Roll No.

Total No. of Pages: 02 Total No. of Questions: 09

B.TECH (Sem.-5th) DIGITAL SIGNAL PROCESSING

Subject Code: BTEC-502 Paper ID: [A2104]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATE:

(i) Section -A, is Compulsory.

(ii) Attempt any four questions from Section-B.

(iii) Attempt any two questions from Section-C.

Section -A

Q.1. Write briefly:

(10x2=20)

- 5.00x What are the advantages of digital over analog signal processing. (a)
- Check y(n) = x(n) + nx(n-1) for causality of the system. (b)
- Find z transform of signal $x(n) = \delta(n+2)$. (c)
- Write any two applications of z-transform in signal processing. (d)
- What is the importance of windowing? (e)
- What are the essential features of a good window for FIR filters? (f)
- Explain mapping of jω axis in s-plane into the z-plane. (g)
- Explain the concept of pipelining in DSP processor. (h)
- State the final value theorem of z-transform. (i)
- What are the advantages of TMS-320 processor? (i)

Section -B

(4x5=20)

Q.2. Find the Z-transform & ROC for the following sequence:

$$x(n) = 7(\frac{1}{3})^n u(n) - 6(\frac{1}{2})^n u(n)$$

Q.3. Find inverse Z-transform of

$$X(z) = \frac{1}{(1+z^{-1})(1-z^{-1})2}$$
, ROC | Z|>1.

Q.4. Compute convolution y(n) of the signals.

$$x(n) = \begin{cases} \frac{1}{3^n} : 0 \le n \le 6 \\ 0 : \text{else where} \end{cases}$$

$$h(n) = \begin{cases} 1 & -2 \le n \le 2 \\ 0 & \text{else where} \end{cases}$$

- Q.5. What are the advantages of FIR filters over IIR filters?
- Q.6. Discuss linear filtering approach for the computation of DFT.



ess. coll (2x10=20)

Q.7. Write shorts notes on:

- Magnitude and phase response of FIR filters. (a)
- (b) Goertzel algorithm
- Q.8. Discuss basic architecture of TMS series of digital signal processors.
- Q.9. Compute the eight-point DFT of a sequence

$$x(n) = \{\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}, 0, 0, 0, 0\}$$

Using in-place radix-2 decimation in time FFT algorithm. Jim

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