

Question Paper Code: 42453

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Fifth Semester

Electronics and Communication Engineering EC 2305 – TRANSMISSION LINES AND WAVEGUIDES

(Regulations 2008)

(Common to PTEC 2305 – Transmission Lines and Waveguides for B.E. (Part-Time) Fourth Semester – Electronics and Communication Engineering – Regulations 2009)

Time: Three Hours

Maximum: 100 Marks

(Smith Chart is to be provided)

Answer ALL questions

PART - A

 $(10\times2=20 \text{ Marks})$

- 1. What are the advantages of m derived filters?
- 2. What are constant K filters?
- 3. What is a distortion less line?
- 4. Define propagation constant.
- 5. A lossless line has a characteristic impedance of 200 ohms. Determine the standing wave ratio if the receiving end impedance is 800 + j 0.0 ohms.
 - 6. What is the application of quarter wave line matching section?
 - 7. What is an evanescent mode?
 - 8. Define cut off frequencies for guided wave.
 - 9. What are cavity resonators?
- 10. Mention the characteristics of TEM waves.

PART - B

 $(5\times16=80 \text{ Marks})$

11. a) Derive the relevant equations of m derived low pass filter and design m derived T type low pass filter to work into the load of 600Ω and cut off frequency at 5 KHz and peak attenuation at $f_{\infty} = 1.25 f_{c}$. (16)

(OR)



	b)	Explain the structure and application of crystal filter. Design a constant K T-section bandpass filter with cutoff frequencies of 1 KHz and 4 KHz. The design impedance is 600 ohms. (16)
12.	a)	Derive the equation of attenuation constant and phase constant of transmission lines in terms of line constants R, L, C and G and explain the significance of reflection loss. (16)
C		(OR)
	b)	i) Derive the conditions required for distortion less line. (8)
		ii) At 6 MHz characteristic impedance of transmission line is $(20 - j3)\Omega$ and propagation constant is $0.01 + j0.1$ per meter. Find the primary constants R, L, G and C. (8)
13.	a)	Explain the procedure of single stub matching using Smith chart and discuss operation of quarter wave transformer. (16)
		(OR) nambanag Lilih ar sann A
	b)	Examine the procedure for obtaining the Smith chart using R and X circles. (16)
14.	a)	Derive the solution for TE and TM mode in rectangular wave guide. (16) (OR)
	b)	Discuss velocity, wavelength, mode cut off frequency and dominant modes in waveguides. (16)
15.	a)	Explain the propagation of electromagnetic waves in a cylindrical waveguides with suitable expressions. (16)
		(OR)
	b)	i) Write short notes on cavity resonators. (4)
		ii) Calculate the guide wavelength, phase velocity, group velocity, characteristic impedance for a rectangular waveguide in TM_{11} mode having dimension $a = 4.5$ cm and $b = 3$ cm internally at $f = 9$ GHz. (12)
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