

MEDC-103**M.E./M. Tech. I Semester**

Examination, December 2012

DSP Application*Time : Three Hours**Maximum Marks : 70**Note:* Attempt any five questions. All questions carry equal marks.

1. a) Examine the following system with respect to static, linear, time invariant, causality and stability.

i) $y(n) = \sum_{k=-\infty}^{n+1} x(k)$

ii) $y(n) = \sin n[x(n)]$

iii) $y(n) = x(n^2)$

iv) $y(n) = x(n) \cos(w_0 n)$

- b) Determine the impulse response $h(n)$ for the system described by second order difference equation.

$$y(n) - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1)$$

2. a) Determine the z-transform of the following signals.

i) $x(n) = -na^n u(-n-1)$

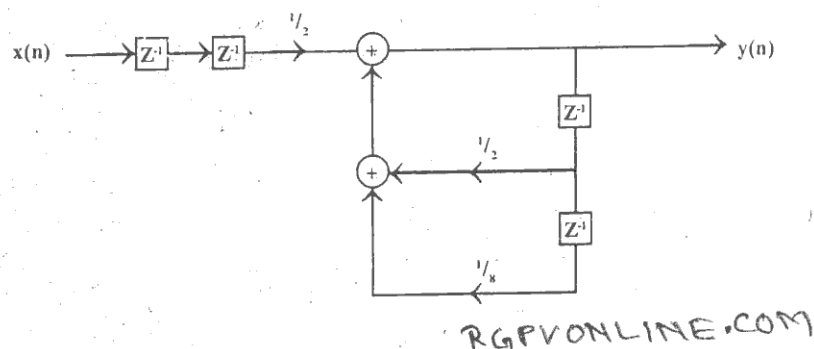
[2]

ii) $x(n) = \sum_{k=-\infty}^n y(k)$

- b) Determine all possible signals $x(n)$ associated with the z-transform.

$$x(z) = \frac{5z^{-1}}{(1-2z^{-1})(3-z^{-1})}$$

3. a) Determine the impulse response and the unit step response of the system shown in fig. 1.



- b) Discuss about different types of realization of discrete time system.

4. a) Discuss the following properties of DFT
- Circular symmetries of a sequence.
 - Symmetric property

- b) Derive a signal flow graph for the N=16 point, radix-4 decimation in time FFT algorithm.

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- Discuss the impulse invariance method for designing IIR filter.
 - Explain the designing of Discrete time chebychey IIR filter.
- Discuss the designing of FIR filter using Bartlett window.
 - Discuss the effect of finite register length in filter design.
- How is the energy density spectrum computed for a deterministic signal of a finite sequence of data.
- Write short notes on any Two of the following:
 - Multirate signal processing.
 - Haar transform
 - Recursive and Non recursive system.

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