P1860

[4859]-1041

B.E. (E & TC)
c - SOFTWARE DEFINED RADIO
(Semester - I) (2012 Course) (Elective - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *Answer any three questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Use of electronic pocket calculator is allowed.*
5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Explain with neat block diagram of Duplexer & Diplexer. **[4]**

b) Explain the various characteristics of the RF front-end topologies. **[4]**

OR

Q2) a) Explain with suitable diagram the AGC operating modes. **[4]**

b) Draw & explain the Dual conversion Transmitter. **[4]**

Q3) Explain the following parameters w.r. to the data converters. **[6]**

a) Signal-to-Noise-and-Distortion Ratio (SINAD).

b) Effective Number of Bits (ENOB).

OR

Q4) State and explain the applications of FPGA in SDR. Comment of Power Management issues in DSP/ASIC/FPGA. **[6]**

P.T.O.

Q5) For a single-stage decimator LPF, compute the approximate length and number of multiplications per second using the Kaiser formulae for the following specifications: **[6]**

Sampling rate = 90 KHz

Decimation factor = 90

Passband = 0 to 450 Hz

Transition band = 450 to 500 Hz

Passband ripple, $\delta_p = 0.002$

Stopband ripple, $\delta_s = 0.001$

OR

Q6) What is the benefit of using the multi-stage structures of a decimator or interpolator when large changes of sampling rates are required. **[6]**

SECTION - II

Q7) a) Explain the following term w.r.to vector channel modeling: **[9]**

   i) Angle of Arrival (AOA).

   ii) Array Calibration.

   iii) Array Ambiguity.

   b) What is Smart Antenna? List the benefits & drawbacks of smart antenna system. **[9]**

OR

Q8) a) What is fully Adaptive array? Explain the LMS algorithm for smart antenna system. **[9]**

   b) Explain with neat diagram the principles of MIMO-OFDM (case study). **[9]**

Q9) a) Draw neat block diagram of OFDM transmitter. Explain the function of constellation mapper & IFFT block. **[8]**

   b) What is Cognitive Radio? How CR is different than the SDR. **[8]**

OR

*Q10)*a)   Enlist the Benefits & Applications of OFDM.   **[8]**

b)   Explain the following concepts with respect to cognitive radio.   **[8]**

   i)   Spectrum sensing-basic assignment methods.

   ii)   Dynamic Spectrum Access (DSA) - mention 4 capabilities.

*Q11)*a)   Explain the concept of Vertical & Horizontal handoff.   **[8]**

b)   Explain the four classes of adaptation in SPECTRA programming environment.   **[8]**

OR

*Q12)*a)   Explain in detail the Beagle board based SDR.   **[8]**

b)   Explain the operating modes of PSCR.   **[8]**

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