Code No.: 21312 S

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

Basic Circuit Analysis

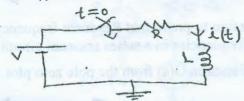
Time: 3 hours

Max. Marks: 70

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

Part-A (10 X 2=20 Marks)

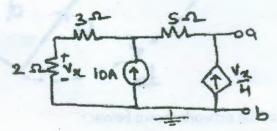
- 1. State and Explain the Volt-Ampere relationships for R, L and C components.
- 2. Distinguish between Independent and dependent sources.
- 3. State and explain Norton's theorem.
- 4. Find the expression for current i(t) in the circuit shown below for t > 0.



- 5. "The Current through an inductor cannot change instantaneously". Explain and justify the statement.
- 6. A coil with 1500 turns surrounds a magnetic circuit which has a reluctance of 6×10-6 AT/wb. Calculate the inductance of the coil.
- 7. Define power Factor.
- 8. Define Q-factor of a resonant circuit.
- 9. What is Duality? Sketch dual of simple RLC network.
- 10. State properties of Tieset analysis.

Part-B $(5 \times 10 = 50 \text{ Marks})$

11. a) Obtain Thevinen's equivalent network across the terminals a and b for the network [6] shown below.

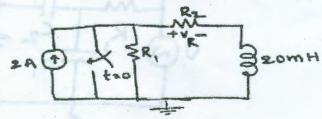


b) State and prove Reciprocity theorem using a simple network.

[4]

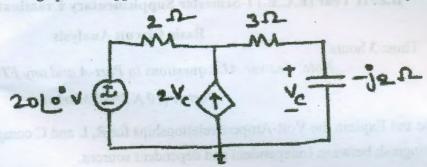
[7]

12. a) Select values of R_1 and R_2 in the circuit so that $V_R(0+) = 10 \text{ V}$ and $V_R(\text{lms}) = 5 \text{ V}$.

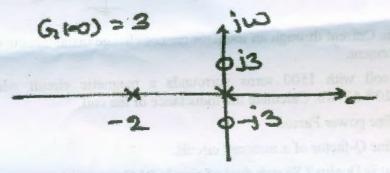


b) Illustrate the Steady state behaviour of Inductor and Capacitor.

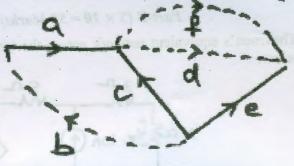
13. a) Determine Average power supplied by dependent source in the circuit.



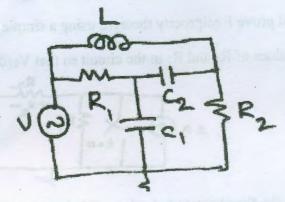
- b) Find complex voltage across series combination of a 500 Ω resistor and a 900 mH [5] inductor if complex current 8e^{i3000t} mA flows through two elements in series.
- 14. a) Derive an expression to prove that Resonant frequency is equal to geometric mean of two half power frequencies in a series resonant circuit.
 - b) Obtain transfer Function G(s) from the pole zero plot. [4]



15. a) Obtain Fundamental Tie-Set matrix of the network graph shown below taking tree [5] branches a,c,e into consideration.



b) Obtain dual of the network shown below.



[5]