K 1028

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2004.

Fifth Semester

Electronics and Communication Engineering

EC 335 — TRANSMISSION LINES AND NETWORKS

Time : Three hours Maximum : 100 marks

Smith chart can be provided.

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What do you understand by loading of transmission lines?

2. Calculate the characteristic impedance Z_0 for the following line parameters.

   R = 10.4 ohms/km ; G = 0.8×10^{-6} mho/km

   L = 0.00367 H/km ; C = 0.00835 μf/km.

3. Determine the input impedance of open and short circuited lines.

4. Explain the use of quarter wave line for impedance matching.

5. What is the need for stub matching in transmission lines?

6. Why do standings waves exist on transmission lines?

7. What are the characteristics of an ideal filter?

8. Why m–derived filter of L–sections are used as terminations of composite filters?

9. What are inverse networks?

10. Mention the applications of attenuators.

PART B — ($5 \times 16 = 80$ marks)

11. (i) Explain the various types of waveform distortions in transmission lines. (6)

(ii) Derive the condition for the distortionless lines. (10)

12. (a) Determine the inductance of a line of two parallel round conductors.

Or

(b) Explain the following terms : (4×4)

(i) Reflection on transmission lines

(ii) Reflection coefficient

(iii) Reflection loss

(iv) Insertion loss.

13. (a) (i) How is power measurement done on transmission lines? (8)

(ii) Show that the reflection coefficient $|K| = \frac{|E_{max}| - |E_{min}|}{|E_{max}| + |E_{min}|}$. (8)

Or

(b) (i) Determine the input impedance of open and short circuited dissipationless transmission line. (8)

(ii) Draw the variation of above for a length of $\frac{3\lambda}{2}$. (8)

14. (a) (i) Determine the input impedance of the transmission line of electrical length 28° with terminated load of $Z_R/R_0 = 2.6 + j1$. Use smith chart. (8)

(ii) Explain the method of single stub matching using smith chart. (8)

Or

(b) The transmission line has standing wave ratio S = 2.5 and the volt minimum exists 0.15λ from the load. Find the load and input impedance for a line of 0.35λ length. Use smith chart.

5. (a) (i) Determine the characteristic impedance of symmetrical T network. (4)

(ii) Explain the characteristics of symmetrical networks while connecting like elements in it. (2)

(iii) Design the elements of a low pass 'T' filter with termination 500 ohms and cutoff frequency 1000 Hz. (10)

Or

(b) (i) Derive the elements of a symmetrical bridged T attenuator. (12)

(ii) What are the disadvantages of two terminal equalizers while comparing with four terminal equalizers? (4)
