

Total No. of Questions :5]

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**EC - 505**

**B.E. V Semester**

Examination, December 2014

**Communication Network And Transmission Lines**

**Time : Three Hours**

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**Maximum Marks : 70**

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.  
ii) All parts of each questions are to be attempted at one place.  
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.  
iv) Except numericals, Derivation, Design and Drawing etc.

**Unit - I**

1. a) For symmetrical T network, show that  $Z_0 = \sqrt{Z_{\alpha} \cdot Z_{SC}}$ .  
b) For symmetrical network, define the propagation constant.  
c) Design L type attenuator to operate in to a resistance of  $500 \Omega$  and to provide an attenuation of 12 dB.  
d) A lattice network has series arm equal to  $Z_a$  and diagonal arm equal to  $Z_b$ . Find the expression for characteristics impedance and propagation constant of the lattice network.

[2]

OR

What is attenuator? Derive design equations for a T-type attenuator.

**Unit - II**

2. a) List the drawbacks of prototype filter.  
b) Explain the importance of terminating half sections in short.  
c) Design m-derived high pass filter.  $\pi$ -section to work into load of  $600 \Omega$  with cut-off frequency of  $\left(\frac{1000}{\pi}\right)$  Hz and peak attenuation frequency at 300 Hz.  
d) Discuss chebyshev approximation for low pass filter.

OR

Describe low pass to high pass frequency transformation.

**Unit - III**

3. a) State the properties of Hurwitz polynomials.  
b) State the properties of positive real function.  
c) Test, whether the polynomial  $s^4 + 7s^3 + 6s^2 + 21s + 8$  is Hurwitz.  
d) Realize the given function in cauer II form.

$$Z(s) = \frac{6 + 8s^2 + 2s^4}{s^3 + 2s}$$

[3]

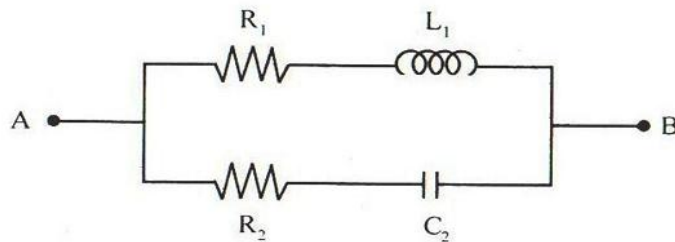
OR

Realize the given function in foster I form

$$Z(s) = \frac{2(s^2 + 1)(s^2 + 3)}{s(s^2 + 2)}$$

#### Unit - IV

4. a) State the important properties of the infinite line.  
b) Obtain inverse network of the network shown in figure.



- c) Derive the relationship between  $\gamma$ ,  $Z_{oc}$  and  $Z_{sc}$ .  
d) Derive design equations for full series equalizer.

Or

Derive expression for reflection coefficient and transmission coefficient.

#### Unit - V

5. a) What are the standing waves?  
b) What is double stub matching?  
c) Derive the relationship between standing wave ratio and the magnitude of reflection coefficient.

[4]

- d) Explain method of measurement of power and SWR of a transmission line.

OR

Find the expression of Input impedance of the dissipationless line.

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