QP Code: RN22BTECH265 | Reg. No | | | | | | | | | | | AY 22

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester – Regular) Examinations, November – 2024

22BECPC35003 – Digital Signal Processing

(ECE)

Time: 3 hrs | Maximum: 70 Marks

(The figures in the right-hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Distinguish between linear and circular convolution of two sequences.	CO1	K4
b. What is transposition theorem?	CO4	K1
c. Find the value of x $((n-753))_4$ if x(n)={1,2,-2,4}?	CO2	K3
d. What is SIF of 64-point DFT?	CO2	K5
e. Explain the advantages and disadvantages of FIR filter?	CO3	K2

PART – B **(15 x 4 = 60 Marks)**

Answer ***All*** the questions	Marks	CO #	Blooms Level
2. a. Evaluate the output y(n) of a filter whose impulse response is h(n)= {1,1,1} and input signal x(n)= {3, -1,0,1,3,2,0,1,2,1} using overlap save method.	10	CO1	K5
b. Proof that DFT is a linear transformation.	5	CO1	K3
(OR)			
c. State and prove the Parseval's relation.	5	CO1	K2
d. Find the circular convolution using DFT & IDFT if p(n)= {1,2,3,1} and q(n)= {4,3,2,2}?	10	CO1	K5
3.a. Draw and explain the basic butterfly diagram of DIT-FFT algorithm.	8	CO2	K5
b. Compute the 8-point DFT using DIF-FFT algorithm if x(n)={1,-2,2,3,-1,4}	7	CO2	K4
(OR)			
c. Find the DFT of the given signals using 4-point DFT if g(n)={1,2,0,1} and h(n)={2,2,1,1}	8	CO2	K5
d. Draw the 16-point butterfly structure of DIF-FFT algorithm?	7	CO2	K3
4.a. Find the system function and Draw the linear phase structure and Direct form structure if h(n)={1,-2,3,-1,3,-2,1}	10	CO3	K5
b. Obtain the transfer function of 4th order FIR Filter and draw the direct form structure .	5	CO3	K6
(OR)			
c. Design a FIR filter using Hanning window of length 7 if the desired frequency response is	10	CO3	K6

$$H_d(\omega) = \begin{cases} e^{-j2w} & for -\frac{\pi}{4} \le \omega \le \frac{\pi}{4} \\ 0 & for\ elsewhere \end{cases}$$

d. Draw the Direct form-II structure of 2y(n)-4y(n-2)=4x(n)-3x(n-3)-7y(n-4)	5	CO4	K3

5.a.	Design a digital IIR filter using impulse invariant method and the system function is $$H(s) = \frac{7}{(s+1)(s-5)}$$	10	CO4	K6
b.	Draw the SFG of 3y(n)-4y(n-2)+4x(n)-3x(n-2)-7y(n-3)=0	5	CO4	K3
	(OR)			
c.	Design a digital IIR filter using Bilinear Transformation method with sampling period 2 seconds and the system function is $$H(s) = \frac{2}{(s-3)(s+4)}$$	8	CO4	K6
d.	Establish the relationship between ω and Ω in bilinear transformation method?	7	CO4	K5

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