Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

MEPS-301(B)

M.E./M.Tech., III Semester

Examination, June 2016

DSP and Its Application (Elective-I)

Time : Three Hours

Maximum Marks: 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) State the sampling theorem in time domain. Explain the aliasing effect.
   b) What are continuous time and discrete time signals and systems? What do you mean by linearity and time invariance of these systems?

2. a) State and prove the following properties of Z-transform:
      i) Time shifting
      ii) Differentiation in Z-domain
   b) Determine the inverse Z-transform of :

$$\frac{1}{1-1.5z^{-1}+0.5z^{-2}}$$

when
i) ROC : $|Z|>1$
ii) ROC : $|Z|<0.5$

3. a) Compute the N-point DFT of the signal :

$$x(n)=\sin\frac{2n}{N}K_o n,\ 0\le n\le N-1$$

   b) Compute the eight point DFT of the sequence :

$$x(n)=\begin{Bmatrix}1\ , & 0\le n\le 7\\ 0\ , & otherwise\end{Bmatrix}$$

by using the decimation in frequency FFT algorithm.

4. a) Compare the computational complexities of DFT and FFT.
   b) Compute the FFT of the following sequence
$X(n)=\{1, 1, -1, -1, 1, 1, -1, -1\}$

5. a) Design a normalized linear phase FIR filter having the phase delay of T= 4 and atleast 40db attenuation in the stop band. Also obtain the magnitude/frequency response of the filter.
   b) Compare the performance of FIR and IIR filters.

6. a) Discuss the design of IIR digital filters using Butter worth approximation. Draw and explain its frequency response characteristics.
   b) Explain the design of FIR digital filter using window method. Explain various types of windows used in the window design method.

7. a) Describe the architecture and organization of any DSP chip.
   b) Discuss about the application of DSP in image processing.

8. a) Draw the architecture of TMS320 C5x family DSP processor and explain.
   b) Explain the biotelemetry receiver system with the help of schematic diagram.

******