

Time: 03 Hours

Marks: 80

N.B.

- 1) Question number ONE is compulsory.
- 2) Attempt any THREE questions from remaining questions.
- 3) All questions carry equal marks.

Q1] Answer any four questions

- a) Compare Butterworth and Chebyshev filters. 5
- b) Compare FIR and IIR filters. 5
- c) Compute the DFT of the sequence  $x(n) = \{0, 1, 2, 1\}$  5
- d) What is Frequency prewarping in Bilinear transformation method? Why it is required. 5
- e) Explain the speed improvement in calculating the DFT using FFT. 5

Q2] a) Find DFT of the following sequence using DIT FFT algorithm.

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

b) Find the circular convolution of the two finite duration sequences 10

$x_1(n) = \{1, -1, -2, 3, -1\}$   $x_2(n) = \{1, 2, 3\}$

Q3] a) Design a Butterworth digital IIR low pass filter using Bilinear transformation by taking  $T=1$  second, to satisfy the following specifications.  $0.707 \leq |H(e^{j\omega})| \leq 1.0 : 0 \leq \omega \leq 0.2\pi$

$|H(e^{j\omega})| \leq 0.08 : 0.4\pi \leq \omega \leq \pi$  10

b) Given that,  $H(s) = 1/(S+1)$ . By impulse invariant method, obtain the digital filter transfer function  $y(n)$ . 10

Q4] a) Explain different addressing modes of TMS 320 c67XX. 10

b) Explain VLIW architecture in detail. 10

Q5] a) Design a linear phase FIR highpass filter using hamming window, with a cutoff frequency,  $\omega_c = 0.8\pi$  rad/sample and  $N = 7$  10

b) Explain Frequency sampling method of designing FIR filter? 10

Q6] Write short notes on (any two)

- a) Effect of quantization in computation of DFT. 10
- b) Application of DFT to Radar signal Processing. 10
- c) Gibbs Phenomenon. 10