B 349

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Sixth Semester

Electrical and Electronics Engineering

EE 337 — DIGITAL SIGNAL PROCESSING

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is seismic signal?

2. What is Hilbert transform?

3. What are the basic operations on a sequence?

4. What is ROC?

5. Define DFT and Inverse DFT.

6. What is the difference between circular convolution and linear convolution?

7. State sampling theorem.

8. What are the different methods available for A/D converters?

9. Draw a basic FIR filter structure.

10. What is bilinear transformation?

PART B — (5 × 16 = 80 marks)

11. (i) Explain how do you generate complex signal from real signal. (8)

(ii) Explain any two application of signal processing. (8)

12. (a) (i) Derive the z–transform of $\cos wn\, u(n)$. (8)

(ii) Find the inverse z–transform of $\dfrac{z(z+2)}{(z^2+0.4z-1.2)}$. (8)

Or

(b) Find the output of the system described by the input output relation $y(n) = 5y(n-1) - 6y(n-2) + x(n-1) - x(n-2)$ for the step input.

13. (a) Derive and draw the flow chart for DIT–FFT flow chart.

Or

(b) Find the DFT coefficient of the input sequence $x(n) = \{1, 1, 1, 1, 1, 1, 1, 1\}$.

14. (a) (i) Explain Nyquist sampling theorem. (10)

(ii) Illustrate the concept of antialaising filters. (6)

Or

(b) (i) Explain sample and Hold circuit. (8)

(ii) Explain R–2 R network of D/A converter. (8)

15. (a) (i) Convert a second order analog filter into an equivalent digital filter using bilinear transformation. $H(s) = 1/s^2 + \sqrt{2}\, s + 1$. Assume $T_s = 1$. (8)

(ii) Explain the impulse invariant method. (8)

Or

(b) Design a FIR filter of order 7 using triangular window.

$$|H(jw)| = \begin{cases} 1 & \text{for } |w| \leq \pi/2 \\ 0 & \text{for } \pi/2 < |w| < \pi \end{cases}$$