Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

UPES

End Semester Examination, May 2023

Course: Electromagnetic Waves **Semester : IV**

Program: B.Tech (ECE) **Time : 03 hrs.**

Course Code: ECEG 2035 **Max. Marks: 100**

Instructions: Attempt all questions.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	What do you understand by the divergence and curl of a vector.	**4**	**CO 1**
Q 2	Describe various transmission line impedance matching techniques.	**4**	**CO 3**
Q 3	State the boundary conditions of a time varying electromagnetic wave at a dielectric-to-dielectric interface.	**4**	**CO 1**
Q 4	How you differentiate transmission line and waveguide.	**4**	**CO 2**
Q 5	Define wave. State the condition when a wave can be referred as the uniform plane wave.	**4**	**CO 2**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Define the polarization of an EM wave. State the conditions for linear, circular, and elliptical polarization.	**10**	**CO 2**
Q 7	Write a short note on microstrip line. Explain quasi-TEM mode operation.	**10**	**CO 2**
Q 8	State Maxwell's equation in differential and integral form. Write their statement and explain the physical significance of each equation.	**10**	**CO 1**
Q 9	A 50 Ω transmission line is connected to a load impedance of Z_L = 25-j47.5 Ω. Find the position and length of the open-circuited stub to match the line. or A two-wire airline has the following line parameters: R = 0.404 mΩ/m, L = 2.0 μH/m, G = 0, and C = 5.56 pF/m. For operation at 5 kHz, determine (a) the attenuation constant α, (b) the phase constant β, (c) the phase velocity up, and (d) the characteristic impedance Z0.	**10**	**CO 3**

SECTION-C (2Qx20M=40 Marks)			
Q 10	An EM wave is travelling in free space, an incident normally on a conductor medium. The free space and conductor interface is located at z =0. (a) Determine the reflection and transmission coefficient. (b) Determine the expression for the total electric field and magnetic field in both the mediums. or (a) Derive wave equation starting from Maxwell's equation for free space. (b) What is a uniform plane wave? Describe its properties, both physically and mathematically.	**20**	**CO 4**
Q 11	(a) Drive the expression of the input impedance of a lossless transmission line of length l and characteristic impedance Z_0. Assume that line is terminated with load impedance Z_L. (b) Determine the value of input impedance for an open-circuited and short-circuited line.	**14+6**	**CO 3**