

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Questions: 09]

[Total No. of Pages: 02]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)  
Semester: 5<sup>th</sup>  
Name of Subject: Digital Signal Processing  
Subject Code: PCEC-111  
Paper ID: 16418  
Scientific calculator is allowed

EVENING

30 DEC 2022

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

- a) Define convolution property of Z transform.
- b) List any two applications of digital signal processing.
- c) Name any two leading manufacturers of DSP processors.
- d) Define radix-2 FFT algorithm.
- e) Distinguish between FIR and IIR filters.
- f) Derive the final value theorem of Z transform.

Part – B

[Marks: 04 each]

Q2. Discuss the block diagram of ADSP 2100 digital signal processor.

Q3. Identify whether the following system is linear or not

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

Q4. Describe the different types of finite word length effects present in digital filters and ways to rectify them with the help of examples.

Q5. Evaluate DFT using DITFFT flow graph for  $N = 4$  of  $x(n) = \{1, 2, 3, 4\}$

- Q6. Calculate the z transform of the DT signal  $x(n) = 2 nu(-n - 1)$  and sketch the ROC.  
Q7. Determine the autocorrelation of the following signal:

$$x(n) = \{4, 3, 2, 1\}$$

EVENING

30 DEC 2022

**Part – C**

[Marks: 12 each]

- Q8. Discuss any six properties of Z- transforms using suitable examples.

OR

Describe the advantages and disadvantages of digital signal processing over analog signal processing. Discuss the basic elements of DSP systems with the help of block diagram.

- Q9. Design a linear phase FIR low pass filter of length seven with cut-off frequency 1 rad/sec using rectangular window.

OR

Determine H (Z) using impulse invariance method at 5 Hz sampling frequency for H(s) as given below:

$$H (s) = 2/((s + 1)(s + 2))$$

\*\*\*\*\*