5E3110

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B. Tech. (Sem. V) (Main/Back) Examination, December - 2013
5EC3 Telecommunication Engg.

Time : **3** Hours] [Total Marks : **80**
[Min. Passing Marks : **24**

Attempt any five questions. Selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) Derive the expression for the input impedance of dissipation less lines. 8

(b) A transmission line is operating at 125 MHz and has the following parameters.

$Zo = 40\,\Omega$ $\alpha = 0.02$ (Np/m)

$\beta = 0.75$ rad/m

Find the line parameters R', L', G' and C'. 8

OR

1 (a) Derive the expression for the input impedance of quarter wave line.

8

(b) A 6 m section of 150 Ω lossless line is driven by a source $Vg = 5 \cos (8 \pi \times 10^7 t - 30^o)$ v and $Zg = 150 \Omega$. If the line which has a relative permittivity $E_r = 2.25$, is terminated in a load $Z_L = (150 - j50) \Omega$.

Find :

(i) λ on the line

(ii) reflection coefficient at the load

(iii) input impedance.

8

UNIT - II

2 (a) A generator with $\tilde{V}_g = 100$ V and $Z_g = 50 \Omega$ is connected to a load $Z_L = 75 \Omega$ through a 50 Ω losslessline of length $l = 0.15 \lambda$. Compute Z_{in}, $\tilde{I}_i$ and $\tilde{V}_i$ time average power delivered to the line i.e. $P_{in} = \frac{1}{2} \text{Re}(\tilde{V}_i \tilde{I}_i)$

8

(b) A 50 Ω lossless line is terminated in a load impedance $Z_L = (30 - j60) \Omega$. The wavelength is 5 cm. Find the following :

(i) Reflection coefficient at the load

(ii) SWR on the line

(iii) Position of V_{max} nearest the load

(iv) Position of I_{max} nearest the load.

8

OR

2 Derive the expression for the voltage and current at any point on the transmission line in terms of propagation constant, length and characteristic impedance of the line. Hence deduce an expression for input impedance in terms of reflection coefficient.

16

UNIT - III

3 (a) Enlist various types of filters. Explain low pass constant–K filter and high pass constant–K filter along with suitable diagrams and equations.

8

(b) Derive the phase shift and attenuation constant of low pass constant–K filter and high pass constant –K filter.

8

OR

3 (a) Derive the design equations of symmetrical–T and symmetrical-π attenuator and hence calculate attenuation inserted by both type of attenuators along with proper diagrams.

8

(b) What is stub matching ? Enlist different types of stub matching. Explain single stub matching with suitable diagrams.

8

UNIT - IV

4 (a) Explain the function of echo suppressors and cancellors in telephone transmission.

8

(b) Write a short note on two wire and four wire transmissions.

8

OR

4 (a) Explain FDM and TDM in detail. 8

(b) Explain the DTMF detection system with suitable diagrams DTMF (Dual Tone Modular Frequency) 8

UNIT - V

5 (a) Give classification of switching systems and explain principle of operation of electronic exchange. 8

(b) Write a short note on EPABx system. 8

OR

5 (a) Write a short note on fascimile services. 8

(b) Write short note on the following :

(i) Trunking concepts and grade of service

(ii) Numbering plan of telephone exchange. 2×4=8