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

Roll No .....

EC-603

B.E. VI Semester

Examination, June 2017

Digital Signal Processing

Time : Three Hours

Maximum Marks : 70

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

1. Determine the impulse response for the systems given by following difference equation.

$$y(n)+3y(n-1)+2y(n-2)=2x(n)-x(n-1)$$

2. Determine H(z) and its poles and zeros if

$$y(n)+\frac{3}{4}y(n-1)+\frac{1}{8}y(n-2)=x(n)+x(n-1)$$

3. Derive the Z-transform of $f(nT)=\sin \omega nT$.

4. Obtain the z-transform of $x(n)=-a^n u(-n-1)$. Sketch the ROC.

5. Find Fourier transform of $f(t)=e^{-at}\cos bt$

6. Find Fourier transform of

$$f(t)=\sin(\omega ct+\theta)$$

7. Find the N-point DFT for $x(n)=a^n$ for $0<a<1$.

8. Answer any four of the following:
   a) Digital filter characterized by the difference equation.

   $y(n)=x(n)+e^{\alpha}y(n-1)$ check the filter for BIBO stability.
   b) Explain the properties of Z-transform.
   c) What is circular convolution.
   d) Determine the DFT of the sequence

$$x(n)=\begin{cases}1/5 & \text{for } -1\le n\le 1\\ 0 & \text{otherwise}\end{cases}$$

   e) Why filtering is performed in DSP.
   f) What are the requirements to design FIR filter.

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