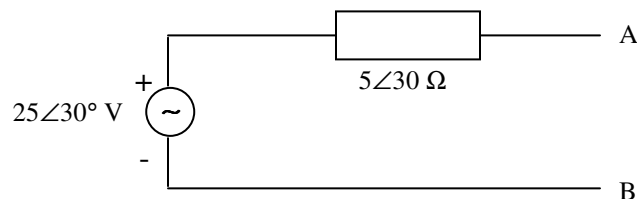
1. Plot the V-I characteristics of an independent voltage source.
2. For the circuit shown in figure, determine the voltage across 15 ohm resistor.



3. If the value of the equivalent impedance of a circuit is  $(4+j6)$  ohm, what will be the value of the conductance?
4. What is the relation between the line and phase voltages and also the line and phase currents, in a 3 phase circuit with balanced delta connected load?
5. Write the voltage equation for the circuit shown in figure.



6. How is the dot convention used in coupled circuits to indicate the polarity of mutual induction?
7. State the Superposition theorem.
8. Obtain the Norton's equivalent circuit for the circuit shown in figure.

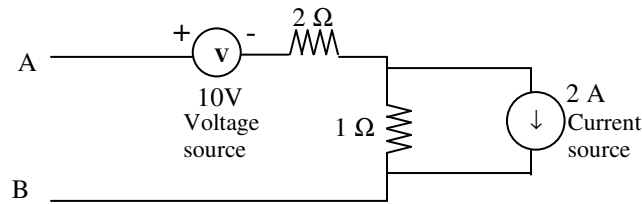


9. A series RC circuit with resistance 10 ohm and capacitance 0.1 Farad will have the time constant \_\_\_\_\_.
10. Write an expression for the critical resistance of a series RLC circuit at which the circuit will behave as a critically damped circuit.

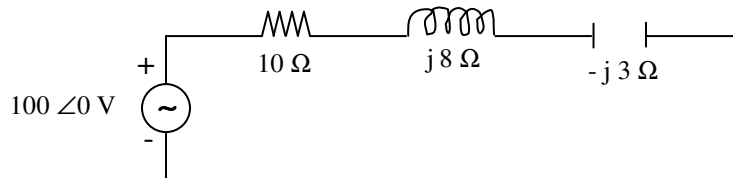
[P.T.O]

**PART – B (5 x 3 = 15 MARKS)**

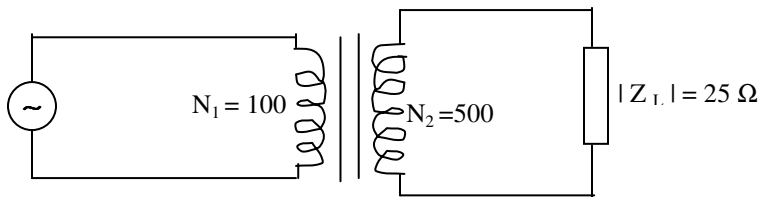
11. Obtain a single equivalent voltage source with respect to the terminal AB.



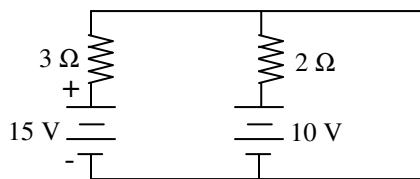
12. Determine the value of the power factor of the circuit given in the figure.



13. An ideal transformer is shown in figure. The number of primary turns is 100 and that of the secondary is 500. If the load impedance is 50 ohm, determine the value of the input impedance of the transformer.



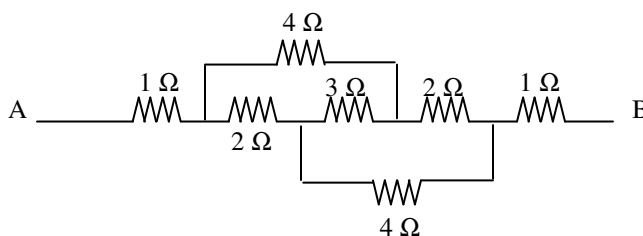
14. Obtain the equivalent generator for the circuit shown in figure using Millman's theorem.



15. A 100 micro farad capacitor carrying an initial charge of 500 micro coulomb is discharged through a 50 ohm resistor. Determine the time needed for the capacitor to discharge 184 micro coulomb.

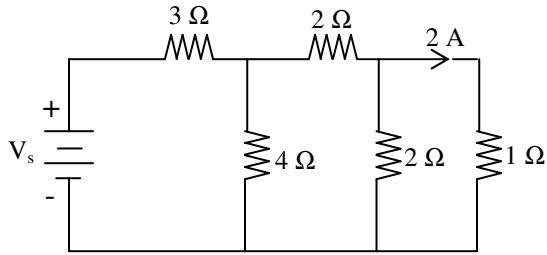
**PART – C (5 x 15 = 75 MARKS)**

16. Obtain the equivalent resistor with respect to the terminal AB.



(OR)

