

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)

B.Tech.Sem - VI E & TC : : SUMMER - 2022

SUBJECT : DIGITAL SIGNAL PROCESSING

Day : Monday
Date : 13-06-2022

S-13361-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Assume suitable data if necessary.
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Q.1 Basic elements of DSP and its requirement in signal processing. [10]

OR

Explain frequency domain analysis and response of LTI system.

Q.2 Explain the overlap save and overlap add method with suitable example. [10]

OR

Compute DIT-FFT and DIF-FFT of sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$.

Q.3 Design FIR-BPF using Hamming windows [10]

$$H_d(ej\omega) = \begin{cases} 1 & \text{for } \pi/2 \leq |\omega| \leq \pi \\ 0 & \text{otherwise} \end{cases} \quad \text{For } N = 11$$

OR

Determine direct form – I and II realization for the following system

$$y(n) = -0.1y(n-1) + 0.72y(n-2) + 0.7x(n) - 0.252x(n-2).$$

Q.4 Design Butterworth filter which satisfies the following conditions [10]

$$0.7 \leq |H_c(j\omega)| \leq 1 \quad 0 \leq \omega \leq 0.2\pi$$

$$|H_c(j\omega)| \leq 0.3 \quad 0.6\pi \leq \omega \leq \pi$$

OR

Design FIR by IIM method has transfer function

$$H_a(s) = \frac{s+a}{(s+a)^2 + b^2}.$$

Q.5 How to minimizing to finite word length? [10]

OR

What is Arithmetic round off error and how overcome using FFT algorithm?

Q.6 Write short note on: [10]

- | | |
|--------------------|-----------------------|
| a) Bus structure | b) Addressing mode |
| b) Processing unit | d) Address generator. |

OR

What are new design required in DSP processor?

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