Code: **ECMC1T5B**

I M.Tech - I Semester-Regular/Supplementary Examinations
January 2017

ANTENNA ARRAYS AND SYNTHESIS
(MICROWAVE & COMMUNICATION ENGINEERING)

Duration: 3 hours   Max. Marks: 70
Answer any FIVE questions.   All questions carry equal marks

1. a) Derive FRIIS transmission formula and explain its
   significance.   8 M

   b) Find the directivity of an antenna having radiation
   resistance of 72 Ω and loss resistance of 12 Ω and a gain
   of 20.   6 M

2. a) Obtain the radiation pattern of 4 sources forming a uniform
   BSA with a spacing of $\lambda/2$.   7 M

   b) Derive an expression for electric field intensity of array of
   n isotropic sources of equal amplitude and spacing and
   having a phase difference of δ.   7 M

3. a) Explain Effect on the Array Radiation Pattern of mutual
   coupling array.   8 M

b) Discuss about Schelkunoff's unit circle representation.

6 M

4. a) Give expression for Array Directivity and Array factor of Circular arrays.   8 M

b) Discuss about transformation between circular and elliptical arrays.   6 M

5. a) Discuss Woodward-Lawson method.   7 M

b) Discuss Fourier Transform Method.   7 M

6. Explain briefly about Hemispherical coverage using planar surface, half sphere, Cone, Ellipsoid and Paraboloid.   14 M

7. a) Define the following parameters w.r.t phased array antenna: 8 M
   (i) Element Pattern, Directivity and Gain
   (ii) Maximum-Array-Gain Theorem

b) Discuss Slot-Fed Patch Array.   6 M

8. a) Explain in detail about gain measurement by direct comparison method.   7 M

b) Explain in detail about antenna test ranges.   7 M