Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-377**
**FACULTY OF SCIENCE AND TECHNOLOGY**
**B.E. (EEP/EE/EEE)**
**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 from section A and Q.No.6 from section B are compulsory.
    ii.    Attempt any three questions from each section.
    iii.    Assume suitable data if necessary.

**Section A**

Q.1    Solve

    1) State the properties of convolution.    03
    2) Define signal system & signal processing.    03
    3) What are the properties of discrete time signals?    03
    4) Define deterministic and random signals.    03
    5) According to Nyquist criteria. What should be minimum value of sampling frequency?    01

Q.2    a) State and explain advantages of digital signal processing over analog signal processing.    07
    b) Determine which of the following sinusoids are periodic and compute their    06
    fundamental. Period –
    i)    $\cos 0.01\pi n$
    ii)    $\cos\left(\pi\frac{30n}{105}\right)$
    iii)    $\sin 3n$

Q.3    a) Draw blocks diagram representation. For following functional blocks-    06
    i)    Adder
    ii)    Subtractor
    iii)    Multiplier
    iv)    Constant multiplier
    v)    Unit delay
    vi)    Unit advance.
    b) Draw basic blocks of block-diagram representation.    03
    c) Draw block diagram for following system-    04
$$y(n) - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1).$$

Q.4    a) Compute convolution $y(n) = x(n) * h(n)$. of following signals.    07
$$x(n) = \{1, -2,3\}, h(n) = \{0,0,1,1,1,1\}$$
    b) Perform following operations. On $x(n) = \{1,2,3,4,5,4,3,2,1\}$.    06
    i)    Time scaling by 2 and $1/2$.

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Q.5    Write short note on – (any two).                                                                14
    1) Concept of frequency in continuous time and discrete time signals.
    2) Correlation of signals.
    3) Discrete time system described by difference equation.

## Section B

Q.6    Solve :-
    1) What is meant by pole and zero?                                              03
    2) State is ROC of infinite. Causal signals.                                    01
    3) State importance of twiddle factor.                                          03
    4) Differentiate between linear and circular convolution.                       03
    5) When, the DFT X(K) of a sequence. x(n) is real and when it is imaginary.     03

Q.7    a) Find. Z-transform   and ROC of signal                                           07
$$x(n) = a^n u(n) + b^n u(-n-1).$$
    b) State and prove following properties. Of Z-transform:-                       06
       i)      Linearity
       ii)     Time shifting
       iii)    Convolution

Q.8    a) Find the DFT of a sequence  x(n)={1,1,0,0}                                       06
    b) Find the IDFT of y(k)=1,0,1,0}.                                               07

Q.9    a) Establish relation between z-transform and desecrate Fourier transform.         07
    b) What is zero padding? What are its uses?                                     06

Q.10   Write short note on- (any two)                                                      14
    1) Methods of inverse z-transform.
    2) FIR filters structures.
    3) Signal flow graphs.