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PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations - March 2026

Date: 12-03-2026

Time: 02:00pm - 03:30pm

School: SOE	Program: B. TECH (ELECTRONICS AND COMMUNICATION ENGINEERING)		
Course Code : ECE3163	Course Name: Antenna and Wave Propagation		
Semester: VI	Max Marks: 50	Weightage: 25 %	

CO - Levels	C01	C02	C03	C04	C05
Marks	26	14	10	0	0

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	State the differential form of Gauss's Law for magnetism and explain its physical significance.	2 Marks	L1	C01
2	Why is a minus sign included in the expression for Faraday's Law of induction?	2 Marks	L1	C01
3	Define the Electric Scalar Potential V in terms of the electric field for static conditions.	2 Marks	L1	C01
4	State reciprocity theorem for antennas?	2 Marks	L2	C02
5	Define directivity of the antenna.	2 Marks	L2	C02

Part B

Answer the Questions.

Total Marks 40M

6.	a.	Derive all four Maxwell's equations in differential form starting from their respective laws (Gauss, Faraday, and Ampere).	10 Marks	L2	CO1
	b.	Explain the radiation pattern of an antenna? Explain all parameters of radiation parameters like HPBW, FNBW, Maximas, minima and nulls with illustration.	10 Marks	L3	CO3
Or					
7.	a.	Using Maxwell's equations, derive the four boundary conditions for the tangential and normal components of E and D at the interface between two general media.	10 Marks	L2	CO1
	b.	Explain the working of the radiation mechanism of dipole antenna with illustration of the voltage and the current distribution. Draw the radiation pattern of a dipole.	10 Marks	L3	CO3

8.	a.	Derive the expressions for the attenuation constant α and phase constant β for an EM wave propagating in a medium with conductivity σ , permittivity ϵ , and permeability μ .	10 Marks	L2	CO1
	b.	What is skin depth? Discuss importance of skin depth with examples of various media	10 Marks	L2	CO2
Or					
9.	a.	Convert Maxwell's equations for sinusoidal varying fields.	10 Marks	L2	CO1
	b.	Illustrate the difference between Horizontal and vertical polarization? Discuss its advantages and disadvantages.	10 Marks	L2	CO2