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

Question Paper Code: 35404

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

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. List the properties about symmetrical networks.
2. Draw the frequency response characteristics of constant K low pass filter.
3. Discover the applications of transmissions lines.
4. State distortion less line and mention the condition for a distortionless line.
5. Justify the reason for preferring a short circuited stub when compared to an open circuited stub.
6. Define SWR.
7. Write Maxwell's equations.
8. Distinguish between TE and TM waves.
9. Mention the application of rectangular waveguide.
10. Define resonant cavities.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain the characteristics impedance of symmetrical networks. (8)

(ii) Explain in detail about constant K filters. (8)

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) Originate the expressions for differential equations governing the voltage and current at any point on a uniform transmission line. Solve the equations to obtain the voltage and current in terms of load current and voltage. (16)

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

(ii) Obtain the input impedance of a Quarter wave line and Half wave line and write about its application . (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) Explain wave impedance and obtain the expression of wave impedance for TE, TM and TEM waves guided along parallel planes. (16)

15. (a) (i) Elucidate the dominant mode in cylindrical waveguide. (8)

(ii) Discuss in detail about attenuation of TE mode in cylindrical waveguide. (8)

Or

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

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