

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2170914

Date:18/11/2016

Subject Name:Digital Signal Processing(Departmental Elective - II)

Time:10.30 AM to 1.00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define sampling. State and explain sampling theorem. **07**
(b) For the system described by $y(t) = x(2t)$, determine whether the system is **07**
(i) Stable (ii) causal (iii) linear (iv) time – invariant and (v) memory less or not.
- Q.2** (a) State and prove the relationship between z-transform and discrete time Fourier **07**
transform.
(b) Define 1) Signal 2) System. Classify them. **07**
- OR**
- (b) State and prove properties of Fourier transform. **07**
- Q.3** (a) What is the importance of ROC in z transform? State the properties of z **07**
transform and ROC.
(b) Explain the concept of pipelining in DSP. Also discuss the need of interlocking **07**
in brief.
- OR**
- Q.3** (a) State and prove Parseval's relation for DTFT. **07**
(b) Describe any one type of DSP architecture. **07**
- Q.4** (a) Define the following terms: **07**
1) State space 2) Correlation 3) ROC 4) Sampling 5) Aliasing 6) Impulse
Response 7) Convolution.
(b) Define periodicity. Check whether the following signals are periodic or not. If **07**
the signal is periodic, then specify its fundamental period.
(1) $x_1(t) = je^{j10t}$ (2) $x_2(t) = e^{(-1+j)t}$ (3) $x_3(n) = e^{j7\pi n}$.
- OR**
- Q.4** (a) Explain Radix-2 FFT and DIT algorithm. **07**
(b) Explain the structures for realization of FIR systems. **07**
- Q.5** (a) Write short note on: Hilbert Transform. **07**
(b) Explain the structures for realization of IIR systems. **07**
- OR**
- Q.5** (a) What are the different formats of fixed point representation? Explain the fixed **07**
point representation of binary numbers.
(b) Discuss the concept of zero input limit cycle oscillation. How this can be **07**
eliminated?
