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**Question Paper Code : 40401**

M.E./M.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

First Semester

Communication Systems

CU 5191 – ADVANCED RADIATION SYSTEMS

(Common to M.E. Electronics and Communication Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define directivity of an antenna.
2. What is the importance of radiation resistance of an antenna?
3. What are the applications of aperture antennas?
4. Define Huygen's principle.
5. What is the function of frequency scanned arrays?
6. List any two advantages of MEMS technology in phased array.
7. Sketch the equivalent circuit of microstrip antenna.
8. What are the applications of microstrip antennas?
9. Define bandwidth applicable for UWB antenna.
10. What are the features of anechoic chamber?

PART B — (5 × 13 = 65 marks)

11. (a) Derive the radiated Electric and magnetic field for a short dipole.

Or

- (b) Explain the following terms with respect to antenna:
  - (i) Polarization
  - (ii) Effective aperture
  - (iii) Radiation pattern.

12. (a) Explain the radiation mechanism of slot antenna with diagram.

Or

- (b) Explain the special features of Reflector antenna and discuss on different types of feed used with neat diagram.

13. (a) Explain the structure of phased array and its function in finding direction.

Or

- (b) Compare analog and digital beam forming techniques. Explain digital beam forming in phased array.

14. (a) With neat diagram, explain the radiation mechanism of a microstrip antenna.

Or

- (b) Explain the different excitation techniques used for microstrip patch antenna.

15. (a) (i) Discuss the design constraints in mobile phone antenna.  
(ii) Explain how PIFA is different from Patch antenna?

Or

- (b) With neat block diagram, explain the procedure for measuring gain of the antenna.

PART C — (1 × 15 = 15 marks)

(Application / Design / Analysis / Evaluation / Creativity / Case study questions)

16. (a) Design a microstrip patch antenna operating at the frequency of 2.4 GHz, built on the substrate  $\epsilon_r = 4.3$  and thickness  $h = 1.6$  mm.

Or

- (b) Identify any one planar antenna used for UWB application and discuss its characteristics.