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

Question Paper Code: 45404

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

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. Which stands for *dB* relative level?

   (a) *dBrn* (b) *dBa* (c) *dBr* (d) *dBx*

2. One decibel equals to

   (a) 5.356*N* (b) 8.686*N* (c) 7.635*N* (d) None of these

3. Condition for distortion less line is

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

4. A ____band is the range of frequencies or wavelengths that can pass through a filter without being attenuated.

   (a) Pass (b)Band (c) Base (d) Low

5. Reflection Coefficient K=_____Voltage at load /Incident voltage at the load.

   (a) Reflected (b) Incident (c) Reflection (d) Inflection

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. Principal mode is

(a) TE mode (b) TM mode (c) TEM mode (d) None

PART - B (5 x 2 = 10 Marks)

11. Define Characteristic impedance.

12. List the advantages of double stub matching over single stub matching.

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 expression for the input impedance of the dissipation less line and the expression for the input impedance of a quarter wave line. Also discuss the application of quarter wave line. (16)

Or

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

18. (a) A lossless transmission line with $Z_0 = 75\ \Omega$ and of electrical length $l = 0.3\lambda$ is terminated with load impedance of $Z_R = (40 + j20)\ \Omega$. Determine the reflection coefficient at load, SWR of line, input impedance of the line. (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) Determine the solution of electric and magnetic fields of TE waves guided along rectangular waveguides. (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) Explain in detail about

(i) Excitation of waveguides (8)

(ii) Resonant cavities (8)