SRM UNIVERSITY

SRM University
Faculty of Engineering and Technology
Department of Electronics and Communication Engineering
Cycle Test-I

Sub Code: 15EC304
Sub Name: Antenna and Wave Propagation
Sem/Year: VISem/ III Year B.Tech/ Batch 1

Date : 29.08.2017
Time :2 Periods(AN)
Marks : 50

Mapping of Student Outcomes (SO) with Instructional Objectives (IO) for this course

SO	a	b	c	d	e	f	g	H	i	j	k
	X	X	X		X						
Mapping of IO with SO	1,2,3,4	3,4	5		1,2,3,4						

Instructional Objectives

1. Acquire knowledge about the various antenna parameters.
2. Enumerate the concept of antenna arrays and its radiation pattern.
3. Understand the basic working of antenna.
4. Analyze the various methods involved in the measurement of antenna parameters
5. Understand the radio wave propagation in the atmosphere.

Student Outcomes

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

No

PART- A (5x4=20 Marks)
Answer ALL Questions

1. Enumerate the conditions to produce and create radiation, and give its significance.
2. Explain retarded vector potential.
3. A plane electromagnetic wave having a frequency of 20MHz has an average Poynting vector of $10W/m^2$. If the medium is lossless with relative permeability of 4 and relative permittivity of 5. Find (i) velocity of propagation (ii) wave length (iii) Impedance of the medium?
4. What is an antenna array and mention the various forms of antenna array and give its significance
5. What is Pascal's triangle? Give its significance

PART-B (3X10=30 Marks)
Answer ANY THREE Questions

6. Derive an expression for the far field component of a half wave dipole antenna
7. A half wave dipole is radiating into free space. Input power is 100 W. Find the power density in W/m^2 at r =750 m, $\theta = 60°$, assuming overall efficiency of 75%.
8. Describe board side array. Deduce the expression for the radiation pattem of a broadside array with n-point sources. Sketch the radiation pattem for such an array with n=4 and spacing is $\lambda/4$
9. Classify different antenna synthesis methods and explain how the designed direction of nulls is achieved by using Schelkunoff polynomial method with examples.