SEAT No. :

P2467

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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 jf 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]**

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 Companding? How important this process is in audio processing? Explain the Companding process in brief. **[8]**

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

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