Code: 13A02101 **SS**

B.Tech II Year I Semester (R13) Supplementary Examinations June 2017

ELECTRICAL CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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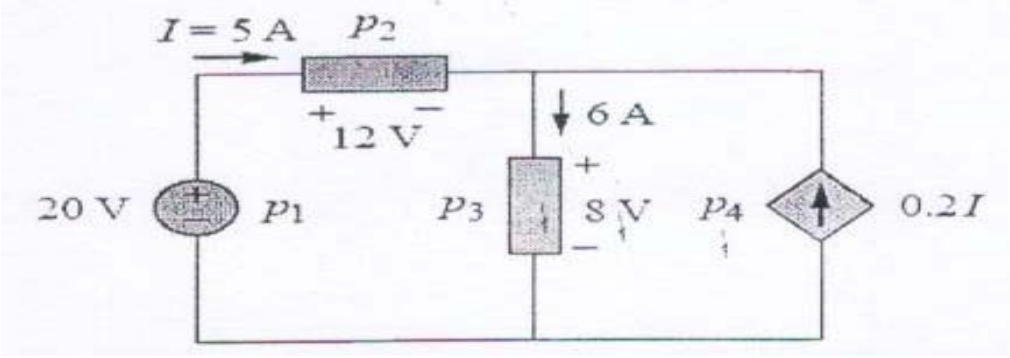
1 Answer the following: (10 X 02 = 20 Marks)

(a) Calculate the power supplied and absorbed by the each element shown in below figure.



(b) Derive the expression for the total inductance in series aiding connection.

(c) Calculate the phase angle between $V_1 = -10\cos(wt + 50°)$ *and* $V_2 = 12\sin(wt - 100)$. State which sinusoid is leading.

(d) Define balanced voltage, phase sequence & balanced load.

(e) Derive the expression for bandwidth and Q-factor for a series resonant circuit.

(f) Define duality and briefly explain about the dual networks.

(g) State reciprocity and compensation theorems.

(h) What is a two port network? Explain the significance of two port network.

(i) Find the Laplace transforms for: (i) The ramp function. (ii) $e^{at}\,u(t)$.

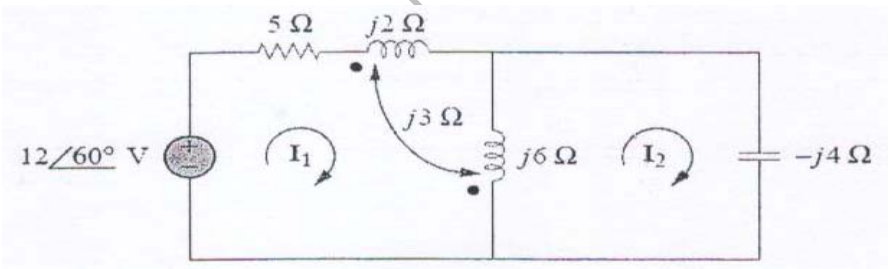
(j) What is half-wave symmetry? Explain.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

