SUBJECT CODE:- 308
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EEE/EEP/EE) Examination Nov/Dec 2015
Digital Signal Processing
(Revised)
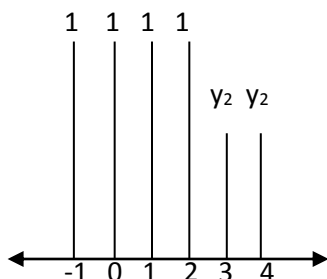
[Time: Three Hours]   [Max. Marks: 80]

"Please check whether you have got the right question paper."

N.B   i) Solve ant three questions from each section.
         ii) Assume suitable data wherever necessary.

Section A

Q.1   a) Consider the analog signal. $x_a(t) = 3cos. 100\pi t$ 07
          1) Determine the minimum sampling rate required to avoid aliaing
          2) Suppose that the signal is sampled at the rate Fs=200Hz. What is the discrete time. Signal obtained after sampling?
          3) What is the discrete time signal if the above signal is sampled at Fs=75Hz?
       b) Define following terms with suitable example   06
          1) Signal 2) System 3) Signal Processing

Q.2   a) State and explain sampling Theorem.   07
       b) Differentiate following signals with suitable example.   06
          1) Multichannel and multidimensional signals.
          2) Continuous time and discrete time signals.
          3) Continuous value and discrete value signals

Q.3   a) A discrete time signal is shown in fig. 1 sketch following signals.   07
          1) X(n-2).
          2) X(4-n).
          3) X(n-1) 8(n-3)
          4) X(n) u(2-n).

                                                                                                   06

       b) Prove the following equation $TD \{FD (x(n))\} \neq FD \{TD (x(n))\}$.
          where TD – time –delay operation
                   FD – folding operation

Q.4   a) Find the z-transform & ROC of the following sequence. $x(n) = a^n u(n) + b^n u(-n-1)$ 07
       b) State and prove any three properties of Z- transform.   06

Q.5 Write short note on (any two)
          1) Inverse z-transform method by partial fraction expansion.   07
          2) Recursive & non recursive discrete time system.   07
          3) Block – diagram of digital signal processing.   06

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SECTION-B

Q.6 a) State & explain the properties of Fourier transform.   07
     b) Give the relationship between z-transform and Fourier transform   06

Q.7 a) State and explain the properties of DFT.   07
     b) Find 4 point DFT of following sequence $x(n) = \{1,2,3,1\}$ 06

Q.8 a) Determine correlation of the sequence given   07
        X(n)={-3,-2,1,4,8,-3}
                   ↑
        Y(n)={1,1,1,-1,2,}
                 ↑
     b) Find IDFT of Y(k)={1,0,1,0}   06

Q.9 a) Draw and explain the direct form structure of FIR filter.   06
     b) Find convolution of following signals. $x(n) = \{1, -2,3\}, h(n) = \{0,0,1,1,1,1\}$ 07

Q.10 Write short note on (<u>any two</u>)
        1) Cascade form of FIR filter   07
        2) Lattice structures   07
        3) Signal flow graph   06

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