SP-120

Seat No.	

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T.Y. B.Tech. (Part - III) (Semester - VI) (CBCS) Examination, November - 2023

DIGITAL SIGNAL PROCESSING (ETC)

Sub. Code : 81646

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Day and Date : Monday, 20 - 11 - 2023 **Total Marks : 70**

Time : 02.30 p.m. to 05.00 p.m.

Instructions : **1)** **All questions are compulsory.**

2) **Figures to the right indicate full marks.**

Q1) **Answer following MCQ :** **[14]**

a) Which of the following statement is in correct about DIT- FFT?

i) It requires complex additions of 'N log2N'

ii) The number of input samples is given by 2^i.

iii) The input sequence is represented in bit-reversal order.

iv) The output sequence is represented in bit-reversal order.

b) The advantages of the butterfly structure is :

i) Reduces computation complexity.

ii) Requires a fewer number of multiplications and additions.

iii) Combines the result of small DFTs into larger DFTs.

iv) All of the above

c) Which of the following is/are incorrect about the Cascade realization of the IIR systems?

i) It requires less amount of energy.

ii) It is helpful in determining the overall transfer function.

iii) The filters in the cascade are connected in parallel.

iv) None of the above

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P.T.O.

d) The anti-symmetric condition with M even is not used in the design of which of the following linear-phase FIR filter?

i) Low Pass ii) Band Pass

iii) Band Reject iv) Band stop

e) In this type of designing, the system function of IIR filter is expressed in which form?

i) Parallel form ii) Cascade form

iii) Mixed form iv) None of the above

f) TMS320C6713 processor uses

i) Parallel form ii) Harvard architecture

iii) Von neumann architecture iv) VLIW architecture

g) Which of the following methods are used in sampling rate conversion

i) D/A convertor and A/D convertor

ii) Performing entirely in digital domain

iii) D/A convertor, A/D convertor & Performing entirely in digital domain

iv) None of the above

Q2) Attempt any two : **[14]**

a) Find 8 point DFT of x[n] = {1 0 0 0 0 0 0 0} using DIF radix 2 FFT algorithm.

b) State & explain properties of FIR filter

c) For the analog transfer function $H(S)=\frac{1}{s^2+5s+6}$ determing H(z) using impulse invariant technique.

Q3) Attempt any two : **[14]**

a) Find the output y[n] of a filter whose impulse response is h[n]={ 111 } and input signal x[n] = {3 –1 0 1 3 2 0 1 2 1} using overlap add method.

b) Design a LPF using rectangular window by taking 9 samples of w(n) and with cut-off frequency of 1.2 rad/sec.

c) Explain design procedure of Bilinear transformation Method.

Q4) Attempt any two : **[14]**

a) Obtain the cascade form realization for the system

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

b) Explain applications of multi rate signal processing

c) Compare Fourier transform and Wavelet transform.

Q5) Attempt any two : **[14]**

a) Obtain the parallel form realization for the system

$y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2)$

b) Explain need of multi rate DSP.

c) Explain applications of wavelet transform.

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