B.E.DEGREE EXAMINATIONS: MAY/JUNE 2011

Second Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE101: Electric Circuit Analysis

Time: Three Hours   **Maximum Marks: 100**

**Answer ALL Questions:-**

PART A (10 x 1 = 10 Marks)

1. When two resistors are in series

   a) Current is same   b) Voltage is distributed

   c) Total resistance is more than the individual resistor   d) All of the above

2. Power factor for a sine wave is

   a) 1.11   b) 1.414   c) 0.707   d) 0.637

3. Three equal resistances of 3Ω are connected in star. What is the resistance in one of the arm of an equivalent delta circuit

   a) 10Ω   b) 3Ω   c) 9Ω   d) 27Ω

4. Norton's equivalent circuit consists of

   a) Voltage source in parallel with resistor   b) Voltage source in series with resistor

   c) Current source in series with resistor   d) Current source in parallel with resistor

5. The total reactance of a series RLC circuit at resonance is

   a) Equal to X_L b) Equal to X_C c) Equal to R   d) Zero

6. DOT convention in coupled circuit is used

   a) To measure mutual inductance

   b) To determine the polarity of the mutually induced voltages in circuit

   c) To determine the polarity of the self induced voltages in circuit

   d) None of the above

7. If the 2-port network is reciprocal or bilateral then

   a) $Z_{11} = Z_{22}$ b) $Z_{12} = Z_{21}$ c) $Z_{11} = Z_{12}$ d) None

8. Which parameters are widely used in transmission line theory?

   a) Z parameters   b) Y parameters   c) ABCD parameters   d) Hybrid parameters

9. The current in the neutral wire of a balanced 3Φ, 4- wire, star connected load is given by

   a) zero   b) $\sqrt{3}\, I_{ph}$ c) $3\, I_{ph}$ d) $V_L/\sqrt{3}$

10. In two watt meter method of power measurement, when the power factor is 0.5

   a) The readings of two watt meters are equal and positive

   b) The readings of two watt meters are equal and opposite

   c) Total power is measured by only one wattmeter

   d) Total reading of the two watt meters is zero

PART B (10 x 2 = 20 Marks)

11. Define active and passive elements.

12. What are real power, reactive power and apparent power? Give their units.

13. What is a tree?

14. State Maximum power transfer theorem.

15. Define time constant of RL circuit.

16. Define Band width of RLC series circuit.

17. Write down the open circuit impedance parameters of a 2- port network and give the expression for each of the parameters

18. What are the transmission (ABCD) parameters of a 2- port network?

19. What is the relation between the line and phase voltages and currents in a balanced 3Φ star connected source / load and a balanced 3Φ delta connected source / load.

20. What is the relationship between wattmeter readings P_1 and P_2 and their power factor?

PART C (5 x 14 = 70 Marks)
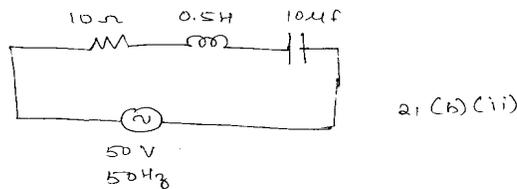
21. a) (i) Determine the total current in the circuit (7)
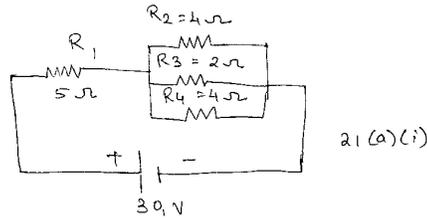
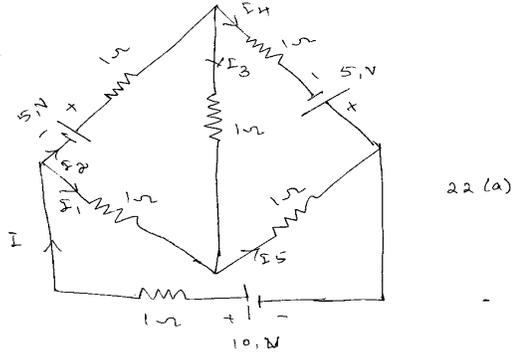(ii) What is the voltage across A and B in the circuit (7)
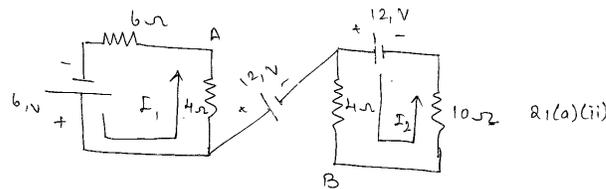
(OR)

