

Code: 9A04603

**R09/SS**

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2016

**DIGITAL SIGNAL PROCESSING**

(Electrical &amp; Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 Check for causality and stability of following systems:
  - (a)  $y(n) = x(n) + x(n-1) + x(n-2)$
  - (b)  $y(n) - 2y(n-1) = x(n)$
- 2 Given the two sequences of length '4' as under:  
 $x(n) = \{0, 1, 2, 3\}$   
 $h(n) = \{2, 1, 1, 2\}$ .  
Verify the answer using DFT method.
- 3
  - (a) What are the twiddle factors? Explain
  - (b) Find DFT of sequence using DIT-FFT:  
 $x(n) = \{1/2, 1/2, 1/2, 1/2, 0, 0, 0, 0\}$
- 4 State and prove following properties of z-transform
  - (a) Time shifting.
  - (b) Multiplication in time domain.
  - (c) Scaling in z-domain.
- 5
  - (a) Compare Butter worth and Chebyshev filter approximations.
  - (b) Use Bilinear Transformation method to find  $H(z)$  for:  
 $H(s) = 1 / (s + 0.5)^2$
- 6
  - (a) Explain the Type – I frequency sampling method of designing FIR filter.
  - (b) Explain the Gibb's phenomenon.
- 7 Implement a two stage decimator for the following specifications. Sampling rate of the input signal = 21,000 Hz  
 $M=100$   
Pass band = 0 to 50 Hz  
Transition band = 50 to 70 Hz  
Pass band ripple = 0.01  
Stop band ripple = 0.002
- 8
  - (a) Discuss about musical sound processing.
  - (b) With necessary block diagrams explain about Discrete Multi Tone transmitter.

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