P2896

[4958]-1089

SEAT No. :

T.E. (Computer Engineering)

[Total No. of Pages :3

DIGITAL SIGNAL PROCESSING APPLICATIONS

(2012 Pattern) (Semester - II) (310253)

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 diagrams must be drawn wherever necessary.
3) Assume suitable data if necessary.

Q1) a) State the mathematical models used to represent a DT system. Define the Impulse response of the system. **[5]**

b) State the necessary condition for the existence of Fourier Transform. State and prove the convolution property of FT. **[5]**

OR

Q2) a) What is the use of Transducers in signal processing? State the sampling theorem. **[5]**

b) State the following properties of DT system and describe it by means of difference equation: **[5]**

    i) Time Invariant

    ii) Dynamicity

    iii) Causality

Q3) a) Draw a pole zero plot for a system described as -

$$y(n) = x(n) - x(n-1) + 3y(n-1) - 2y(n-2)$$ **[5]**

b) Draw the basic butterfly structures for DIT and DIF FFT algorithms and hence obtain the computational complexity of FFT algorithm. **[5]**

OR

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Q4) a) Use ZT properties to obtain ZT of a DT sequence $x(n) = a^n u(n-1)$. [5]

b) What is convolution property of DFT? Compare Linear convolution with Circular Convolution.

[5]

Q5) a) Obtain and realize Direct Form –I and Direct Form –II IIR filter structure for a system described as –

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

[9]

b) Discuss the form of Linear Phase FIR filter structure and realize it for M = 7 where M is the length of the filter (i.e.6th order filter) [9]

OR

Q6) a) Obtain parallel form realization for IIR filter having transfer function

$$H(z) = \frac{1 + 2z^{-1} + z^{-2}}{1 - 0.75z^{-1} + 0.125z^{-2}}$$

[9]

b) 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]

Q7) a) Explain the characteristics of DSP processor. Explain basic building blocks of DSP processor. [8]

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

OR

Q8) a) Compare conventional microprocessor architecture with Harvard and SHARC DSP architectures with important features. [8]

b) Draw and explain the architecture of SHARC DSP processor. [8]

Q9) a) What is Compounding? How important this process is in audio processing? Explain the Compounding process in brief. [8]

b) What is image enhancement in digital image processing? Explain any two gray level transforms used for image enhancement. [8]

OR

Q10) a) Draw and explain block diagram of compact disk playback system. [8]

b) Explain the operation of CCD (Charge Coupled Device) used in electronic cameras. [8]

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