M.Sc. - I (Electronics) (NEP Pattern) Semester-II

PSCELT204-2 - Elective-I Paper-IV : Digital Signal Processing

P. Pages : 2 **GUG/S/25/15373**

Time : Three Hours * 3 0 2 2 * Max. Marks : 80

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw neat and well-labelled diagrams wherever necessary.

Either:

1. a) Explain the characteristics of discrete-time sinusoidal signal. **8**

b) Explain the properties of discrete time signals. **8**

OR

c) Explain the linear and nonlinear system. **8**

d) Perform convolution sum using the mathematical equation of convolution. **8**

Given: $h[n] = \{1, \underset{\uparrow}{2}, 1, -1\}$, $x[n] = \{\underset{\uparrow}{1}, 2, 3, 1\}$

Either:

2. a) Explain any four properties Fourier Transform. **8**

b) Find the Fourier Transform of $e^{-at}u(t)$. **8**

OR

c) Explain any four properties of z-transform. **8**

d) Find Z transform of $x_1[n] = \alpha^n u[n]$ and draw ROC. **8**

Either:

3. a) Discuss the steps to design FIR filter. **8**

b) Explain IIR filter design using impulse invariant method. **8**

OR

c) Explain the Fourier Series Method for designing FIR filter. **8**

d) Discuss the windowing technique for designing FIR filter. **8**

Either:

4. a) Explain the Harvard Architecture of DSP. **8**

b) Discuss the type of DSP processor. **8**

OR

c) Discuss the key feature of DSP TMS320C54X family. **8**

d) How does the flange effect introduced in music? Explain it. **8**

5. Attempt the followings:

a) Find the Fourier transform of unit step function. **4**

b) Discuss twiddle factor. **4**

c) Differentiate between FIR and IIR filter. **4**

d) State the application of DSP. **4**

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