H.T.No. | | | | | | | | | | |

Code No: EC1533 **GEC-R14**

III B. Tech II Semester Supplementary Examinations, November 2017

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 60**

Note: All Questions from **PART-A** are to be answered at one place.
Answer any **FOUR** questions from **Part-B.** All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. What is the condition for stability of LTI System?
2. Explain distributive property of convolution.
3. State any two properties of DFT.
4. What is meant by radix-2 FFT?
5. Find the z-transform and ROC of the given function $\delta(n)$

   a) 0,z = 0 b) 1,z = 0 c) 1,z = ∞ d) 1, all z values
6. a) The canonical form of a structure is_____

   A) direct-form I B) direct-form II

   C) both (a) and b) D) none of the above

   b) In high-speed filtering applications_____

   A) parallel realization is preferred B) cascaded realization is preferred

   C) linear realization is preferred D) none of the above

PART-B

4 × 12 = 48M

1. a) Define the energy and power of the signal. Find whether the signal $x(n) = u(n)$ is energy or power signal and calculate the energy or power. (6M)

   b) Discuss various form of real and complex exponential signal with graphical representation. (6M)

2. a) State and prove three properties of Discrete Time Fourier Transform. (6M)

   b) Find frequency response of the following system. (6M)

   $$y[n] - y[n-1] + \frac{3}{16}y[n-2] = x[n] - \frac{1}{2}x[n-1]$$

3. a) Find 4 point DFT of sequence x[n] = 1; $0 \le n \le 2$

   0 Otherwise (6M)

   b) Explain the relationship between DFT and Z transform. (6M)

4. Explain how you can compute DFT of N=8 point sequence using Radix -2 DIT FFT algorithm with the Butterfly diagram. (12M)

5. a) Explain Analog Chebyshev Filter. (6M)

b) For the analog transfer function H(s) = $\frac{2}{(s+1)(s+2)}$ Find H(z) using Bilinear Transformation Invariant Method. Assume T= 1 Sec. (6M)

6. a) Explain the following realization methods of FIR Filters.

   i) Transversal ii) Cascade Methods. (6M)

   b) Realize the second order IIR system

   $y(n)= 2r\cos(\omega_0)y(n-1)- r^2y(n-2)+x(n) - r\cos(\omega_0)x(n-1)$ in direct form II. (6M)

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