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Question Paper Code: 55402

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Fifth Semester

Electronics and Communication Engineering

15UEC502 - TRANSMISSION LINES AND WAVEGUIDES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. A network is symmetrical if its input impedance is _____ CO1- R
(a) Equal to output impedance (b) Larger than output impedance
(c) Smaller than output impedance (d) Infinity to output impedance
2. Frequency distortion in a transmission line is reduced by the use of _____. CO2- R
Delay distortion is avoided by the use of _____
(a) Capacitor, equalizers (b) Equalizers, co axial cable
(c) Inductance, equalizers (d) None of the above
3. Which type of transmission line/s exhibit/s less capacitance in CO3- R
comparison to underground cables?
(a) Co-axial cables (b) Open-wire (c) Waveguides (d) All of the above
4. By which phenomenon does the energy transmission take place CO4- R
between the walls of the tube in waveguides?
(a) Reflection (b) Refraction (c) Dispersion (d) Absorption
5. At cutoff frequency the wave impedance for TM and TE waves becomes CO5- R
(a) Zero, infinity (b) Infinity, Zero (c) Infinity, infinity (d) None of the above

PART – B (5 x 3= 15Marks)

6. What is the relationship between characteristic impedance and propagation constant? CO1- U
7. Find the reflection coefficient of a 50Ω transmission line which is terminated by a load impedance of $60+j40\Omega$. CO2- App
8. What is meant by standing wave ratio? CO3- U
9. Differentiate TE and TM mode. CO4- U
10. Define dominant mode in rectangular wave guide. CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Describe the characteristic impedance of T network and π network with Open and short circuit impedance condition. CO1- App (16)
Or
(b) Examine the design of constant K low pass and high pass filter with suitable filter section. CO1- App (16)
12. (a) Discuss in detail about inductance loading of telephone cables and derive the attenuation constant, phase constant and velocity of signal transmission for the uniformly loaded cable. CO2- U (16)
Or
(b) (i) Explain the two types of waveform distortion on a transmission line and obtain the condition for distortion less line. CO2- U (10)
(ii) Express the expression for insertion loss of transmission line. CO2- U (06)
13. (a) Explain the technique of single stub matching and discuss operation of quarter wave transformer. CO3- Ana (16)
Or
(b) A 50Ω lossless transmission line is terminated in a load impedance of $Z_L = (25+j50) \Omega$ Use the SMITH chart to analyze
(i) Voltage reflection coefficient.
(ii) VSWR.
(iii) Input impedance of the line given that the line is 3.3 wavelength long.
(iv) Input admittance of the line.

14. (a) Discuss in detail about TM and TE standing wave between parallel plates with its mathematical analysis. CO4- U (16)

Or

- (b) (i) Discuss briefly the attenuation TE and TM waves between parallel planes. CO4- U (8)

- (ii) Summarize wave guide impedance matching and reflection coefficient. CO4- U (8)

15. (a) Summarize the expression for the field components of TE waves in a cylindrical waveguide. CO5- U (16)

Or

- (b) Express the field components of TM waves in a rectangular waveguide. CO5- U (16)

