3605

Antenna Theory & Design
(1110)

P. Pages : 2

Time : Three Hours   Max. Marks : 100

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any five** questions.

1. a) State Maxwell's Field Equations & Explain their significance. Derive the wave equation for lossless dielectric medium. **15**

   b) Draw the radiation pattern of the antenna. Given its radiation intensity as $U(\theta) = \cos^2\theta$ **5**

2. a) Describe the principle of End – Fire & Broad side arrays. Explain the principle of pattern multiplication with illustrative diagram. **12**

   b) Four isotropic sources are placed symmetrically along Z-axis a distance $\frac{3\lambda}{4}$ apart Design Binomial array. Find. **8**
   i) Normalised Excitation Coefficients.
   ii) Array Factor
   iii) Null Direction.

3. a) Design 10-turn Helix to operate in axial mode for an optimum design Determine. **10**

   i) Circumference (in λ_0)

   ii) Pitch angle (in degree)

   iii) Separation between turns (in λ_0)

   iv) Half power beam width of main lobe.

   v) Directivity in dB using formula.

   vi) Axial Ratio in dB.

   b) Explain Log – Periodic Antenna in detail. **10**

4. a) Explain Parabolic Reflector antenna in detail. **12**

b) Find the First Null beam Width & power gain of 2-m paraboloid reflector operated at 6000MHZ. **8**

5. a) Explain Dolph pattern method of obtaining optimum pattern using chebyshev polynomial. **10**

b) Explain Fourier transform method for pattern synthesis. **10**

6. a) Derive the Pocklington's integral equation. Explain its significance. **10**

b) Explain weighting functions moment method in detail. **10**

7. a) Write a short notes on : **20**

i) Microstrip Antenna.

ii) Yagi-Uda Antenna.

iii) Travelling Wave Antenna.

iv) Loop Antenna.

8. a) Design Microstrip patch with dimensions W & L over a single substrate whose central frequency is 10GHZ. The Dielectric constant of the substrate is 10.2 & the height of the substrate is 0.127cm (0.050 inch) Determine W & L (in cm) of the patch taking into account field fringing
W = width of the patch
L = Length of the patch **10**

b) Explain the antenna polarization in detail. **10**

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