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VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. II Year (E.E.E.) I-Semester Supplementary Examinations, May/June-2017

Electrical Circuits-I

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 X 2=20 Marks)

- Two resistors are connected in parallel and a voltage of 200V is applied to the terminals. The total current taken is 20A and the power dissipated in one of the resistors is 1000W. What is the resistance of each element?
- Classify the dependent sources and draw their symbols.
- Draw the phasor diagram of series RC circuit.
- Draw the sinusoids corresponding to these phasors $i) I = -20 \angle 60^\circ$ $ii) j(4 - j10)$.
- State superposition theorem.
- State and explain Tellegen's theorem.
- Define oriented graph, tree.
- Write the properties of ideal transformer.
- Calculate the active and reactive current components in each phase of a star connected 10kV, 3-phase alternator supplying 4MW at a power factor 0.8.
- For a two-port symmetrical network, the three transmission parameters are given by $A = \frac{6}{5}$, $B = \frac{17}{5}$ and $C = \frac{1}{5}$, What is the value of D?

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

- Twelve similar conductors each of 1ohm resistance form a cubical frame work. Calculate the resistance between two adjacent corners.
 - Find the currents i_1 , i_2 and i_3 for the network shown in Fig.1.

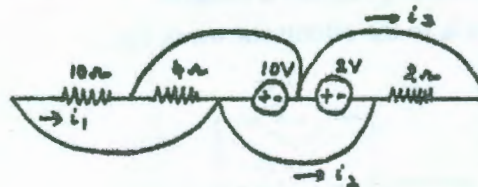


Fig. 1

- Determine the form factor and peak factor of the full wave rectified sine wave.
 - Find what inductance must be placed in series with a lamp requiring 3.05A, 410W at unity power factor, when the supply is 230V, 50Hz. Find also the value of the capacitance which must be placed across the supply terminals to raise the power factor to unity?
- For the circuit shown in Fig. 2, find the load impedance for which source delivers maximum power to the load. Also find the amount of maximum power.

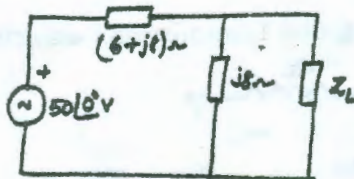


Fig. 2

- b) Determine the voltage across $(2 + j5)\Omega$ impedance shown in Fig.3 by using the Superposition theorem.

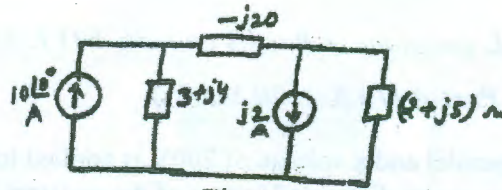


Fig. 3

14. a) A coil of inductance 9H and resistance 50 Ω in series with a capacitor is supplied at constant voltage from a variable frequency source. If the maximum current is 1A at 75Hz, find the frequency when the current is 0.5A.
 b) Find the circuit elements of the following current locus diagram shown in Fig. 4

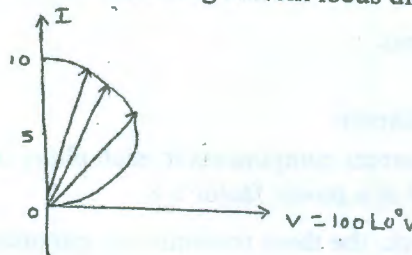


Fig. 4

15. a) Explain how power is measured using two wattmeter method?
 b) Three balanced loads are connected in delta and take a power of 30KW at 0.8 power factor from a three-phase, 415V supply. Calculate the line current. If the above loads are reconnected in star to the same supply, what power would be consumed?
 16. a) Explain the super mesh analysis using suitable example.
 b) Using nodal analysis determine i_o in the circuit shown in fig 5.

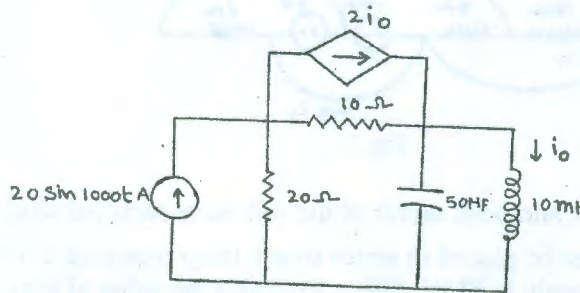


Fig. 5

17. Answer any two of the following:

- a) Explain the procedure to obtain Norton's equivalent circuit when dependent sources are present
 b) For the network shown in Fig 6 find Transmission Parameters.

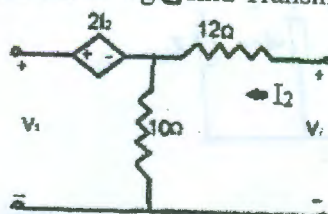


Fig. 6

- c) Derive the conditions for symmetry and reciprocity in terms of ABCD parameters.