Reg. No. :

Question Paper Code : S 4652

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Sixth Semester

Mechatronics Engineering

EE 351 — DIGITAL SIGNAL PROCESSING

(Regulation 2001)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the disadvantages analog signals processing?
2. Define symmetric and antisymmetric signal.
3. What is meant by dynamic system?
4. What is ROC in Z-transform?
5. Distinguish between DFT and FFT.
6. Write any two properties of DFT.
7. What is the role of reconstruction filter?
8. What is aliasing effect?
9. What is meant by linear phase response in filter?
10. Draw the direct form structure of IIR filter.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the various operations performed on discrete time signals. (8)

(ii) Explain the various classes of signals with example. (8)

Or

(b) Discuss the merits, demerits and applications of digital signal processing. (16)

12. (a) Find whether the following system is

(i) causal

(ii) static

(iii) linear

(iv) stable and

(v) time invariant

$$y(n) = nx^2(n).$$

(16)

Or

(b) Find the Z-Transform and ROC of the following discrete time signal.

$$x(n) = [-1/5]^n u(n) + 5[1/2]^{-n} u(-n-1).$$

(16)

13. (a) Find 8-point DFT of the following sequence using DIT Radix-2 algorithm.

$$x(n) = (0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0).$$

(16)

Or

(b) Find DFT of the following sequence if N = 8.

$$x(n) = 1; 0 \le n \le 2$$

$$= 0; \text{ otherwise.}$$

14. (a) Explain the process of analog to digital conversion with block diagram in detail.

(16)

Or

(b) Discuss different types of digital to analog converters. (16)

15. (a) What are the desirable characteristics of the window? Explain design procedures FIR filter using windows. (16)

Or

(b) Obtain direct form-I and direct form-II structures for the following system.

$$y(n) = \frac{1}{2} y(n-1) + \frac{1}{4} y(n-2) + x(n) + x(n-1).$$

(16)