Total No. of Questions : 12]

SEAT No. :

P1860

[Total No. of Pages : 3

[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, δ_p = 0.002

Stopband ripple, δ_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]**