

Day: Wednesday

Time: 02.30 PM TO 05.30 PM

Date: 22/05/2019

S-2019-2743

Max. Marks: 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat diagrams **WHEREVER** necessary.

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- Q.1** a) What is twiddle factor of DFT? Explain its properties. (05)  
b) Compute Circular convolution of following two sequences using matrix method (05)  
 $x(n)=\{1,2,0,1\}$ ,  $h(n)=\{2,2,1,1\}$

**OR**

- Q.1** a) Convolve the following sequences using overlap add method. (07)  
 $x(n)=\{1,-1,2,1,2,1,-1,1,3,2,1\}$   $h(n)=\{2,1,2\}$   
b) State and explain periodicity property of DFT. (03)

- Q.2** a) Draw butterfly diagram for the 8-point DIT-FFT algorithm and compute DFT. (10)  
 $x(n)=\{5,5,5,5,0,0,0,0\}$

**OR**

- Q.2** a) Using 4-point inverse FFT algorithm compute IDFT of the following sequence (06)  
 $X(k)=\{6, -2+2j, -2, -2-2j\}$   
b) Explain briefly Chirp-Z transform algorithm. (04)

- Q.3** The desired frequency response of a low pass filter is given as (10)

$$H_d(e^{j\omega}) = \begin{cases} 1 & 0 \leq \omega \leq \pi/2 \\ 0 & \pi/2 < \omega \leq \pi \end{cases}$$

Find  $h(n)$  using symmetric rectangular window with window length = 7.

**OR**

- Q.3** a) Compare the time domain characteristics of different types of window functions. (06)  
b) Prove that filter with the following response has linear phase response. (04)  
 $h(n) = \{2, 1, 1, 2\}$

- Q.4** If  $H_a(s) = \frac{1}{(s+1)(s+2)}$  find the corresponding  $H(z)$  using impulse invariance (10)  
method for sampling frequency of 5 samples / sec.

**OR**

- Q.4** a) Derive mapping formula for the bilinear transformation techniques. (06)  
b) Explain the stability of impulse invariance method. (04)

- Q.5** a) What are the quantization effects in Analog to digital conversion of signals? (05)  
b) Explain coefficient quantization in direct form realization of FIR filters. (05)

**OR**

- Q.5** a) What is product quantization? (06)  
b) What is meant by limit cycles in recursive structures? (04)

- Q.6** a) Draw and explain the VLIW architecture. (05)  
b) With a neat block diagram explain MAC unit. (05)

**OR**

- Q.6** Draw and explain Architecture of TMS320C6XX in detail. Also enlist features of processor. (10)