B.TECH. SEM -VI ELECTRONICS 2014 COURSE (CBCS) :
SUMMER - 2018
SUBJECT: DIGITAL SIGNAL PROCESSING

Day: **Friday** Time: **02.30 PM TO 05.30 PM**
Date: **01/06/2018** **S-2018-2423** Max Marks: 60

N.B:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non- programmable **CALCULATOR** is allowed.
4) Assume suitable data if necessary.

Q.1 Convolve the following sequences using overlap- add method. **(10)**

x(n)= (1,-1,2,1,2,-1,1,3,1} and h(n)= {1,2,1}

OR

a) Find the 4- point DFT of the sequence **(05)**

$$x(n) = \cos\left(\frac{n\pi}{4}\right) = \{1,\ 0.707,\ 0,\ -0.707\}$$

Using direct computation method.

b) State and explain any two properties of DFT. **(05)**

Q.2 Using DIF- FFT algorithm , find DFT X (K) of the sequence **(10)**

x(n)= {1,2,3,4,5,6,7,8 } & N=8

OR

a) Give the computation efficiency of FFT over DFT. **(05)**
b) Write a short note on Geoertzel Algorithm **(05)**

Q.3 The desired frequency response of FIR filter is **(10)**

$$H_d(\omega) = \begin{cases} e^{-j3\omega} & \frac{-\pi}{4} \le \omega \le \frac{\pi}{4} \\ 0 & \frac{\pi}{4} < |\omega| \le \pi \end{cases}$$

Determine the filter coefficients if the window function is defined as

$$w(n) = \begin{cases} 1 & 0 \le n \le 5 \\ 0 & \text{elsewhere} \end{cases}$$

OR

a) Explain in detail Gibb's phenomenon. **(05)**
b) Discuss the direct form realization of FIR filters. **(05)**

Q.4 **a)** Obtain cascade realization of the system characterized by the transfer function. **(05)**

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}$$

b) Compare bilinear transformation method with impulse invariance technique. **(05)**

OR

Q.4 Using impulse invariance technique convert the analog filter into a digital filter whose system function is **(10)**

$$H(s) = \frac{(s+0.2)}{(s+(0.2)^2+9}$$

P.T.O

Q.5 **a)** Explain in detail overflow limit cycles. **(05)**

b) Obtain an expression for the variance of the round off quantization noise. **(05)**

OR

Discuss coefficient quantization in IIR filters. **(10)**

Q.6 **a)** Compare fixed point & floating point DSP processor. **(05)**

b) Explain the necessity of MAC in DSP processor. **(05)**

OR

With a neat block diagram explain the architecture of TMS 320C67XX DSP processor. **(10)**

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