



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 121654

Roll No.

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B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15
ANTEENA & WAVE PROPOGATION

Time : 2 Hours]

[Total Marks : 50

Note : Attempt all problem.

1 Answer any four parts of the following : $3.5 \times 4 = 14$

- Calculate the radiation resistance of antenna length of $\lambda/2$, $\lambda/4$, λ/θ and λ .
- Discuss Gain, Power Gain, Directive Gain, Directivity.
- Explain reciprocity theorem in brief.
- Differentiate in between Near and Far Field.
- Calculate the directivity of antenna whose pattern is given by $\phi = \phi_m \sin^2 \theta \sin^2 \phi$, $0 \leq \theta \leq \pi$ & $0 \leq \phi \leq 2\pi$.
- Justify "Antenna is transducer".

2 Answer any two parts of the following : $6 \times 2 = 12$

- (a) Differentiate among Broadside, Endfire, Binomial and Chebyshev array.
- (b) Draw the radiation pattern of four isotropic point separated at the distance of $\lambda/4$ in broad side sense. Discuss pattern multiplication theorem.
- (c) Prove that Gain and Aperture can be related as
- $$A_e = G \left(\lambda^2 / 4\pi \right).$$

3 Answer any two parts of the following : $6 \times 2 = 12$

- (a) Discuss the operation of parabolic Reflector. What is spill over ? How it is removed ? Discuss Cassegrain feeds also.
- (b) Discuss Rumsey principles. Where it is used ? Name that antenna after explaining the operation and characteristics and other use.
- (c) Discuss the designing of Yagi-Uda antenna and Explain its limitations.

4 Answer any one part of the following : $12 \times 1 = 12$

- (a) Discuss the operation of inosphere. Prove that refractive index is given by $\mu = \sqrt{1 - (81N / f^2)}$ where N is concentration of ions and f is operated frequency.

(b) Explain :

- (1) Skip distance
 - (2) Duct propagation
 - (3) Maximum unusable frequency
 - (4) Fading
 - (5) Critical frequency.
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