

Duration: 3 hrs.

Max. Marks:80

N.B. (1). Question No. 1 is compulsory.

(2). Attempt any three questions out of remaining five.

(3). Figures to the right indicate full marks.

(4). Assume suitable data if required and mention the same in answer sheet

1. Solve any four 20
  - (a) Define: Gain, Directivity, Radiation pattern, Return loss and axial ratio.
  - (b) List the substrates with dielectric constant and loss tangent value used for MSA fabrication.
  - (c) Compare RMSA and CMSA.
  - (d) Write a short notes on compact techniques of MSA.
  - (e) Explain MIMO antennas and its application in 5G.
2. (a) Design a rectangular microstrip antenna using a substrate (RT/ duroid 5880) with dielectric constant of 2.2,  $h = 0.1588$  cm (0.0625 inches) so as to resonate at 10 GHz. 10
  - (b) Explain the design steps of single feed circularly polarized MSAs. 10
3. (a) Write a short notes on broadband techniques of MSA. 10
  - (b) Enumerate the methods to achieve circular polarization in MSA. 10
4. (a) Write a short notes on wearable textile antennas w.r.t bending and crumpling. 10
  - (b) Design a circular microstrip antenna using a substrate (RT/duroid 5880) with a dielectric constant of 2.2,  $h = 0.1588$  cm (0.0625 in.) so as to resonate at 10 GHz. 10
5. (a) Explain the analysis methods of patch antenna. 10
  - (b) Explain the stacked Multi-resonator Rectangular Patches on Thick Substrates. 10

6. Write short note on (any four)

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- (a) Reconfigurable antennas
- (b) Fractal antennas.
- (c) Implantable antennas
- (d) Electromagnetically coupled MSA's
- (e) Feeding methods of MSA
- (f) Advantage and disadvantages of MSA.

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