Total No. of Questions : 12]

SEAT No. :

P2450

[Total No. of Pages : 2

[5153]-84
T.E.(Computer)
DIGITAL SIGNAL PROCESSING
(2008 Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION-I

Q1) Explain different classification of signals with example. **[16]**

OR

Q2) a) Define energy and power signal. Find whether the following signal is an energy signal or power signal x(n) = n n > 0
= 0 n < 0 **[7]**

b) Test Linearity, Causality, and time invariance systems of y(n)=x(n) u(n). **[9]**

Q3) a) Obatin DTFT of different standard signals. **[12]**

b) Explain clearly: Circular convolution. **[6]**

OR

Q4) a) Compare DFT with DTFT. **[4]**

b) Why the result of circular and linear convolution is not same? **[4]**

c) Using DFT and IDFT obtain circular convolution of **[10]**
x(n) = {2, 0, 0, 1} and h(n) = {4, 3, 2, 1}.

Q5) Derive and explain Radix-2 Decimation in time (DIT) FFT algorithm for computing N-point DFT. **[16]**

OR

Q6) a) State time shifting property of Z-transform and calculate x(n) = ∂ (n+2). **[4]**

b) Explain different properties of twiddle factor. **[9]**

c) Define ROC and state significance of ROC. **[3]**

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SECTION-II

Q7) a) Explain the method of simple geometric interpretation to obtain the frequency response of DT system. **[10]**

b) Determine impulse response of a system:
$y(n)=x(n)-x(n-1)-3y(n-1)-2y(n-2)$ **[8]**

OR

Q8) a) Define system function H(z). How it is obtained from the general difference equation? **[6]**

b) what is pole zero plot? State condition for causality and stability in terms of ZT. **[6]**

c) Determine H(z) and draw a pole zero plot for a system **[6]**

$$x(n)+x(n-1)=y(n)+\frac{3}{4}y(n-1)+\frac{1}{8}y(n-2)$$

Q9) a) Explain Gibb's phenomenon associated with FIR filter design. What are the desirable features of window function to improve the frequency response? **[10]**

b) The transfer function of analog filter is: $H(s)=\frac{3}{(s+2)(s+3)}$ with T_S=0.1sec.Design the digital IIR filter using BLT method. **[6]**

OR

Q10)a) To design the digital IIR filter, analog IIR filter is designed first, why? What are the different methods to design IIR filters? Explain any one in brief. **[10]**

b) What are the advantages and disadvantages of FIR filter. **[6]**

Q11)a) Obtain linear phase FIR filter of $H(z)=\left(1+\frac{z^{-1}}{4}+\frac{z^{-2}}{4}+z^{-3}\right)$. **[6]**

b) Compare DSP processor and general purpose processors. **[6]**

c) What are the advantages of representing the digital filter in block diagram form? **[4]**

Q12)a) Draw Direct Form-I IIR filter structure for: $H(z)=3+\frac{4z}{(z-0.5)}-\frac{2}{(z-0.25)}$ **[8]**

b) Explain the application of DSP in speech processing. **[8]**