

Roll No.

OLE-3219

B. Tech. 5th Semester (ECE)

Examination – April, 2021

DIGITAL SIGNAL PROCESSING

Paper : PCC-ECE-307-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting at least *one* question from each Unit. Question No. **1** is *compulsory*. All questions carry equal marks.

1. (a) Define system with an example.
- (b) Explain Region of Convergence (ROC).
- (c) Define Butterfly unit.
- (d) List out the application of filters.
- (e) List out the techniques of designing FIR filters.
- (f) Define multirate signal processing. 6 × 2.5

UNIT – I

2. (a) Explain the classification of system. 6
(b) Explain the process of reconstruction of signals from its samples. Also explain aliasing effect and how it is minimized. 9
3. (a) Find the z-transform and Roc of the signal 8
$$x(n) = [3(2^n) - 4(3^n)]4(n)$$

(b) Explain the properties of z-transform. 7

UNIT – II

4. Explain the DIF FFT algorithms. 15
5. Determine the 8-point DFT of sequence $x(n) = \{1, 1, 1, 0, 1, 1, 0, 1\}$ 15

UNIT – III

6. (a) Differentiate between Ideal and Practical filters. 5
(b) Design of FIR Filter by using Window technique. 10
7. (a) Find transfer function, $H(z)$, by applying bilinear transformation to 8

$$H(S) = \frac{2}{(S+1)(S+2)} \text{ with } T = 1$$

- (b) Explain Digital frequency transformation. 7

UNIT – IV

8. Obtain the polyphase decompositions of IIR digital system having following transfer function 15

$$H(z) = \frac{1 - 4z^{-1}}{1 + 5z^{-1}}$$

9. Write down notes on any *two* : 15

- (a) Decimator
 - (b) Digital Filter banks
 - (c) Interpolator
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