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Reg. No. : | | | | | | | | | | |

Question Paper Code: 55401

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Fifth Semester

Electronics and Communication Engineering

15UEC501 - DIGITAL SIGNAL PROCESSING

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. If x(n) and X(k) are an N-point DFT pair, then X(k+N) = ? CO1- R

   (a) X(-k) (b) -X(-k) (c) X(k) (d) None of the above

2. In IIR Filter design by the Bilinear Transformation the Bilinear Transformation is a mapping from CO2- R

   (a) Z-plane to S-plane (b) S-plane to Z-plane

   (c) S-plane to J-plane (d) J-plane to Z-plane

3. How many memory locations are used for storage of the output point of a sequence of length M in direct form realization? CO3- R

   (a) M+1 (b) M (c) M-1 (d) None of above

4. What is the model that has been adopted for characterizing round of errors in multiplication? CO4- R

   (a) Multiplicative white noise model (b) Subtractive white noise model

   (c) Additive white noise model (d) None of the mentioned

5. TMS320C5x processor is a _____ bit processor CO5- R

   (a) 8 bit (b) 16 bit (c) 32 bit (d) None of above

PART – B (5 x 3= 15Marks)

6.	Compare and contrast DFT and DTFT.	CO1-U
7.	Differentiate Butterworth and Chebyshev filter.	CO2-U
8.	Write the steps involved in FIR filter design.	CO3-U
9.	Define product round off error	CO4-U
10.	List any two applications of TMS320C5x processor	CO5-U

PART – C (5 x 16= 80Marks)

11.	(a)	Derive and draw the radix -2 DIT algorithms for FFT of 8 points	CO1- App	(16)
		Or		
	(b)	Compute the DFT for the sequence x(n)={1, 2, 0, 0, 0, 2, 1, 1} using radix -2 DIF FFT.	CO1- App	(16)
12.	(a)	Obtain the cascade and parallel form realizations for the following system $y(n) = -0.1y(n-1) + 0.2\,y(n-2) + 3x(n) + 3.6\,x(n-1) + 0.6\,x(n-2)$	CO2- App	(16)
		Or		
	(b)	Design a digital Chebyshev low pass filter satisfying the following specifications $0.707 \leq \lvert H(e^{jw})\rvert \leq 1,\ 0 \leq \omega \leq 0.2\pi$ $\lvert H(e^{jw})\rvert \leq 0.1,\ 0.5\,\pi \leq \omega \leq \pi$ with T= 1 sec using bilinear transformation.	CO2- App	(16)
13.	(a)	Design a high pass filter with Hamming window with a cut-off frequency of 1.2 radians/sec and N=9.	CO3- App	(16)
		Or		
	(b)	Design and implement linear phase FIR filter of length N =15 which has following unit sample sequence H(k) = 1; for k = 0, 1, 2, 3 ; H(k) for k = 4, 5, 6, 7	CO3- App	(16)

14.	(a)	Illustrate limit cycle oscillation. Explain with examples.	CO4- U	(16)
		Or		
	(b)	Explain briefly	CO4- U	(8)
		(i) Effects of coefficient quantization in filter design.		
		(ii) Effects of product round off error in filter design.	CO4- U	(8)
15.	(a)	Explain the architecture of TMS320C5x Digital Signal Processor.	CO5- U	(16)
		Or		
	(b)	Explain briefly	CO5- U	(8)
		(i) Addressing modes of TMS320C5x Processor.		
		(ii) Instruction pipeline	CO5- U	(8)

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