Code: R7100406

R07

B.Tech I Year (R07) Supplementary Examinations June/July 2014

NETWORK ANALYSIS

(Common to ECE, EIE, E.Con.E & ECC)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks

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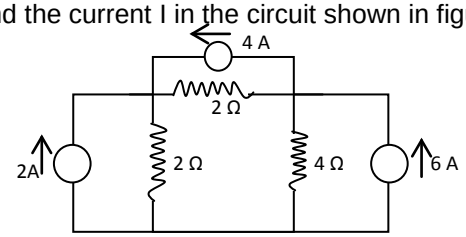
1 (a) State and explain the volt-ampere relationships for R, L, C parameters.

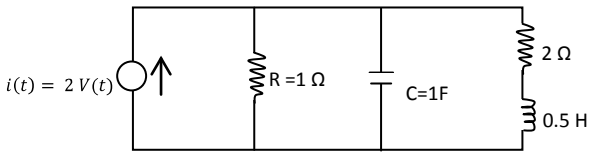
(b) Using nodal analysis, find the current I in the circuit shown in figure given below.



(c) A $5\mu F$ capacitor has charge $q(t) = 100\left[1 + e^{-5*10^4 t}\right]$ micro Coulombs. Determine the corresponding $V(t)\ and\ i(t)$.

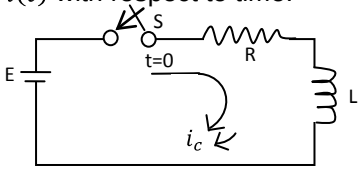
2 (a) Define RMS value, average and form factor for a periodic quantity. Find the RMS values of:
(i) $V(t) = 25\cos\omega t + 15\sin\omega t$ and
(ii) $I(t) = 100\sin\omega t - 10\cos 2\omega t$

(b) Determine $V_C(t)$ and $i_L(t)$ in the circuit shown below. Assume zero initial conditions. Use Laplace transforms method.



3 (a) The voltage applied to a circuit and the current drawn are V = (200-j100) V and I = (60+j40) A respectively. Determine the circuit parameters and power dissipated.

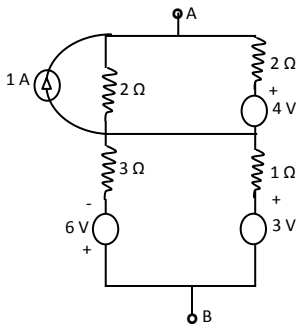
(b) Derive the expression for $i(t)$ when the switch S is suddenly closed at t = 0 in the circuit shown below. Sketch the variation of $i(t)$ with respect to time.



(c) A series RLC circuit has R = 10 Ω, L = 0.01 H and C = 100 μF. Find
(i) Resonance frequency.
(ii) Q factor.
(iii) Band width of the circuit.

4 (a) Define and explain the following with an example.
(i) Oriented graph. (ii) Tree of a graph.
(iii) Cutset & a basic cutset. (iv) Tieset & a basic tieset.

(b) Using source transformation, reduce the network between A & B shown below into an equivalent voltage source.



(c) What is duality? Explain the procedure for drawing the dual of given network with an example.

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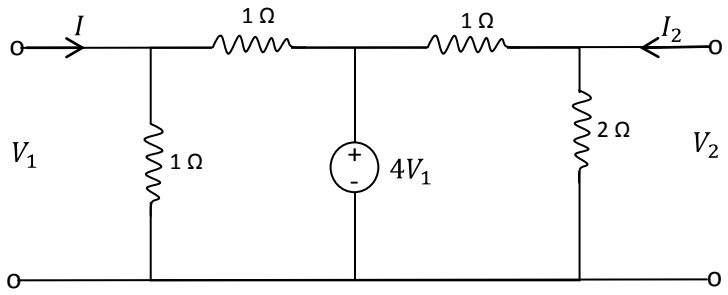
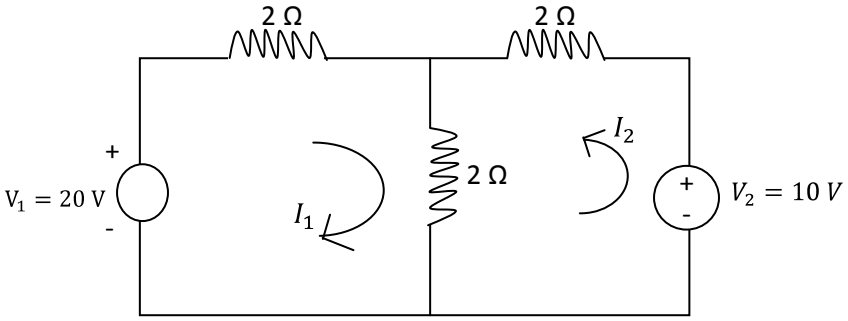
5 (a) Why Z-parameters are known as open circuit parameters?
(b) What is meant by port? Explain two port networks.
(c) Obtain 'y' parameters for the network shown in figure below.

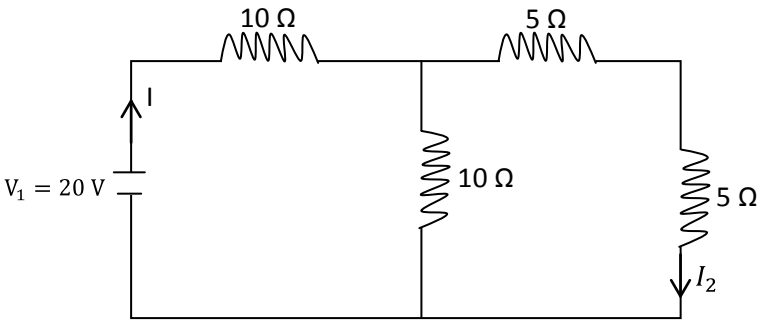


6 (a) A coil of 500 turns is wound uniformly over a wooden ring having a mean circumference of 50 cms and a cross sectional area of 500 mm^2. If the current through the coil is 3 A, calculate:
(i) The magnetic field strength.
(ii) The flux density and
(iii) The total flux.
(b) Define magneto motive force, magnetic flux density, magnetizing force and reluctance in a magnetic circuit.
(c) Derive the expression for coefficient coupling between pair of magnetically coupled coils.

7 (a) Define & verify Tellegen's theorem in the network shown below.



(b) Define & verify the reciprocity theorem for the network shown below.



8 (a) Discuss about m derived low pass T-section and π section in detail.
(b) Discuss about the variation of attenuation, phase shift and characteristic impedance of m derived high pass filter.

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