Code: 13A04101 **SS**

B.Tech II Year II Semester (R13) Regular & Supplementary Examinations May/June 2016

NETWORK ANALYSIS

(Electronics and Communication 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) State the superposition.

(b) Define incidence matrix.

(c) Write the expression for transient current of RL circuit for a step input and draw the transient curve.

(d) What do you mean by external critical frequency?

(e) A two port network has the following Z parameters $Z_{11} = 10\ \Omega$, $Z_{22} = 12\ \Omega$, $Z_{12} = Z_{21} = 5\ \Omega$. Find Y_{11}.

(f) Define quality factor.

(g) List the advantages of m- derived filters.

(h) Draw the Frequency Vs Attenuation constant curve for a Prototype Band Pass Filter.

(i) Test whether: $F(s) = \frac{5(s+1)^2}{s^3 + 2s^2 + 2s + 40}$ is positive real.

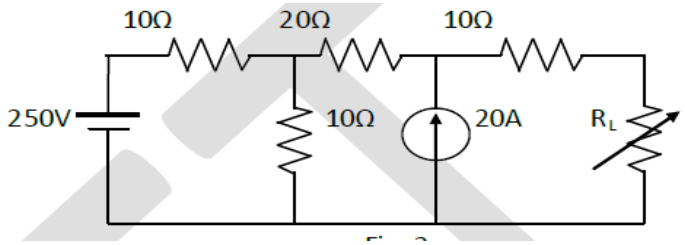
(j) Write the equations that describe a two port network in terms of the transmission parameters.

PART – B

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

UNIT – I

2 Find the value of RL in the circuit of shown below, such that the maximum power transfer takes place. Also calculate maximum power transferred.



OR

3 The reduced incidence matrix of an oriented graph is:

$$A = \begin{bmatrix} 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -1 & -1 \\ -1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

(i) Draw the graph. (ii) Determine the Tie-set matrix.

UNIT – II

4 A series RLC circuit with R = 300 ohms, L = 1H and C = 100 micro farads has a constant voltage of 50 V applied to it at t = 0. Find the maximum current value. Assume zero initial conditions.

OR

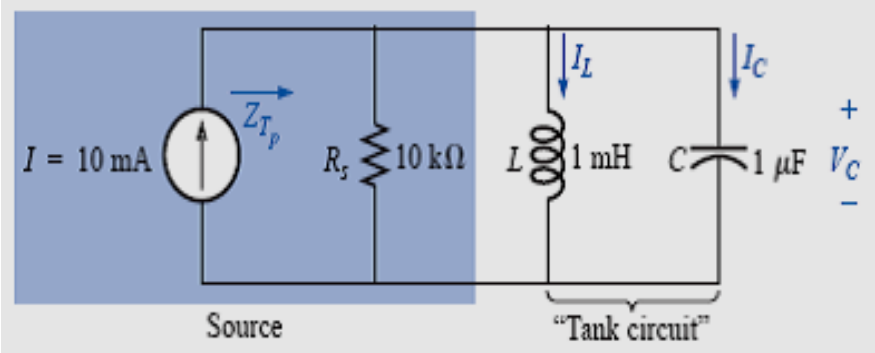
5 Draw the pole zero diagram for the given network function and hence obtain v(t).

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

Contd. in page 2

UNIT – III

6 (i) Determine the resonant frequency f_p.
(ii) Find the total impedance at resonance.
(iii) Calculate the quality factor, bandwidth, and cutoff frequencies f_1 and f_2 of the system.

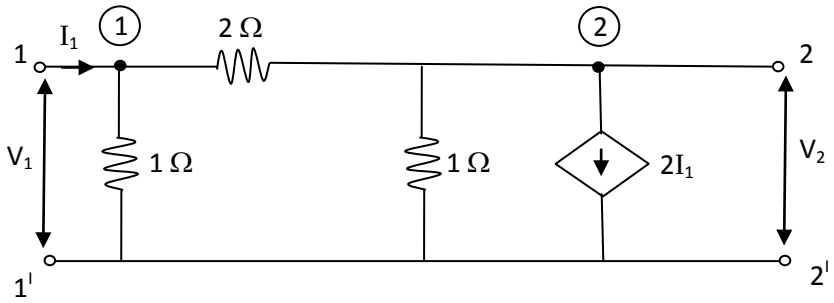


OR

7 The bandwidth of a series resonant circuit is 400 Hz.
(i) If the resonant frequency is 4000 Hz, what is the value of Qs?
(ii) If R = 10 Ω, what is the value of XL at resonance?
(iii) Find the inductance L and capacitance C of the circuit.

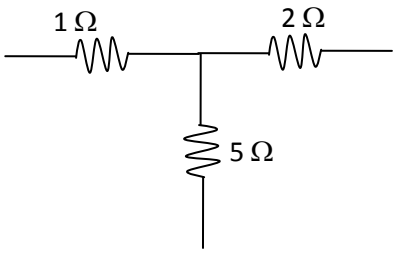
UNIT – IV

8 Find the Z and Y parameters of the circuit shown below:



OR

9 Determine the image parameters of the network shown below.



UNIT – V

10 Design a prototype T section High Pass Filter with cut off frequency 10 KHz and nominal impedance 600 Ω.

OR

11 Design a m-derived π section Low Pass Filter having cut-off frequency of 1 KHz, design impedance of 400 Ω and the resonant frequency of 1100 Hz.

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