

B. Tech Third Year : 5th Semester

TELECOMMUNICATION ENGINEERING, DEC., 2012

(FOR 5 EC 3 BRANCH OF ENGINEERING)

Times : 3 Hours

Min. Passing Marks : 24

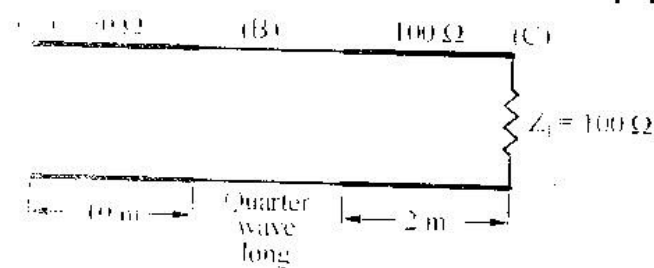
Total Marks : 80

Instructions to Candidates : Attempt overall 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 may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

UNIT-I

1. (a) With the use of transmission line equation derive the condition for line to be lossless. [6]
- (b) What are the waveform distortion with reference to transmission line. [4]
- (c) Consider three lossless transmission line shown in fig. The lengths and the

characteristic impedance of quarter wave B line for matching on line A. What will be the VSWR on line A if line B is not used. [6]



OR

1. (a) Show that the input impedance of a transmission line of length l terminated by an impedance Z_L is given by.

$$Z_{in} = Z_0 \left[\frac{Z_L \cosh \gamma l + Z_0 \sinh \gamma l}{Z_0 \cosh \gamma l + Z_L \sinh \gamma l} \right]$$

Where Z_0 is secondary constant of line [10]

- (b) The terminating load of UHF transmission line ($Z_0 = 50 \angle 0^\circ \Omega$) working at 300 MHz is $(50 + j50)$ ohms. Calculate VSWR and reflection coefficient. [6]

UNIT-II

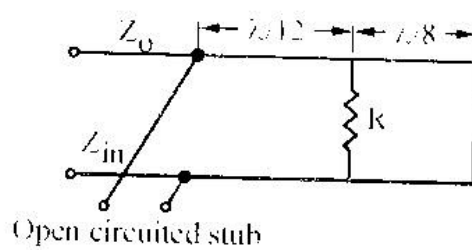
- (a) What do you understand by quarter wave transformer. Design a quarter wave transformer if it is required to match a 100Ω impedance to 500Ω , if the frequency of operation is 200 MHz. [10]
- (b) A transmission line of length 200m and characteristic impedance of 100Ω and load impedance is $100 - j200 \Omega$. Determine the line impedance

and admittance at 50m distance from load end at a frequency of 5MHz. Use Smith chart. [6]

OR

2. (a) Describe in detail a method for measurement of VSWR in an open wire transmission line. [6]
- (b) Fig. shows a line terminated by a resistance as well as short

circuit stub. Find the length L of the stub to provide impedance matching assume $Z_0 = 400 \angle 0^\circ \Omega$ [10]



UNIT-III

3. (a) Derive the expression for characteristic impedance of symmetrical T and II networks and hence show that $Z_{01} Z_{02} = Z_1 Z_2$, where Z_1 and Z_2 are the series and shunt arm impedance of the network respectively. [8]
- (b) Calculate the element values for (i) T type (ii) II type attenuator to be inserted between 600Ω impedance for attenuation of 10dB.

OR

3. (a) What are symmetrical and asymmetrical two port network. What parameters are used to describe their behavior. [4]
- (b) Why are equalizers used in networks. Discuss various types of equalizers. [4]
- (c) Design band pass filter T section with cut off frequency of 6 KHz and 11 KHz operating into a load of 800Ω . Also find the resonant frequency of shunt arm and series arm. [8]

UNIT-IV

4. (a) With the help of equivalent circuits, explain the operation of four wire terminating set and explain why 2 wire to 4 wire conversion is required? [10]
- (b) What is carrier telephony? Explain the difference between frequency and time division

multiplex telephone system. [6]

OR

4. (a) What is echo in telephone system? With aid of diagram discuss the operation of echo cancellor and echo suppressor. Also explain the basic difference between the two. [8]
- (b) With aid of diagram explain the formation of standard CCITT-FDM group. What frequency band it occupies and what is voice channel capacity? [8]

UNIT-V

5. (a) Define terms (i) Busy hour (ii) Average holding time (iii) Traffic unit (iv) Call rate [4]
- (b) How are switching system classified. In what way stored program control superior to hard wired control. [4]
- (c) During the busy hour 1200 calls were offered to a group of trunks and 6 calls were lost. The average call duration was 2 min. Find - (i) The traffic offered (ii) The traffic carried (iii) The traffic lost (iv) The grade of service [8]

OR

5. Write short note on any four of the following: (a) Facsimile service (b) Principle of STD (c) EPABX (d) Numbering plan (e) Cross bar switching [16]