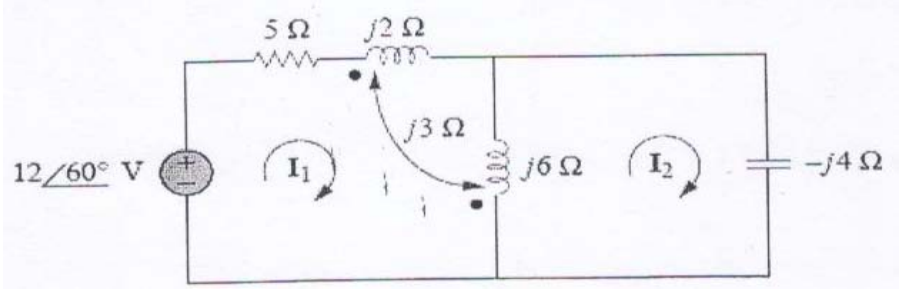
UNIT – I

2 Determine the phasor currents I_1 and I_2 for the circuit shown in figure below.



OR

3 Determine the currents I_1 and I_2 for the circuit shown in figure below.



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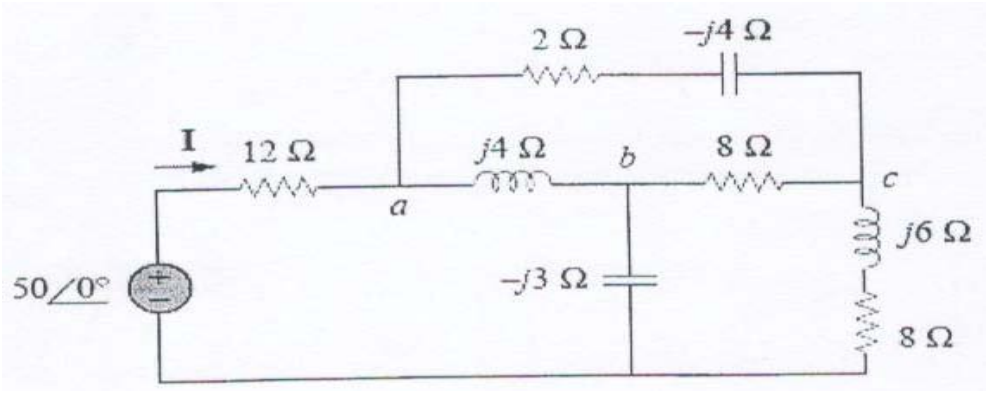
UNIT – II

4 Determine current I in the circuit shown in figure below.

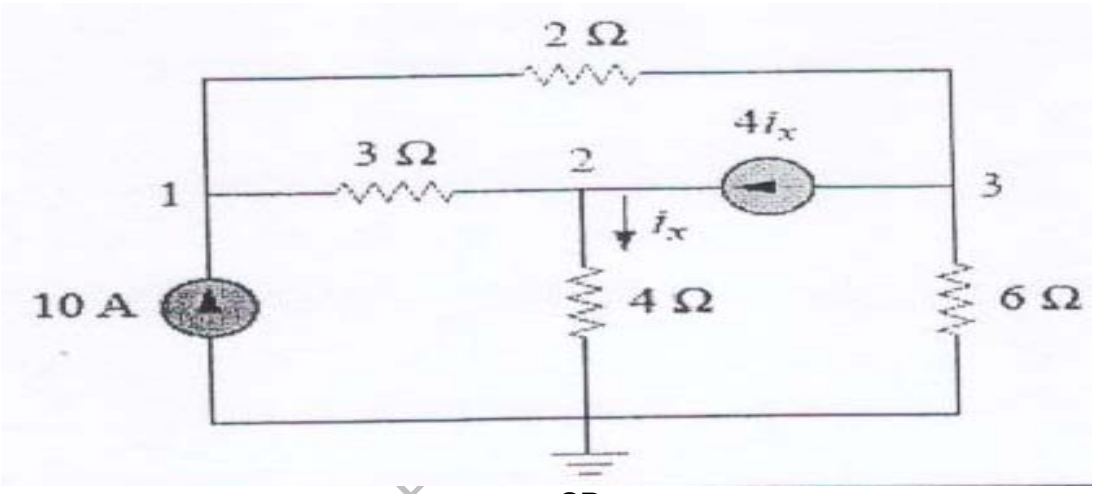


OR

5 A Y-connected balanced 3-phase generator with an impedance of $0.4 + j0.3\Omega$ per phase is connected to a Y-connected balanced load with an impedance of $24 + j19\Omega$ per phase. The line joining the generator and the load has an impedance of $0.6 + j0.7\Omega$ per phase. Assuming a positive sequence for the source voltages and that $V_{an} = 120\angle 30°$. Find: (i) Line voltages. (ii) Line currents.

