Total No. of Questions :6]

SEAT No. :

P86

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Oct. -16/BE/Insem. - 141
B.E. (E & TC)
SOFTWARE DEFINED RADIO
(2012 Course) (Semester - I) (404184 C) (Elective - I)

Time : 1 Hour] *[Max. Marks :30*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q6.***
2) ***Figures to right indicate full marks.***
3) ***Assume suitable data if necessary.***
4) ***Use of electronic calculator is allowed.***

Q1) a) State the Need for Software Radios. List the applications of the software radio. **[5]**

b) Draw the model of a software radio. Explain only the role of ADC & DAC. **[5]**

OR

Q2) a) State the need for RF Front - End. Draw the block diagram of a single conversion heterodyne receiver. **[5]**

b) What is AGC? List its types. Draw only the block diagram of a Digital AGC system. **[5]**

Q3) a) Explain the following non-linear errors w.r. to Practical Transfer Characteristic Considerations.

i) Integral non-linearities (INL).

ii) Differential non-linearities (DNL) **[5]**

b) What is Aperture Jitter? Derive the formula for maximum input frequency that can be applied to the i/p of a Data converters. **[5]**

OR

P.T.O.

Q4) a) State & explain the different key parameters to define the digital hardware choices for software radios. (JTRS) **[5]**

b) Write a short note on Joint Tactical Radio System. **[5]**

Q5) For a two - stage decimator, find the filter length & multiplications per second for the given specifications. **[10]**

Sampling rate = 90 KHz

Decimation factors = 45 & 2 for stage I & stage II respectively.

Passband = 0 to 450 Hz

Passband ripple, δ_p = 0.002

Stopband ripple, δ_s = 0.001

Note that stopband & passband ripples are specified for a single - stage decimator.

OR

Q6) a) Find the relation between $x(n)$ & $y(n)$ in frequency domain for the figure given below. **[5]**

b) Explain the need and advantages of multi-rate signal processing. **[5]**