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DFI1350

Digital Signal Processing & Processors
(New) (1230)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **all** questions.
5. Assume suitable data if necessary.
6. Use of non - programmable calculator is allowed.
7. Figures to right indicate full marks.

UNIT - I

1. a) Classify the different types of discrete time system giving examples for each. **10**
b) Determine whether system is causal and stable $h(n)=3^n u(1-n)$. **10**
c) Explain echo cancellation over telephone channels in details. **10**

UNIT - II

2. a) Find the Z - transform of the following discrete time signals and find ROC for given signal $x(n)=\left(-\frac{1}{5}\right)^n u(n)+5\left(\frac{1}{2}\right)^{-n} u(-n-1)$. **10**
c) Explain the various properties of Z - transforms. **10**
c) Determine the unit step response of DT - LTI system described by the following difference equation for $n \geq 0$.
 $y(n)+3y(n-1)=x(n)$ where $y(-1)=1$. **10**

UNIT - III

3. a) Find DFT of a sequence $x(n) = \{1, 1, 0, 0\}$ and also find IDFT of $y(k) = \{1, 0, 1, 0\}$. 10
- b) What is dirichlet condition. Explain energy density spectrum of a periodic signal. 10
- c) Compute 8 point DFT of a sequence $x(n) = \{1, 1, 0, 0, 0, 0, 1, 1\}$. 10

UNIT - IV

4. a) Obtain direct I and direct II form realization for the system function. 10
- $$H(z) = \frac{2(1 - z^{-1})(1 + \sqrt{2} z^{-1} + z^{-2})}{(1 + 0.5z^{-1})(1 - 0.9z^{-1} + 0.81z^{-2})}$$
- b) Discuss windowing technique. Describe any two windows in detail. 10
- c) Convert the analog filter with system function. 10

$$H(s) = \frac{s + 0.1}{(s + 0.1)^2 + 9}$$

Into digital IIR filter using bilinear - transformation. The digital filter should have a resonant frequency of $\omega_r = \pi/4$.

UNIT - V

5. a) Explain the features of TMS 320C62XX DSP processor. 10
- b) Compare DSP processors and microprocessor. 10
- c) List the functional units in C6X and explain the function performed by each of them. 10
