Q. P. Code: 26253

(3 Hours)   Max Marks: 80

1. Question No. 1 is compulsory.
2. Out of remaining questions, attempt any three questions.
3. Assume suitable additional data if required.
4. Figures in brackets on the right hand side indicate full marks.

Q.1. (A) What do you mean by antenna efficiency? How is it different from radiation   (5)
efficiency?

(B) What are the advantages and disadvantages of smart antenna systems?   (5)

(C) Design a rectangular microstrip antenna (RMSA) at 2.5 GHz using 0.8 mm   (10)
duroid substrate of dielectric constant 2.2 and loss tangent 0.001.

Q.2. (A) Draw and explain various feeding techniques and their equivalent circuit and also   (10)
mention their advantages and disadvantages.

(B) What are the necessary conditions to obtain circular polarization? What are the   (10)
various techniques to design a single feed circularly polarized MSA?

Q.3. (A) Draw and explain any two techniques to increase the 3 dB axial ratio bandwidth   (10)
of a microstrip antenna.

(B) What are the various parameters on which impedance bandwidth of MSA antenna   (10)
depend? Using VSWR plot or impedance variation plot, explain effect of two such
parameters on impedance bandwidth.

Q.4. (A) Why compact antennas provide low efficiency and narrow bandwidth? Explain   (10)
different methods to design compact microstrip antennas.

(B) Explain radiating coupled methods used for bandwidth enhancement of RMSAs.   (10)

Q.5. (A) Why planar monopole antennas provide broad impedance bandwidth? Derive an   (10)
expression for lower frequency of a planar circular monopole antenna.

(B) Design a stacked multi-resonator antenna with rectangular patches which can   (10)
provide at least 20% impedance bandwidth.

Q.6.   Write short notes on following:
(A) Challenges in MIMO antenna design.   (10)
(B) Antennas using matamaterials.   (10)

****

E5E62E0555449C8D0D500FB5A9040364