<b>Total No. of Questions :6]</b>	<b>Total</b>	No.	of C	uestions	:6]
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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.
  - 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)
  - 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.* 

[5]

- 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

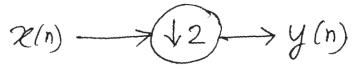
Passband ripple,  $\delta_p = 0.002$ 

Stopband ripple,  $\delta_s = 0.001$ 

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]

