SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act,1956)

Course & Branch :B.E - ECE/EIE/ETCE
Title of the Paper :Circuit Theory — Max. Marks :80
Sub. Code :6C0026 — Time : 3 Hours
Date :19/11/2009 — Session :FN

PART - A (10 x 2 = 20)

Answer ALL the Questions

1. State Norton's Theorem and draw its equivalent circuit.

2. The internal impedance of a source is (3 + J4) ohms. It is desired that maximum power should be transferred to a resistive load. What should be the load resistance? What is the maximum power transferred?

3. Explain in transient and steady state responses.

4. What are poles and zeroes of a network function?

5. Give the applications of tuned circuits.

6. Write the expression for resonant frequency and current at resonance of a RLC series circuit.

7. When do you say two circuits are dual to each other?

8. Define tree and co tree with reference to network topology.

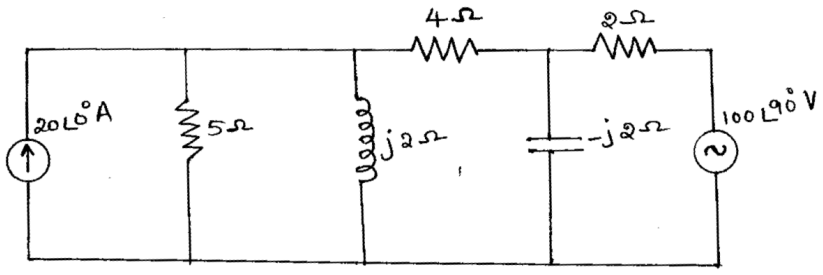
9. What is meant by Pspice?

10. Explain the use of . PROBE statement in circuit simulation.

PART – B (5 x 12 = 60)

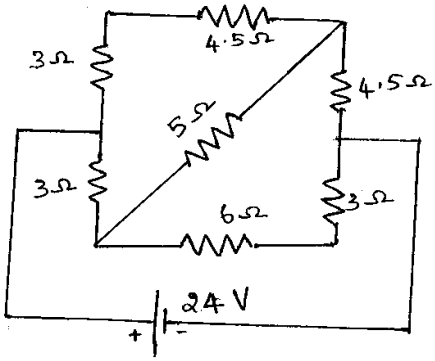
Answer ALL the Questions

11. Using superposition theorem determine the current in the 4Ω resistor.



(or)

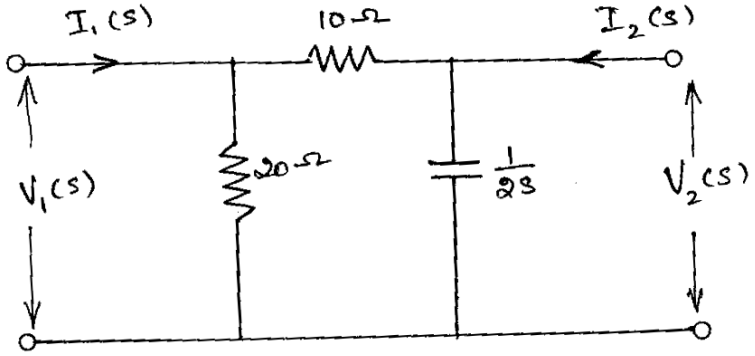
12. Calculate the current through the 5Ω using Thevenin's theorem.



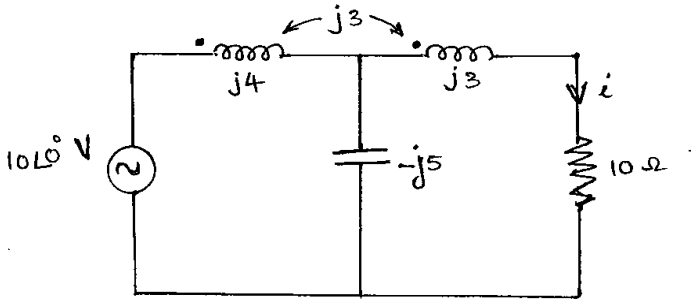
13. A series RLC circuit with R = 50Ω, L = 0.1H and C = 50μF has a constant voltage v = 100V applied at t = 0. Find i(t) assuming zero initial charge on the capacitor.

(or)

14. For the network shown, determine the transfer functions $G_{12}(s)$ and $Z_{21}(s)$. Also find the driving point impedance $Z_{11}(s)$ and driving point admittance $Y_{11}(s)$.



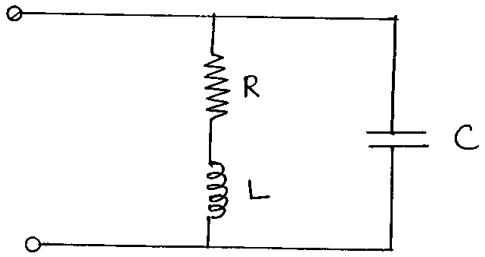
15. (a) Define mutual inductance.
(b) Derive the relation between coupling coefficient, self inductance and mutual inductance.
(c) Find the current in the magnetically coupled circuit shown.



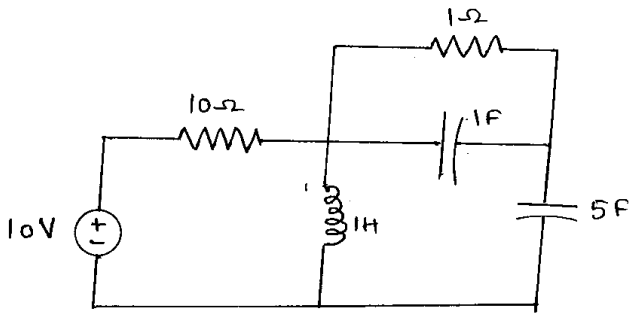
(or)

16. (a) Derive the following expressions for a series resonant circuit.
(i) resonant frequency
(ii) half power frequencies
(iii) quality factor and
(iv) bandwidth.

(b) In the parallel RLC circuit shown, let R = 8k, L = 0.2mH, and C = 8μF. Calculate ω_0, Q and B.W.

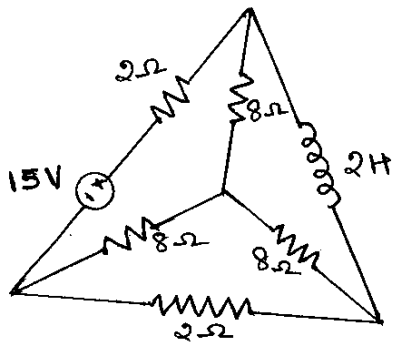


17. Draw the dual circuit for the given network and give the element values.

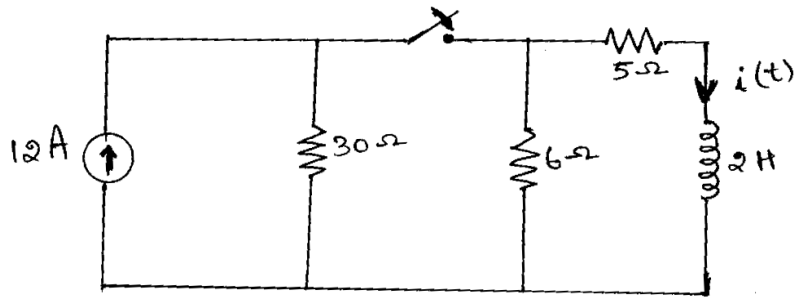


(or)

18. Write the fundamental tie set matrix and cur set matrix for the network shown.



19. The switch in circuit was open for a very long time, but closed at t = 0. If i(0) = 10A, find i(t) for t > 0 by Pspice.



(or)

20. Solve for I using Pspice in the circuit shown.