B.Tech. SEM -VI Electronics 2014 Course (CBCS) : WINTER - 2018

SUBJECT: DIGITAL SIGNAL PROCESSING

Day: Tuesday
Date: 13/11/2018

W-2018-2478

Time: 10.00 AM TO 01.00 PM
Max. Marks: 60

N.B.:

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

Q.1 Determine 8-point DFT of the sequence using direct computation method. **(10)**

$x(n)=\{1,1,1,1,1,1,0,0\}$

OR

Q.1 a) State and explain following properties of DFT **(04)**
i) Linearity ii) Multiplication

b) Compute Circular convolution of the following sequences using concentric circle method. **(06)**

$x(n)=\{0,1,2,3\}$, $h(n)=\{2,1,1,2\}$

Q.2 Determine DFT of the following sequence using radix-2 DIF-FFT algorithm. **(10)**

$x(n)=\{1,1,1,1,1,0,0,1\}$

OR

Q.2 a) What is twiddle factor? State and explain its properties. **(06)**

b) Explain computational efficiency of Radix-2 FFT algorithm. **(04)**

Q.3 Determine $h_d(n)$ and $H(e^{j\omega})$ of the digital filter with the desired frequency response **(10)**

$$H_d(e^{j\omega}) = 0 \quad ; \quad -\frac{\pi}{4} \le \omega \le \frac{\pi}{4}$$

$$e^{-2j\omega} \quad ; \quad \frac{\pi}{4} \le |\omega| \le \pi$$

$$w(n) = 1 \; ; \quad 0 \le n \le 5$$
$$= 0; \quad \text{otherwise}$$

OR

Q.3 a) A digital filter has the following impulse response $h(n)=\{-3,2,1,-2,3\}$. If it is linear phase, Justify. **(05)**

b) What are the desirable features of FIR filter? **(05)**

Q.4 Derive mapping formula for Bilinear transformation method for IIR filter. What is warping effect? **(10)**

OR

Q.4 a) What are advantages and disadvantages of bilinear transformation method? **(05)**

b) What is mapping procedure between S-plane and Z-plane? **(05)**

P.T.O

Q.5 **a)** Explain the errors which arise due to the quantization process. **(05)**

b) What is coefficient quantization error? **(05)**

OR

Q.5 **a)** Why rounding is preferred error to truncation in realizing digital filter? **(05)**

b) What do you mean by overflow oscillation? **(05)**

Q.6 **a)** What are the differences between fixed type and floating type processors? **(05)**

b) Describe the various addressing modes used in TMS 320 C6XX processor. **(05)**

OR

Q.6 Draw and explain architectural block diagram of TMS320C6XX processor. **(10)**

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