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

Question Paper Code: 35404

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

Third Semester

Electronics and CommunicationEngineering

01UEC504- TRANSMISSION LINES AND WAVEGUIIDES

(Regulation 2013)

Duration: Threehours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define decibel. Calculate the *P (mW)* for a gain of -30*dbm.*
2. List the advantages of *m* derived filter.
3. State distortion less line and mention the condition for a distortionless line.
4. Define deflection coefficient.
5. What are the drawbacks of single stub matching? How it is overcome by double stub matching?
6. Write the relationship between standing wave ratio and reflection coefficient.
7. Write Maxwell's equations.
8. Distinguish between TE and TM waves.
9. Define the quality factor of a resonator.
10. List the applications of cavity resonator.

PART - B (5 x 16 = 80 Marks)

11. (a) Derive expressions for characteristics impedance and propagation constant of a symmetrical π network. (16)

Or

(b) Design m-derived LPF, having a f_c =5000*Hz* and a design impedance of 600 Ω. The frequency of infinite attenuation is 1.25 f_c.. (16)

12. (a) A transmission line is 2 *miles* long operates at 10*KHz* and has parameters *R*=30 Ω */mile, C*=80*nF*/*mile*, *L*=2.2*mH/mile*, and *G*=20*nV/mile*. Find the characteristics impedance, propagation constant, attenuation and phase shift per mile. (16)

Or

(b) (i) Explain in detail about the waveform distortion and also derive the condition for distortion less line. (10)

(ii) A telephone cable 64 *km* long has a resistance of 13Ω*/km* and a capacitance of 0.008 μ*F/km*. Calculate the attenuation constant, velocity and wavelength of the line at 1000 *Hz*. (6)

13. (a) A open wire consist of two copper conductors each of radius 2 *mm* and distance of separation of 200 *mm* in free air. Calculate the following parameters per unit length of the line if frequency of signal transmitted is 40 *kHz.* Find Inductance *L*, Capacitance *C*, DC resistance per length and AC resistance per length. Assume for copper $\sigma = 5.75 \times 10^7$ *℧/m*. (16)

Or

(b) (i) Obtain the input impedance of a Quarter wave line and Half wave line and write about its application. (8)

(ii) Illustrate the input impedance of open and short circuited dissipation-less transmission line. (8)

14. (a) Derive the expression for the field strengths for Transverse Electric waves between a pair of parallel perfectly conducting planes of infinite extent in the 'Y' and 'Z' directions. The planes are separated in X direction by "a" meter. (16)

Or

(b) Derive the expression for *E* and *H* fields, if electromagnetic wave propagates in Z-direction between two parallel plates. (16)

15. (a) Derive the field expression of TM wave propagation in rectangular waveguide stating the necessary assumption. (16)

Or

(b) Explain the propagation of electromagnetic waves in a cylindrical waveguide with suitable expressions. (16)

———————