

Roll No.

Total Pages : 3

305503

December, 2019

**B.Tech. (ECE)-Vth Semester
Digital Signal Processing (ECC04)**

Time : 3 Hours]

[Max. Marks : 75

Instructions:

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART - A

1. (a) Sketch the waveform of discrete signal
 $x(n) = u(n) - (n-3)$. (1.5)
- (b) Find the z-transform of unit impulse sequence
 $x(n) = \delta(n)$. (1.5)
- (c) Compare static and dynamic system with example. (1.5)
- (d) What are various elements for realization of digital filter? (1.5)

305503/260/111/239

[P.T.O.
14/12

- (e) Explain how IIR filters are designed from analog filters? (1.5)
- (f) Write mathematical expression of Chebyshev polynomial. (1.5)
- (g) Compare the IIR and FIR filter in short. (1.5)
- (h) Explain about decimation process. (1.5)
- (i) Discuss how finite-word length effect lead instability in digital filter. (1.5)
- (j) Explain spectral estimation in brief. (1.5)

PART - B

- 2. (a) Explain the analysis of discrete time Linear Time Invariant system. And list the various properties of Linear Time Invariant System. (8)
- (b) Explain the sampling of continuous function to generate a sequence. Discuss how continuous-time signals are reconstructed from discrete-time sequences. (7)
- 3. (a) Discuss linear filtering using Discrete Fourier Transform. (5)
- (b) Explain radix-2 decimation in time using Fast Fourier Transform algorithms. (5)
- (c) Describe the various properties of Region of Convergence of Z-Transform. (5)

- 4. (a) Explain designing of IIR filters from analog filters using bilinear transformation technique along with necessary mathematical analysis. (8)
- (b) Explain Butterworth approximations for designing of filter. (7)
- 5. (a) Explain designing of FIR Filters using windows technique. (8)
- (b) Convert analog filters with transfer function $H(s) = \frac{s+2}{(s+1)(s+3)}$ using impulse invariant method into digital filter. (7)
- 6. (a) Explain Parametric and non-parametric spectral estimation technique. (8)
- (b) Discuss the effect of infinite-word length and effects of finite precision arithmetic on digital filters. (7)
- 7. (a) Explain the various application of DSP. (8)
- (b) Explain how sampling rate conversion is achieved? Explain filter design and implementation for sampling rate conversion. (7)