Total No. of Questions :10] *[Total No. of Printed Pages :4*

Roll No.....

EC - 605

B.E. VI Semester

Examination, December 2012

Communication Network and Transmission Lines

Time : Three Hours

Maximum Marks : 100 ***Minimum Pass Marks :35***

Note : Attempt any one question from each Unit. Total five questions are to be attempted. All questions carry equal marks.

UNIT - I

1) a) Define and explain the iterative and image impedance of an asymmetrical network. (10)

b) Design an asymmetrical L-attenuator to work with image impedance of 600 Ω and 400 Ω. (10)

OR

2) a) Give the comparison between symmetrical and asymmetrical T-attenuators. (10)

b) Derive the characteristics impedance of a symmetrical T-section and find Zo whose total series arm impedance is (100+j250)Ω and shunt arm impedance is (400 - j200)Ω. (10)

UNIT - II

3) a) Explain the frequency transformation in detail. (10)

b) Design a constant k-LPF having cut off frequency 2000 Hz and a characteristics impedance Zo = 600Ω. Also find the frequency at which the filter offers attenuation of 19.1 dB. Give rough sketch of attenuation constant with frequency. (10)

OR

4) a) What are the characteristics of ideal filter and derive the conditions for Pass-Band and Stop-Bands. (10)

b) If the specifications for LPF be Pass Band attenuation $\leq$ 1dBW $\leq$ 150 k rad/sec. Stop Band attenuation $\geq$ 60dBW $\geq$ 200 K rad/sec. Find the order of the Butterworth and the Chebyshev filter polynomials. (10)

UNIT - III

5) a) Explain the concept of Positive Real Functions and give some useful properties of positive real function. (10)

b) Discuss Bott-Duffin method. Realize the circuit using Cauer second form expansion method.

$$Z(S) = \frac{S^4 + 10S^2 + 9}{S^3 + 2S} \qquad (10)$$

OR

6) a) Determine if the following functions are positive real. Give reasons to justify your conclusions

$$y(s) = \frac{(s+2)(s+3)}{(s+1)(s+4)} \qquad (10)$$

b) Explain the various properties of R-C driving point impedance. (10)

UNIT - IV

7) a) Define wavelength, velocity of propagation and group velocity of transmission line. (10)

b) A co-axial cable has characteristic impedance of $50\angle 0^{o}$ and α = 1.2 dB/km. A 20 km length of this cable is terminated in its characteristic impedance and the input power to the line is 0.5 watt. Find (i) The output power and (ii) output current. (10)

OR

8) a) To prove that for a transmission line terminated by an impedance of Z_R

$$Z_{in} = Z_o \left[\frac{(Z_o + Z_R)\, e^{rl} - (Z_o - Z_R)\, e^{-rl}}{(Z_o + Z_R)\, e^{rl} + (Z_o - Z_R) e^{-rl}} \right] \qquad (10)$$

b) An open-wire transmission lines having $Z_o = 650 \angle -12^{o}\,\Omega$ is terminated in Zo at the receiving end. If this line is supplied from a source of internal resistance 300Ω. Calculate line reflection factor and the reflection loss at the sending end terminal. (10)

UNIT - V

9) a) Define SWR. What is the formula for it if the load is purely resistive ? Why high value of SWR is often undesirable. (10)

b) Derive the expressions for input impedance of open and short circuited lossless line. (10)

OR

10) a) What is stub matching ? Explain single stub and double stub-matching. (10)

b) For the line at radio frequencies, calculate the voltages and currents on the dissipation less line. (10)

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