Reg. No. : | | | | | | | | | | |

Question Paper Code: 41454

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Fifth Semester

Electronics and Communication Engineering

14UEC504 - TRANSMISSION LINES AND WAVEGUIDES

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

(Smith chart may be permitted)

PART A - (10 x 1 = 10 Marks)

1. One Neper equals to

   (a) 3 db (b) 8.686 db (c) 0.115 db (d) 10 db

2. If filter passes all frequencies upto the cut-off frequency and attenuates all frequencies above it, then it is called as

   (a) low pass filter (b) high pass filter
   (c) band pass filter (d) band stop filter

3. Condition for distortion less line is

   (a) RG = LC (b) $\alpha = \sqrt{RG}$ (c) LG = RC (d) $\beta = \omega\sqrt{LC}$

4. When reflection will occur in a transmission line?

   (a) $Z_R = Z_O$ (b) $Z_R \neq Z_O$ (c) $Z_R < Z_O$ (d) $Z_R > Z_O$

5. Which parameter is completely neglected for dissipation less line?

   (a) α (b) R (c) L (d) C

6. What is the range of values of standing wave ratio?

(a) 1 to ∞ (b) 0 to 1 (c) 100 (d) none of these

7. Another name of H wave is

(a) TM wave (b) TE wave (c) TEM wave (d) Circular wave

8. Dominant mode means

(a) highest cut-off frequency (b) lowest cut-off wavelength
(c) guide wavelength (d) lowest cut-off frequency

9. Write the Dominant modes of TE waves in rectangular waveguide

(a) TE_{10} (b) TE_{01} (c) TE_{00} (d) TE_{11}

10. TEM mode sometimes called as

(a) dominant mode (b) principal mode
(c) degenerative mode (d) parallel mode

PART - B (5 x 2 = 10 Marks)

11. Define Decibel.

12. Define reflection coefficient and write its formula.

13. A line with characteristic impedance of 678.878- j 143.87 is terminated in 200 Ω resistor. Determine reflection coefficient.

14. Define phase velocity.

15. Why TEM mode is not possible in rectangular waveguide?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Design a T-type prototype band pass filter. (10)

(ii) A constant K T-section high pass filter has a cut-off frequency of 10 kHz. The design impedance is 600 Ω. Determine the value of L. (6)

Or

(b) (i) Derive the current and voltage ratio as exponentials propagation constant. (8)

(ii) Design m derived T type low pass filter to work into load of 500 Ω with cut-off frequency at 4 kHz and peak attenuation at 4.15 kHz. (8)

17. (a) Derive the general solution of transmission line. (16)

Or

(b) Explain about reflection on a line not terminated in Z_O. (16)

18. (a) Derive the input impedance of open and short circuited lines. (16)

Or

(b) A load (50 - j100) Ω is connected across a 50 Ω line. Design a short circuited stub to provide matching between the two at a signal frequency of 30 MHz using Smith chart. (16)

19. (a) Derive the field equations of TM waves between parallel planes. (16)

Or

(b) (i) Explain about velocities of propagation of waves between parallel planes. (8)

(ii) Derive the wave impedance of TE waves. (8)

20. (a) Derive the field equation of TM waves in rectangular waveguide. (16)

Or

(b) Derive the field equation of TM waves in cylindrical waveguide. (16)