

Q.P. Code : 6432

(3 Hours)

[Total Marks : 80

- N.B. : (1) Question No.1 is compulsory.
 (2) Answer any three questions from remaining five question.
 (3) All questions carry equal marks.

1. (a) Justify: In impulse invariance transformation method there is many to one mapping of poles from s-plane to z-plane. 5
- (b) Find the number of computations required to compute 32 point DFT using direct calculation and by using FFT algorithm. Also find the computational complexity. 5
- (c) Compare DSP processor and microprocessor. 5
- (d) Compare fixed point arithmetic and floating point arithmetic. 5
2. (a) Find the DFT of the following sequence using Radix 2 DIF FFT algorithm 10
 $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$
- (b) Compute the circular convolution of the sequences using DFT and IDFT approach. 10
 $x_1(n) = \{1, 2, 0\}$
 $x_2(n) = \{2, 2, 1, 1\}$
3. (a) Design a Low pass FIR filter with 11 coefficients for the following specifications. Passband frequency edge = 0.25KHz and sampling frequency = 1 KHz 10
 Use rectangular window in the design.
- (b) Explain frequency sampling method of designing FIR filter. 10
4. (a) Use bilinear transformation to obtain a digital filter of notch frequency 75Hz and sampling frequency of 200 Hz, for a given normalized second order filter having transfer function $H(S) = \frac{S^2 + 1}{S^2 + S + 1}$ 10
- (b) Design a Butterworth lowpass filter to meet the following specifications. 10
 Passband gain = 0.89
 Passband frequency edge = 30Hz
 Attenuation = 0.20
 Stopband edge = 75Hz

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5. (a) Explain with neat diagram architecture of TMS320C67XX DSP processor. 10
(b) Explain the applications of the DSP processor in following fields. 10
(i) Radar signal processing
(ii) Speech recognition.

6. (a) Draw the quantization noise model for second order system. 10

$$H(z) = \frac{1}{1 - 2r \cos \theta z^{-1} + r^2 z^{-2}}$$

find the steady state output noise variance.

- (b) Explain the following terms. 3
(i) Dead band 3
(ii) Limit cycle oscillations 3
(iii) Addressing modes of TMS320C67XX processor. 4