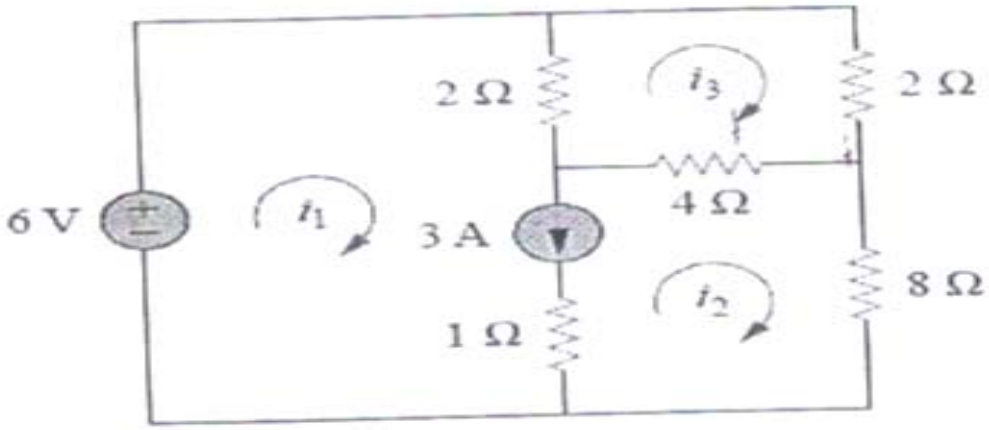
UNIT – III

6 Find the voltages at the three non reference nodes shown in figure below with the nodal analysis.



OR

7 Using Mesh analysis determine i_1, i_2, i_3 for the circuit shown in figure below.



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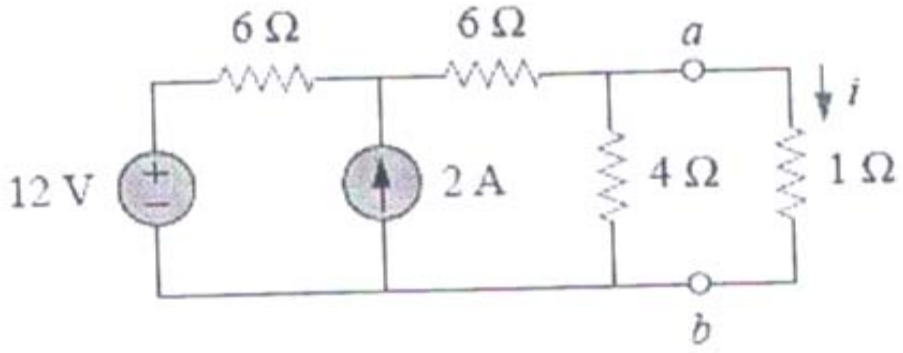
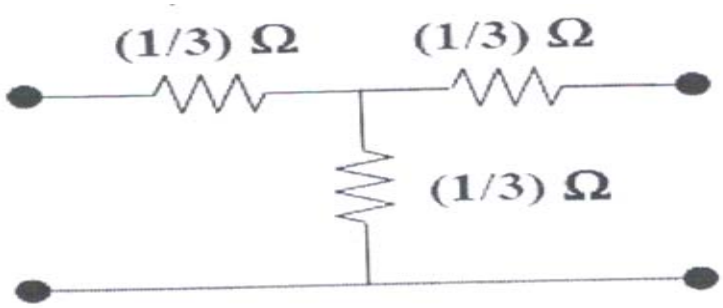
UNIT – IV

8 Using Thevenin's circuit find I for the circuit shown in figure below.



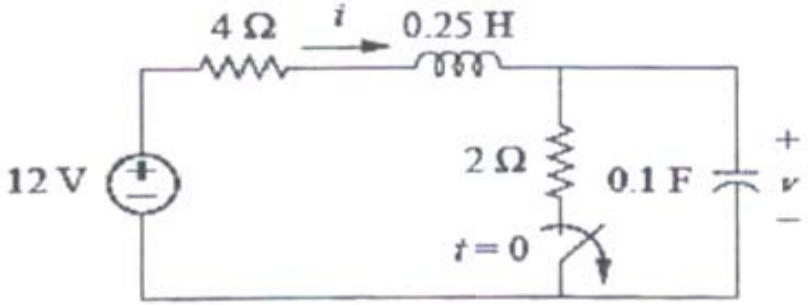
OR

9 Determine Y-parameters for the network shown in figure below.



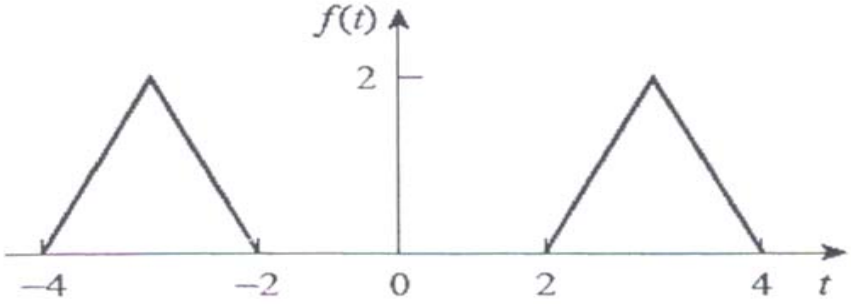
UNIT – V

10 The switch has been closed for a long time. It is open at t = 0 as shown in figure given below. Find: (i) i(0+), v(0+). (ii) di(0+)dt, dv(0+)/dt. (iii) i(∞), v(∞).



OR

11 Calculate the Fourier transform of the signal shown in figure below.



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