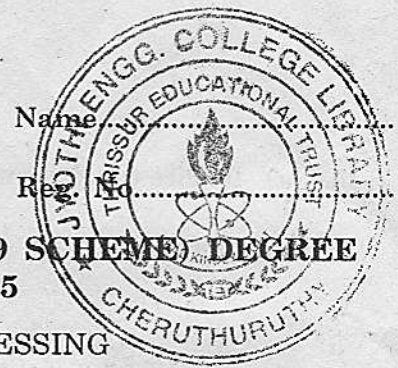


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SEVENTH SEMESTER B.TECH. [ENGINEERING] (09 SCHEME) DEGREE
EXAMINATION, NOVEMBER 2015

EE/PTEE 09 703—DIGITAL SIGNAL PROCESSING

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. What is the difference between DFT and DTFT ?
2. How many number of multiplication required for 4 point DFT ?
3. What are the different types of structures for realization of IIR filter ?
4. Distinguish between FIR and IIR filters ?
5. What is product quantization error ?

(5 × 2 = 10 marks)

Part B

Answer any four questions.

6. Find DFT of the sequence $x(n) = \{1, 2, 3, 0\}$ using DIF algorithm.
7. Explain in detail about Direct form II realization.
8. Write short notes on lattice to direct form structure.
9. Design an ideal band-pass filter with frequency response

$$H_d(e^{j\omega}) = 1 \text{ for } \pi/4 \leq |\omega| \leq 3\pi/4$$
$$= 0 \text{ otherwise.}$$

Find the value of $h(n)$ for $N = 11$.

10. Write short notes on overflow limit cycle oscillations.
11. Explain in detail about Multiply Accumulate Unit (MAC).

(4 × 5 = 20 marks)

Part C

Answer all questions.

12. (a) Compute the eight-point DFT of the sequence $x(n) = \{0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0\}$ using the in place radix-2 DIT algorithm.

Or

- (b) Explain in detail about overlap add method of convolution.

Turn over

13. (a) Realize the system given by difference equation

$$y(n) = -0.1 y(n-1) + 0.72 y(n-2) + 0.7 x(n) - 0.252 x(n-2) \text{ in parallel form.}$$

Or

- (b) An FIR filter is given by the difference equation

$$y(n) = 2 x(n) + 4/5 x(n-1) + 3/2 x(n-2) + 2/3 x(n-3).$$

14. (a) Design a third order Butterworth digital filter using impulse invariant technique. Assume sampling period $T = 1$ sec.

Or

- (b) Write short notes on design of FIR filters using windows.

15. (a) Consider the transfer function $H(z) = H_1(z)H_2(z)$ where $H_1(z) = \frac{1}{1 - a_1 z^{-1}}$ and

$$H_2(z) = \frac{1}{1 - a_2 z^{-2}}.$$

Assume $a_1 = 0.5$ and $a_2 = 0.6$ and find the output roundoff noise power

Or

- (b) Explain the architecture of TM320 C54X DSP Processor.

(4 × 10 = 40 marks)