SUBJECT CODE NO:- P-116
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EEE/EEP/EE) Examination MAY/JUNE-2016
Digital Signal Processing
(Revised)

[Time: Three Hours]   [Max Marks:80]

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

N.B
    i) Q.No.1 is compulsory. <u>Solve any two</u> from remaining questions from section A.
    ii) <u>Solve any three</u> questions from section B.
    iii) Assume suitable data, wherever necessary.

Section A

Q.1   Solve-
    1) Give the advantages of digital signal processing over analog signal processing.   03
    2) Define signal differentiate between multi-channel and multi-dimensional signals.   02
    3) Define Roc of infinite causal signal.   02
    4) State the properties of convolution.   03
    5) Define power and energy signals.   03

Q.2   a) Determine which of the following signals are periodic and compute their fundamental period.   06
    1) $\cos 0.01\pi n$ 2) $\cos\left(\frac{30n}{105}\pi\right)$ 3) $\sin 3n$ 4) $\sin\left(\frac{62n}{10}\pi\right)$
    b) Draw block-diagram of digital signal processing & explain the function of each block.   07

Q.3   a) Check the following systems for time variance causality, linearity and stability   06
    i) $y(n) = x[n] + x[n-1]$ ii) $y(n) = nx(n)$ iii) $y(n) = x(-n)$
    b) A discrete time signal x(n) is shown in fig. below sketch and label carefully each of the following signal.   07
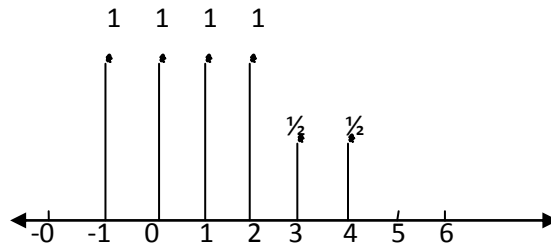
    a) x(n-2) b) x(4-n) c) x(n+2) d) x(n) u(2-n)

Q.4   a) Determine z- transform and sketch ROC of the following signals.   07
    $x(n) = [3(3)^n - 4(2)^n]u(n)$

    b) Find the inverse z- transform of   06
    $x(z) = \frac{z^3+z^2}{(z-1)(z-3)}$, $ROC :\ |z| > 3$

Q.5   Write short note on <u>(any two)</u>
    a) Properties of discrete time signal   07
    b) Sampling theorem   07
    c) Interconnection of discrete time systems.   06

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Q.6   a)   Find the cross – correlation of two finite length sequence $x_1(n) = \{1, 2, 1, 1\}, x_2(n) = \{1, 1, 2, 1\}$ 07

      b)   What is zero padding? What are its uses?   06

Q.7   a)   Compute 4-point DFT of the sequence $x(n) = \{0, 2, 4, 6\}$ 07

      b)   State and explain at least 3 properties of DFT   06

Q.8   a)   Perform circular convolution of the following sequence : $x_1(n) = \{1, 2, 3, 4\}$ 07

$$x_2(n) = \{1, 1, 2, 1\}$$

      b)   Give the relationship between DFT and ZT   06

Q.9   a)   Draw and explain direct form –I of FIR filter   06

      b)   Obtain the direct form –I realization for the system described by difference equation: 07

$$y(n) = 0.5y(n-1) - 0.25y(n-2) + x(n) + 0.4x(n-1)$$

Q.10   Write short note on (<u>any two</u>)

      a)   Various methods of linear convolution   07

      b)   Signal flow graphs.   07

      c)   Lattice structure of filter.   06

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