d) Determine the input impedance of open and short circuit line.

OR

A lossless RF line has Z_0 of 600Ω and is connected to a resistive load of 75Ω. Find the position and length of short circuited stub of same construction as line which would enable the main length of a line to be correctly terminated at 150 mHz.

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Roll No ....

EC - 505

B.E. V Semester

Examination, December 2015

Communication Network and Transmission Lines

Time : Three Hours

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 question 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 $\tan h\,\gamma = \sqrt{\frac{Zsc}{Zoc}}$.

b) For symmetrical network define the characteristic impedance.

c) Design a π-type attenuator with the following specifications. Attenuation = 20 dB, characteristic impedance = 500 Ω.

d) Determine the image impedance of an asymmetrical L-network.

OR

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

Unit - II

2. a) What are the demerits of m-derived filters?

   b) What is the need of composite filters?

   c) Explain the variations of characteristic impedance (z_0), attenuation constant (α) and phase constant (β) with frequency (f) with the help of neat sketch in bandpass filters.

   d) Discuss constant - k low pass filter with suitable diagrams. Derive expression for cut-off frequency (f_c)

OR

Discuss Butterworth approximation for low pass filter.

Unit - III

3. a) What is positive real function?

   b) Explain maximum modulus theorem.

   c) Test, whether the polynomial $s^4+s^3+2s^2+3s+2$ is Hurwitz.

   d) Realize given network in foster I form.

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

OR

Realize the given function in cauer II form

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

Unit - IV

4. a) What is the difference between lumped parameters and distributed parameters?

   b) Define attenuation constant and phase constant.

   c) What is distortionless line? Derive the condition for distortionless line.

   d) Derive the design equations for full shunt equalizer.

OR

Define input impedance of transmission line. Derive an expression for input impedance of a transmission line in terms of reflection coefficient.

Unit - V

5. a) Explain standing wave ratio.

   b) What is step matching?

   c) Explain any one method of power measurement on the line.