Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Z 6059

M.E. DEGREE EXAMINATION, MAY/JUNE 2008.

First Semester

Control and Instrumentation

CI 1602 — DIGITAL SIGNAL PROCESSING

(Common to M.E. – Power Systems Engineering, M.E. – Power Electronics and Drives and M.E. – Embedded System Technologies)

(Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define a Causal system.

2. State the time-shifting property of DTFT.

3. Define R.O.C. of z-transform.

4. List the different types of structures for the realisation of IIR system.

5. What are the advantages of FIR filters?

6. What is the relation between digital and analog frequency in Bilinear transformation?

7. What are the steps involved in A to D conversion?

8. What is round off error in processor?

9. Explain the fixed point representation of binary numbers.

10. Define 'Convolution'.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Test the causality of the following systems :

(1) $y(n) = x(n) + 3x(n+4)$

(2) $y(n) = x(2n)$

(3) $y(n) = x(n^2)$

(4) $y(n) = x(-n)$. (8)

(ii) Test the stability of the first order IIR filter governed by the equation, $y(n) = x(n) + by(n-1)$ where, $|b| < 1$. (8)

Or

(b) State and prove any four properties of Discrete Time Fourier Transform. (16)

12. (a) Explain neatly with butterfly diagram, DIT–FFT algorithm. (16)

Or

(b) What is windowing technique? Explain on Hanning window. (16)

13. (a) Explain the design techniques of Digital filter transformation from analog LPF filter. (16)

Or

(b) Explain (i) bilinear transformation technique and (ii) impulse invariance method. (16)

14. (a) (i) What are digital filter banks? Explain. (8)

(ii) Explain the process of A to D conversion. (8)

Or

(b) (i) Write short notes on wavelets. (8)

(ii) Distinguish between wavelet transform and STFT. Explain some applications of wavelet transform. (8)

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15. (a) (i) Write notes on fixed point and floating point representation of numbers. (8)

   (ii) Write down the assembly language program for performing correlation of the sequences using TMS320C50 processor. (8)

Or

   (b) (i) Explain in detail about a TMS320C54 processor. (10)

   (ii) Write an assembly language program to perform multiplication using TMS320C54 processor. (6)

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