C 6264 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2005

EC/AI/IC2K 604. DIGITAL SIGNAL PROCESSING

(New Scheme)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

1. (a) Explain how do determine linear convolution using DFT.
   (b) What is FFT ? Why it is needed ? Explain.
   (c) Draw the direct form-I representation of second order system and explain.
   (d) Explain about saturation overflow.
   (e) Explain the properties of Butterworth filters.
   (f) Explain the design of FIR filter using Kaiser window function.
   (g) Explain the pipelining operations of DSP.
   (h) Compare TMS 320 familiy with motorolar DSP 56000 family.

   (8 × 5 = 40 marks)

2. (a) (i) Find the DFS of $x(n) = \{1, 1, 0, 0\}$ with period N = 4. (7 marks)
   (ii) Find the 4-point DFT of $x(n) = \{1, 2, 3\}$. (8 marks)

   Or

   (b) Derive the decimation-in-time radix-2 FFT algorithm for evaluating DFT coefficients of the given N point sequence and plot signal flow graph for N = 8.

3. (a) Obtain cascade and parallel realization of the system having transfer function.

$$H(z) = \frac{\left(1 - z^{-1}\right)^3}{\left(1 - \frac{1}{2}z^{-1}\right)\left(1 - \frac{1}{8}z^{-1}\right)}.$$

   Or

   (b) Explain finite word length effects in digital IIR filters.

4. (a) (i) Describe bilinear mapping techniques for designing IIR filter.
   (ii) Convert the following analog filter into digital using bilinear mapping :—

$$H(s) = \frac{2}{(s+1)(s+2)}; \text{ assume } T = 1 \text{ sec.}$$

   Or

Turn over

(b) Design a digital low-pass FIR filter with cut-off frequency at 0·2 rad./sec. The filter ord N = 11. Use the Hanning window function.

(a) Explain the architecture of TMS 320 C50 DSP processor with neat block diagram.

Or

(b) Explain the special instructions of DSP processor with examples.

(4 × 15 = 60 m