

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL – 2021**

DIGITAL SIGNAL PROCESSING

[Maximum Marks: 75]

[Time: 2.15 Hours]

PART-A

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

- I. 1. Define discrete time Signal.
2. Define Circular Convolution.
3. List the advantages of FFT.
4. Write any two properties of FIR filter.
5. Define execution speed of DSP. (3 x 2 = 6)

PART-B

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

- II 1. Explain Scalar Multiplication and Signal Multiplication with suitable examples.
2. List the properties of DFT.
3. Describe decimation in time algorithm.
4. Distinguish between FIR filter and IIR filter.
5. Describe the selection of DSP.
6. Explain the block diagram of DSP.
7. Draw the basic butterfly diagram for DIT Algorithm. (4 x 6 = 24)

PART-C

(Answer **any of the three units** from the following. Each full question carries 15 marks)

UNIT – I

- III (a) Explain Unit Impulse, Unit step, and unit ramp signals with necessary diagrams. (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) Determine the system described by the following equations are casual or non-Casual.

$$(i) y(n) = x(n) + \frac{1}{x(n-1)}$$

$$(ii) y(n) = x(n^2) \quad (8)$$

(b) Explain shifting, time reversal and time scaling operation in Digital signal Processing. (7)

UNIT – II

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

(b) State and prove the linearity property of DFT. (7)

OR

VI (a) Find the inverse Z-transform of $x(z) = \frac{1+3z^{-1}}{1+z^{-1}+2z^{-2}} |Z| > 2$ using partial fraction Method. (8)

(b) Describe Z-transform of unit step and unit impulse functions. (7)

UNIT- III

VII (a) Explain 8-point FFT using radix 2 DIT block diagram. (8)

(b) Describe the similarities and difference between 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. (8)

(b) Explain 8-point FFT using radix2 DIT butterfly diagram. (7)

UNIT - IV

IX (a) Draw the architecture of TMX320c50 DSP and explain. (10)

(b) Describe FIR features. (5)

OR

X (a) Explain different addressing modes of TMX320c50 DSP. (8)

(b) List the applications of DSP. (7)
