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

Question Paper Code: R3408

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Third Semester

Electronics and Communication Engineering

R21UEC308-ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

PART A - (5 x 1 = 5 Marks)

1. What is the Unit of magnetic flux density? CO1- U

   (a) Wb/m^2 (b) Tesla (c) Both a) and b) (d) A/m

2. Electromagnetic waves are produced by_____ CO1- U

   (a) static charge (b) accelerated charge c) moving charge d) charged particle

3. When the load impedance is not equal to characteristic impedance of transmission line _____ takes place. CO1- U

   (a) Insertion (b) Reflection (c) Both a) and b) (d) None of these

4. The Secondary constants of a transmission line are CO1-U

   (a) α (b) γ (c) β (d) All the above

5. Single stub matching is applicable for_____frequency. CO1-U

   (a) Single (b) Double (c) Low (d) High

PART – B (5 x 3= 15 Marks)

6. Justify the magnitude of electric flux density and volume charge density is equal. CO1- U
7. State polarization of a uniform plane wave. CO1- U
8. A constant k low pass filter has a cut off frequency of 10 kHZ. The design impedance is 600 ohms. Find the value of L. CO2-App
9. Measure the reflection coefficient of a 75 Ω transmission line which is terminated by a load impedance of 30+j20 Ω. CO2-App
10. What are guided waves? Give examples. CO1-U

PART – C (5 x 16= 80 Marks)

11.	(a)	Illustrate the Maxwell equation for both integral and point form for time varying field by applying suitable theorem	CO2-App	(16)
		Or		
	(b)	Measure the capacitance by applying Laplace's equation for the potential field in homogenous region between two concentric conducting spheres with radius a & b and $V=V_0$ at r = a and V= 0 at r = b.	CO2-App	(16)
12.	(a)	Examine the EM wave propagation parameters in Free space and also derive the expression for electric and magnetic field.	CO3-App	(16)
		Or		
	(b)	Develop the EM wave propagation parameters in Perfect dielectric and also derive the expression for electric and magnetic field.	CO3-App	(16)
13.	(a)	Design a constant k high pass filter with suitable filter sections	CO3-App	(16)
		Or		
	(b)	Construct low pass filter having a cut off frequency of 5000Hz and design impedance of 600 ohms. The frequency of infinite attenuation is 1.25 fc	CO3-App	(16)
14.	(a)	A 65 Ω lossless used at a frequency where wavelength 80 cm terminated by load of 120 + j70 Ω. Analyze the reflection co-efficient, VSWR and input impedance using smith chart.	CO5-Ana	(16)
		Or		
	(b)	Analyze a single stub match for a load of 150+j225 ohms for a 75 ohms line at 500 MHz using smith chart.	CO5-Ana	(16)
15.	(a)	Determine the solution of electric and magnetic fields of TE waves guided along rectangular waveguide.	CO1-U	(16)
		Or		
	(b)	Integrate the TM wave field equations between parallel planes into classes.	CO1-U	(16)