PSELT303.1 - Paper-III : Digital Signal Processing

P. Pages : 2

Time : Three Hours

Max. Marks : 80

1430

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Notes :   1.   All questions are compulsory and carry equal marks.
          2.   Draw well labeled diagrams wherever necessary.
          3.   Use of calculator is allowed.

Either:

1. a) Define a system. Draw a block diagram to represent a system and describe it.   **8**

    b) Explain the stability and causality criterion for LTI system.   **8**

OR

    c) Define: **8**

        i)   Static system

        ii)   Dynamic system

        iii) Causal system

        iv)   Non casual system

    d) Which of the following systems are LTI system? Justify.   **8**

        i) $y[n] = x\left[n^2\right]$

        ii) $y[n] = x^2[n]$

    Either:

2. a) Discuss the properties of Region of Convergence (RoC).   **8**

    b) Plot pole/zero pattern of the following z-transform equation.   **8**
        $$x(z) = \frac{z}{3} + \frac{1}{3} + \frac{z-1}{3}$$

OR

    c) What is z-transform? State its properties.   **8**

    d) Describe inverse z-transform and its method.   **8**

Either:

3. a) What is digital filter? Draw the block diagram of digital filter and explain. **8**

b) Describe the difference between FIR and IIR filter. **8**

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OR

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c) Draw low pass filter of length M=61 with pass band edge frequency fp=0.1 and stop band edge frequency fs = 0.15. **8**

d) Design band pass filter of length M=32 with pass band edge frequencies fp1 = 0.2 and fp2 = 0.35 and stop band edge frequencies fs1 = 0.1 and fs2 = 0.425. **8**

Either:

4. a) Draw a block diagram of Motorola DSP 56000 family. Explain ALU and memory in it. **8**

b) Describe echo effect introduced in music. **8**

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OR

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c) Explain the various types of DSP processors with examples. **8**

d) Describe the flange effects introduced in music. **8**

5. a) What is zero input response? Explain it in brief. **4**

b) State the properties of Fourier transform. **4**

c) Name different types of window techniques. **4**

d) Explain the chorus effect in music. **4**

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