17. Determine the value of the voltage source.

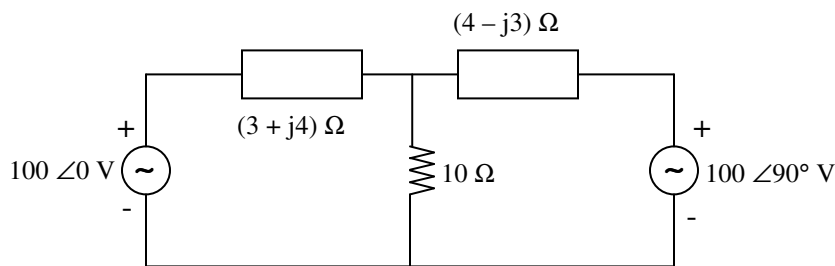


18. An induction coil of 0.75 power factor lagging is connected in series with a 100 micro farad capacitor. The supply frequency is 50 Hz. When this series circuit is connected across a voltage source and measured, it was observed that the voltage across the coil is equal in magnitude to the voltage across the capacitor. Determine the circuit parameters of the coil.

(OR)

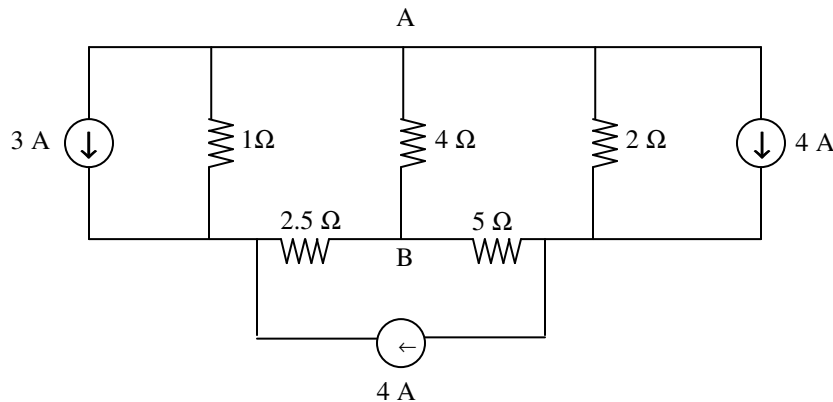
19. A balanced 3 phase star connected impedances of  $(6+j6)$  ohm per phase is connected across a 400V, 3 phase balanced source. Determine the line currents and phase voltages. Draw the phasor diagram. What will be the readings of 2 wattmeters connected to measure the total power.

20. Write the mesh equations for the circuit shown in figure and hence determine the current through the 10 ohm resistor.

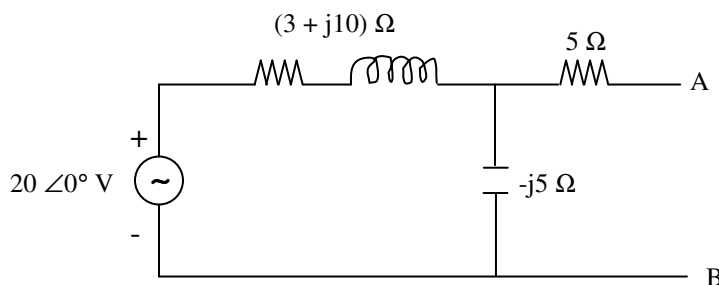


(OR)

21. Write the nodal equations for the circuit shown in figure and hence determine the voltage  $V_{AB}$ .

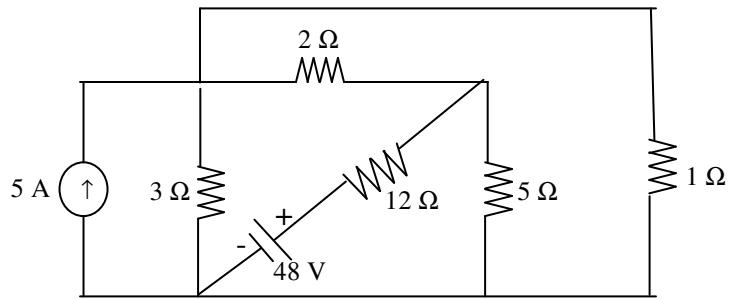


22. A loud speaker is connected across the terminals A and B. What should be the impedance of the speaker to obtain the maximum power transferred to it and what is the maximum power.

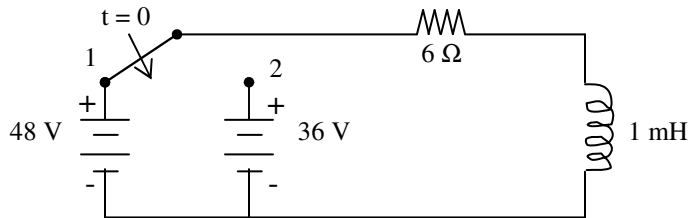


(OR)

23. Determine the current through the 1 ohm resistor using the Superposition theorem.



24. Determine the current through the inductance when the switch is moved from position 1 to position 2 at  $t=0$  for the circuit shown in figure.



(OR)

25. In the circuit shown, capacitor  $C_1$  has an initial charge  $q_0 = 300 \times 10^{-6}$  coulombs. If the switch is closed at  $t=0$ , find the current transient and the voltage of capacitor  $C_1$ .

