

C 47604

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Name.....

Reg. No.....

**SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, JUNE 2008**

EC/AI/IC/BM 04 602—DIGITAL SIGNAL PROCESSING

(2004 admissions)

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

Part A

- I. (a) Find the discrete Fourier series representation of the periodic sequence $x(n) = \{1, 0, 1, 0\}$ with period $N = 4$ samples.
- (b) Explain what is meant by in-place computation with reference to FFT algorithm.
- (c) Compare cascade realizations with parallel realizations.
- (d) Explain what is meant by limit cycle oscillations.
- (e) Explain the advantages of FIR filter.
- (f) Explain what is meant by warping effect.
- (g) Draw the block diagram of hard ware multiplier accumulator and explain.
- (h) Explain the basic requirements of special-purpose DSPs.

(8 × 5 = 40 marks)

Part B

- II. (a) (i) Explain how do determine linear filtering operation using DFT.
- (ii) State and prove convolution property of DFT.

Or

- (b) Derive decimation-in-frequency, radix-2, FFT algorithm for evaluating DFT coefficients.

- III. (a) Obtain lattic structure for the discrete-time system described by the difference equation :

$$y(n) = 2x(n) - 5x(n-1) + 3x(n-2).$$

Or

- (b) Explain the effects of quantization of filter coefficients in FIR filters.

- IV. (a) Draw the basic hardware architecture for signal processing system and explain.

Or

- (b) Draw the flow-chart for the operation of FIR filter and explain.

Turn over

V. (a) Explain the design of FIR filters using frequency sampling technique.

Or

(b) (i) Derive the formula for obtaining order of standard Butterworth filter. (7 marks)

(ii) Convert the following analog transfer function into digital using bilinear transformation with sampling time $T_s = 1$ sec.

$$H(s) = \frac{1}{(s+1)(s+3)}$$

(8 marks)

[4 × 15 = 60 marks]

