

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, OCTOBER/NOVEMBER – 2018**

**DIGITAL SIGNAL PROCESSING**

[Maximum Marks: 100]

[Time: 3 hours]

**PART-A**

[Maximum Marks: 10]

(Answer *all* questions in one or two sentences. Each question carries 2 marks)

- I. 1. Define unit impulse signal.  
2. List out any two applications of DSP.  
3. Define Fast Fourier Transform.  
4. Write the Z transform of unit step signal..  
5. How many stages are there in radix-2, 8 point FFT. (5x 2 = 10)

**PART-B**

[Maximum Marks: 30]

(Answer any *Five* of the following questions. Each question carries 6 marks)

- II. 1. Explain the following signals.  
(a). Even and odd. (b). Casual and non casual (iii). Periodic and aperiodic.  
2. Determine the circular convolution of two sequences  $x_1(n) = \{1,2,0\}$  and  $x_2(n) = \{3,5,4\}$   
3. Find the Z transform of the signal  $x(n) = \{1,6,9\}$ .  
4. Define casual system. Check whether the system  $y(n) = x(n-1)$  is casual or not.  
5. List out the criteria for selection of a digital signal processor.  
6. Distinguish between decimation in time and decimation in frequency.  
7. Explain the following.  
(i). Execution speed (ii). Word length. (5x 6 = 30)

**PART-C**

[Maximum Marks: 60]

(Answer *one* full question from each Unit. Each question carries 15 marks)

**MODULE-I**

- III. 1. With help of a neat block diagram explain digital signal processing system. (9)  
2. Check whether the following systems are linear or not.  
(i).  $y(t) = tx(t)$ . (ii).  $y(t) = x^2(t)$  (iii).  $y(t) = x(t) + 3$  (6)

**OR**

IV. 1. Let  $x(n) = \{1,2,3,4\}$  find

(i).  $x(2n)$ . (ii).  $x(n/2)$ . (iii).  $x(n+1)$ . (6)

2. Explain the signal operation time shifting, time scaling and time reversal with examples. (9)

#### MODULE -II

V. 1. Describe Z-Transform. Find the inverse Z transform of  $X(z) = 5z/(2((z-0.5)(z+2)))$ . (8)

2. Describe the properties of DFT. (7)

#### OR

VI. 1. Describe Discrete Fourier Transform (DFT). Find the DFT of a unit impulse signal. (8)

2. Describe the properties of Z transform. (7)

#### MODULE -III

VII. 1. Plot 8 point FFT using radix 2 DIT butterfly diagram. (10)

2. Describe 4 point FFT using radix 2 DIF diagram. (5)

#### OR

VIII. 1. Plot 8 point FFT using radix 2 DIF butterfly diagram. (10)

2. Describe 4 point FFT using radix 2 DIF diagram. (5)

#### MODULE -IV

IX. 1. Explain the Texas DS processor TMX320c50 DSP (10)

2. Compare FIR and IIR filter (5)

#### OR

X. 1. Describe the addressing Modes of TMX320c50 DSP (10)

2. Explain window method for FIR filter design. (5)