

Roll No

EC-8004 (1) (CBGS)**B.E. VIII Semester**

Examination, May 2019

Choice Based Grading System (CBGS)**Advanced Digital Signal Processing***Time : Three Hours**Maximum Marks : 70**Note:* i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Classify and explain different types of signals and systems.
- b) Determine if the system described by the following input output equation are linear time invariant or not.
 - i) $y(n) = nx(n)$
 - ii) $y(n) = e^{x(n)}$
 - iii) $y(n) = x^2(n)$
 - iv) $y(n) = x(2n)$
2. a) Determine the Z-transform of the signal $x(n) = na^n u(n)$.
- b) Determine the signal $x(n)$ whose Z-transform is given by

$$X(z) = \log(1 + az^{-1}) \quad |z| > |a|$$
- c) Determine the causal signal $x(n)$ whose Z-transform is

$$\text{given by } X(z) = \frac{1 + z^{-1}}{1 - z^{-1} + 0.5z^{-2}}$$

3. a) Discuss about average spectrum representation of infinite energy signals.
- b) Discuss about cross covariance and cross spectrum.
4. a) State and prove any three properties of DFT.
- b) Explain linear convolution using DFT.
5. Compute N = 8 point DFT using Radix-2 decimation in time FFT algorithm.
6. a) Discuss the design of digital filter based on least square method. <http://www.rgpvonline.com>
- b) Compare IIR and FIR digital filters.
7. a) Discuss forward and backward linear prediction.
- b) Discuss filter design and implementation for sampling rate conversion.
8. Write short notes any two of the following.
 - i) Response of linear system to random signals
 - ii) Estimation of the auto covariance
 - iii) Two dimensional DFT
