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Total No. of Questions : 10]

SEAT No. :

P2467

[Total No. of Pages : 3

[5253]-190

T.E. (Computer Engineering)

DIGITAL SIGNAL PROCESSING APPLICATIONS

(2012 Pattern) (Semester - II)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Neat diagram must be drawn wherever necessary.
- 3) Assume suitable data if necessary.

Q1) a) Describe Properties of DT systems. [5]

b) How DFT is obtained from Fourier Transform (FT)? State the relationship between FT and DFT. [5]

OR

Q2) a) Find circular convolution of a given DT signals by using DFT and IDFT method where, [5]

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

$X[k] = \{6, 0, 2, 0\}$ and $H[k] = \{10, -2 + 2j, -2, -2 - 2j\}$

b) Explain in brief the sampling theorem and aliasing effect. [5]

Q3) a) Compare between DIT FFT and DIF FFT algorithm. [5]

b) Obtain the Z Transform of sequence $x(n) = -a^n u(-n-1)$ and sketch the ROC. [5]

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OR

Q4) a) How can we compute Linear Convolution using N point Circular Convolution? [5]

b) State the Scaling and Time shifting properties of Z transform. What is the significance of ROC in ZT? [5]

Q5) a) What are filter structures? Explain how the Direct and Cascade form of FIR filters are obtained and realized from the system function H(Z). [9]

b) A DT System is given by -

$$y(n) = \left(\frac{3}{4}\right)y(n-1) - \left(\frac{1}{8}\right)y(n-2) + x(n) + \left(\frac{1}{2}\right)x(n-1)$$

Obtain and Draw Direct Form – I and Direct Form – II IIR filter structure. [9]

OR

Q6) a) Obtain and realize Linear Phase FIR filter structure for a DT system.

$$H(z) = \left(1 + \frac{1}{2}z^{-1} + z^{-2}\right) \left(1 + \frac{1}{4}z^{-1} + z^{-2}\right)$$

What are the advantages of this filter structure? [9]

b) Derive the Direct Form-II IIR filter structure from system function H(Z) and represent it using multipliers, adders and delay elements. [9]

Q7) a) Compare DSP processor architecture with conventional Microprocessor. List the number of DAGs and supporting memory pointer registers used in DSP Processor. [8]

b) What is SHARC? Explain how SHARC DSP processor supports the multiprocessing capabilities. [8]

OR

Q8) a) What is OMAP? Explain the Software architecture of OMAP in brief. [8]

b) State and explain in brief OMAP multimedia applications. [8]

Q9) a) Draw and explain Compact Disk playback system. [8]

b) Write a short note on Television Video Signals. [8]

OR

Q10) a) What is Comanding? How important this process is in audio processing? Explain the Comanding process in brief. [8]

b) Draw and explain Human Speech Model in speech synthesis and recognition. [8]

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