No. of Printed Pages : 3

BIEL-010

00971

B. Tech. ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

December, 2012

BIEL-010 : DIGITAL SIGNAL PROCESSING

Time : 3 Hours *Maximum Marks : 70*

Note : *Answer **any seven** questions. Each question carries **ten** marks. Use of scientific calculator is permitted.*

---

1. (a) Explain the relation between DFT and z-Trans form. **4**

(b) Prove that the multiplication of two DFTs is equivalent to the circular convolution of their sequences in time domain. **6**

2. Compute 4-point DFT of the following sequence : **10**

$x(n) = u(n) - u(n-2)$.

Sketch the magnitude of DFT.

3. Discuss chirp z transform algorithm and illustrate the implementation of the algorithm using block diagram. **10**

4. Determine 4 - point DFT of $x(n) = [1, 2, 3, 4]$ using DIF - FFT flow graph. **8+2=10**

Give the butterfly computation for DIT-FFT.

5. (a) Discuss the limitations/disadvantages of digital filter. **3**

(b) Discuss the design of IIR filter by approximation of derivatives method. **7**

6. Find H(z) for $H_a(S) = \frac{1}{(S+1)(S+2)}$, by using impulse invariance method for sampling frequency of 5 samples/sec. **10**

7. (a) What are the desirable features of window functions ? **5**

(b) What is rectangular window function ? Obtain its frequency domain characteristics. **5**

8. What do you mean by linear - phase filter ? Derive the condition for the same. State its advantages. **10**

9. Realize the following system by Direct form - I and form - II realization. **10**

$y(n) = -0.1 \quad y(n-1) + 0.72 \quad y(n-2) + 0.7$
$x(n) - 0.25\ x(n-2)$

10. Write notes on ***any two*** of the followings : **2x5=10**

(a) Realization using ladder structure.

(b) Matched z-transform.

(c) Hilbert Transform and its use.