

M.Sc. F.Y. (Electronics) CBCS Pattern Semester-III  
**PSELT303.1 - (DSE-I) Paper-III : Digital Signal Processing**

P. Pages : 1

Time : Three Hours



**GUG/W/23/11255**

Max. Marks : 80

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

**Either:**

1. a) Explain Linear Time Invariant Systems in details. 8
- b) Define a rectangular window and derive the frequency response of the rectangular window. 8

**OR**

- c) Consider the LTI system:  $y(n) = x(n) + x(n-1) - 2x(n-2) - 4x(n-4)$  8  
Determine direct form-II realization for the given system.
- d) Explain any four properties of Discrete Fourier Transform (DFT). 8

**Either:**

2. a) Write a short note on chirp Z transform algorithm and its advantages. 8
- b) Explain any four properties of Fourier transform. 8

**OR**

- c) Explain pole zero plot. 8
- d) Explain the inverse z-transform and its methods. 8

**Either:**

3. a) Give advantages and disadvantages of FIR filters. 8  
State and explain at least three characteristics of FIR filters.
- b) Explain Kaiser window filter design method. 8

**OR**

- c) Explain Cascade form realization of FIR Filters. 8
- d) Explain Fourier series method of FIR filter design. 8

**Either:**

4. a) What are the applications of DSP? How does a DSP chip work? 8
- b) What is the use of DSP processors in real world applications? 8

**OR**

- c) Explain architecture of DSP processors. 8
- d) Explain implementation of noise removal techniques in DSP processors. 8

5. Attempt the following.

- a) State the difference between DFT and DTFT. 4
- b) What is Fourier series method? 4
- c) Explain echo and chorus effects introduced in music. 4
- d) Explain frequency sampling method in FIR filter design. 4

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