D 90276 (Pages : 2) Name.....

Reg. No.....

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

$H_d(e^{jw})=1$ for $\pi/4 \le |w| \le 3\pi/4$

$=0$ 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

$$y(n) = -0.1\, y(n-1) + 0.72\, y(n-2) + 0.7\, x(n) - 0.252\, x(n-2)$$ 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 $H_1(z) = \dfrac{1}{1 - a_1\, z_{-1}}$ and

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

Assume a1 = 0.5 and a2 = 0.6 and find the output roundoff noise power

Or

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

(4 × 10 = 40 marks)