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**B.E. / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011
ELECTRONICS AND COMMUNICATION ENGINEERING BRANCH
SEVENTH SEMESTER**

EC 474 – ANTENNAS AND WAVE PROPAGATION

(REGULATION 2004)

Time: 3 Hours

Max. marks: 100

Answer ALL Questions

Part-A (10x2=20 Marks)

1. Define polarization mismatch.
2. Give the relation between Gain and Directivity.
3. What is meant by sectoral horn?
4. Estimate the diameter of the aperture of a parabolic reflector antenna required to produce a null beam width of 10° at 3 GHz.
5. What is the principle of adaptive array?
6. How are side lobes suppressed in antenna arrays?
7. Give the relation between apex and wavelength of log-periodic antenna.
8. Draw the structure for Turnstile antenna.
9. Define skip distance.
10. What is called duct propagation?

Part-B (5x16=80 Marks)

- 11.(i) Draw the basic antenna structure and explain how it converts photons to current and vice versa. (6)
- (ii) Describe the radiation intensity and beam efficiency. (4)
- (ii) Explain the types of baluns. (6)

- 12.(a) (i) Design a rectangular microstrip antenna using a substrate (RT/duroid 5880) with dielectric constant of 2.2 and height of 0.1588 cm so as to resonate at 10GHz. (8)
- (ii) Explain the geometry of cassegrain feed. Mention its advantages. (8)

OR

- 12.(b)(i) A rectangular aperture with a constant field distribution, with $a = 3\lambda$ and $b = 2\lambda$ is mounted on an infinite ground plane. Compute, in the E-plane, HPBW, BWFN, FSLBW and FSLMM. (8)
- (ii) Compare the features of uniform and tapered apertures. (8)

- 13.(a) With diagrams compare broad side array, end fire array and Hansen-Woodyard array. (16)

OR

- 13.(b)(i) Explain pattern multiplication for arrays. (8)
- (ii) Derive the field pattern of 'n' isotropic point sources of equal amplitude and spacing. (8)

14.(a) Draw the structure of Helix antenna with ground plane mounted and explain its current distributions and resolution. (16)

OR

14.(b)(i) With block diagram describe the principle of a typical active antenna. (8)

(ii) Explain the types of antenna measurements. (8)

15.(a) Describe the salient features of ground wave propagation and sky wave propagation. (16)

OR

15.(b)(i) Explain the diversity reception techniques. (10)

(ii) What are critical frequency and maximum usable frequency? (6)
