

Seat  
No.

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मुख - 012

## 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. Answersheet 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) Find the power radiated & maximum directivity of an antenna given its radiation density as. 10  
$$W_{rad} = A_0 \frac{\sin \theta}{r^2} \rightarrow (W/m^2)$$
  
b) Draw the radiation pattern of the antenna. Given its radiation intensity as  $U(\theta) = \cos^2 \theta$ . Also find the half power beamwidth. 10
2. a) Explain for linear array. 10
  - i) Array Factor
  - ii) Null Direction
  - iii) Direction of maxima
  - iv) SLL (Side Lobe level)
  - v) HPBW.  
b) Explain the principle of Pattern Multiplication with illustrative diagram. 10
3. a) Explain Biconical Antenna in detail. 10  
b) Design 10-turn Helix to operate in axial mode for an optimum design Determine. 10

Circumference (in  $\lambda_0$ )  
Pitch angle (in degree)  
Separation between turns (in  $\lambda_0$ )  
Half power beam width of main lobe  
Directivity in dB using formula  
Axial Ratio in dB.

4. a) Explain Parabolic Reflector antenna in detail. 10
- b) It is desired to design aperture antenna with uniform illumination, so that the directivity is maximized at an angle  $30^\circ$  from the normal to the aperture. Determine the optimum dimension and its associated directivity with aperture is 1. Square 2. Circular. 10
5. a) Explain Dolph pattern method of obtaining optimum pattern using chebyshev polynomial. 10
- b) Explain WOODWARD - LAWSON method for antenna synthesis. 10
6. a) Derive the Pocklingtons integral equation. Explain its significance. 10
- b) Explain E - Plane Analysis of Horn Antenna. 10
7. a) Explain Loop antenna in detail. 10
- b) What is the Diffraction ? List out types of Diffraction Explain any one in Detail. 10
8. a) Explain the antenna polarization in detail. 10
- b) Write a short notes on. 10
- i) Microstrip Antenna.
- ii) Travelling Wave Antenna.

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