R16

SET - 1

III B. Tech I Semester Supplementary Examinations, May - 2019
ANTENNA AND WAVE PROPAGATION
(Electronics and Communication Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Find effective height if antenna length is $\lambda/10$.   [2M]
    b) Find the retarded time in antenna field travelled in a medium ε_r is 4 at Radial   [2M]
        distance 4λ.
    c) Calculate the number of elements required to design a linear array of length 50λ [2M]
        with $d=\lambda/2$.
    d) Define travelling wave radiators? List out the differences between resonant and   [3M]
        travelling wave radiators.
    e) Define Zoning in lens antenna.   [3M]
    f) Define critical frequency and MUF.   [2M]

PART -B

2. a) Calculate the exact directivities of the unidirectional antenna having Power pattern   [7M]
        $p(\theta,\Phi) = P_m \cos\theta$. ($0 \leq \phi \leq 2\pi$, and $0 \leq \theta \leq \pi/2$).
    b) Find the radiation resistance of a Hertzian dipole of length $\lambda/40$, $\lambda/60$, $\lambda/80$.   [7M]

3. a) Estimate the directivity of a half-wave dipole antenna? (Note: Use required basic   [7M]
        equations).
    b) Define retarded potentials? Explain Heuristic approach.   [7M]

4. a) Prove that the uniform amplitude linear array antenna SLR(Side lobe Ratio) is   [7M]
        Independent on the Configuration.
    b) Design a Yugi-Uda antenna at frequency 200 MHz and Number of Elements are 5.   [7M]

5. a) Design a Microstrip antenna at operating frequency 2 GHz and $\varepsilon_r=2.2$. Assume the   [7M]
        required Data.
    b) Explain the principle of long –wire antenna with their equations.   [7M]

6. a) Classify the lens Antenna? Explain the function of lens antennas.   [7M]
    b) Find the gain of a paraboloid of 2m diameter operating at 5 GHz when Half-wave   [7M]
        dipole feed is used.

7. a) Derive the reflective index and cutoff frequency of a layer in sky Wave   [7M]
        propagation.
    b) Draw the equivalent circuit of a ground? Explain the effect of wave tilt in Ground   [7M]
        wave propagation.

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