

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, APRIL – 2022**

**DIGITAL SIGNAL PROCESSING**

[Maximum Marks: 100]

[Time: 3 Hours]

**PART-A**

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

- I. 1. Define discrete time Signal.
- 2. State initial value theorem of Z- transform.
- 3. Write the advantages of FFT.
- 4. Draw the basic butterfly diagram of 2 point radix -2 DIT algorithm.
- 5. Define execution speed of DSP. (5 x 2 = 10)

**PART-B**

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

- II 1. Explain the block diagram of a DSP system.
- 2. Briefly describe LTI system
- 3. Determine the circular convolution of two sequences  $x_1(n) = \{1,2\}$  and  $x_2(n) = \{3,5,4\}$
- 4. Explain Discrete Fourier Series.
- 5. Describe the selection of DSP.
- 6. Compare decimation in time and decimation in frequency..
- 7. Explain any five application of DSP. (5 x 6 = 30)

**PART-C**

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

**UNIT – I**

- III (a) Explain linear and non linear systems. Check whether the systems are linear or not.
  - i)  $y(t)=t^2$  ii)  $y(t) = t + 1$  (7)
- (b) Check whether the following systems are time – invariant or time variant. (8)
  - (i).  $y(n) = x(n) + x(n - 1)$
  - (ii).  $y(n) = x(-n)$

**OR**

- IV (a) Let  $x(n) = \{1,3,5,7,9\}$ , find  $x(3n)$ ,  $x(n/2)$   $x(n+5)$  (7)  
(b) Briefly describe shifting, time reversal and time scaling operation in digital signal processing. (8)

**UNIT – II**

- V (a) Find the DFT of the sequence  $x(n) = \{1,1,0,0\}$ . (8)  
(b) Explain properties of DFT. (7)

**OR**

- VI (a) Find the inverse transform of  $x(z) = (2z^2 + z)(z-1)(z - 0.5)$  (8)  
(b) Explain Z-transform and its properties. (7)

**UNIT- III**

- VII (a) Explain 8-point FFT using radix 2 DIT block diagram. (8)  
(b) Compare DIT and DIF algorithms. (7)

**OR**

- VIII (a) Find the 8-point DFT of the sequence  $x(n) = \{0,1,2,3,4,5,6,7\}$  using DIF, radix2 FFT algorithm. (9)  
(b) Explain 4-point FFT using radix2 DIT diagram. (6)

**UNIT - IV**

- IX (a) Draw the architecture of TMX320c50 DSP and explain. (10)  
(b) Explain about FIR filters. (5)

**OR**

- X (a) Explain different addressing modes of TMX320c50 DSP. (8)  
(b) Describe IIR filters and explain the criteria for the selection of a digital signal processor (7)

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