b) (i) Derive the average value of a pure sine wave (7)

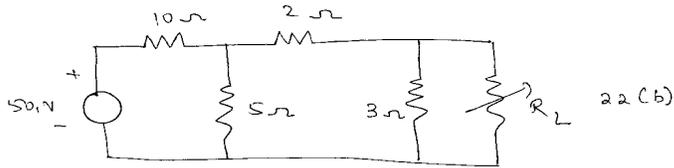(ii) Determine the total impedance, current, phase angle and the voltage across each element (7)

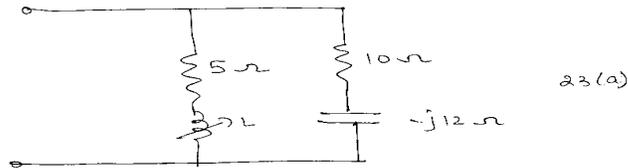22. a) Determine the mesh currents in the circuit shown and hence find the current in each branch

22 (a)

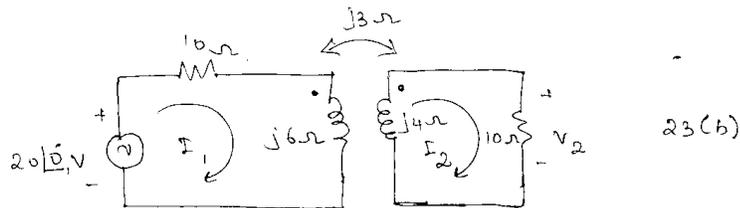**(OR)**

b) Determine the maximum power delivered to the load

22 (b)

23. a) Find the value of L at which the circuit resonance at a frequency of 1000 rad /sec
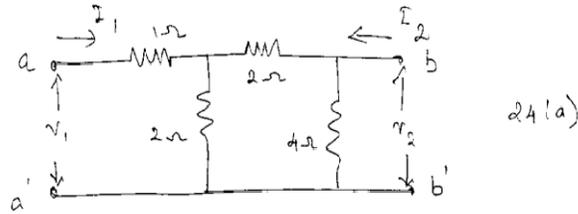

23 (a)

(OR)

b) Find the phasor voltage V_2

23 (b)

24. a) Find the Z parameters for the circuit shown

24 (a)

(OR)

b) For a 2-port network, the Z parameters are $Z_{11} = 50\Omega$, $Z_{22} = 30\Omega$, $Z_{12} = Z_{21} = 25\Omega$. Compute the ABCD parameters. Hence write the network function using both ABCD and Z parameters.

25. a) A 3Φ balanced star connected load of impedance $(15+j20)$ Ω / phase is connected to a 3Φ, 440 V, 50 Hz supply. Find the line current and power absorbed by the load, assuming RYB sequence

(OR)

b) (i) Determine the power and power factor of a 3Φ load if the two watt meters used for power measurements read (a) 1000 W each, both positive (b) 1000 W each of opposite sign.

(ii) Two watt meters are used to measure power in a 3Φ load. The watt meters readings are 400 W and -35 W. calculate (a) Total active power (b) power factor (c) Reactive power and (d) Volt-Ampere.

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