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Total No. of Pages : 03

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B.Tech.(Electronics & Electrical) (2011 Onwards)
B.Tech. (Electrical & Electronics) (2013 Batch)
(Sem.–6)

DIGITAL SIGNAL PROCESSING

Subject Code : BTEEE-601
M.Code : 71130

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a) What are the advantages of digital over analog signal processing?

b) Find the even and odd parts of the x(n) =u(n).

c) What is the z-transform of the finite duration signal?

$$X(n) = \{2,4,5,7,0,1\}$$
$$\uparrow$$

d) Why the result of circular and linear convolution is not same?

e) What are the advantages of bilinear transformation method for the design of IIR filter?

f) What is the difference between DSP processor and microprocessor?

g) Explain symmetric and anti symmetric FIR filters.

h) What is the time shifting property of DFT?

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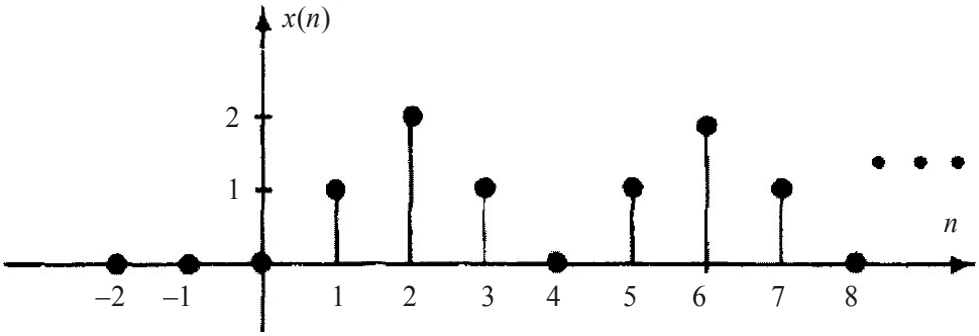
i) What do you understand by DSP Filters?

j) What is the use of DSP processors?

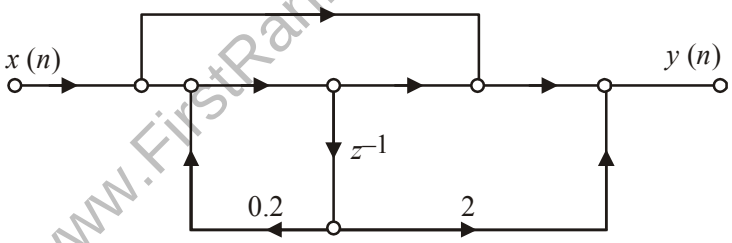
SECTION-B

2. Consider the sequence shown in the figure below :



The sequence repeats periodically with a period N = 4 for $n \geq 0$ and is zero for $n < 0$. Find the z-transform of this sequence along with its region of convergence.

3. Consider the filter structure shown in the figure below :



Find the system function and the unit sample response of this system.

4. State the properties of DFT. Explain Goertzel algorithm.

5. Discuss basic architecture of TMS series of digital signal processors.

6. Explain FFT algorithm using decimation in time techniques.

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SECTION-C

7. Find the z-transform of each of the following sequences. Also discuss their ROC in details.

   a) $x(n) = 3\delta(n) + \delta(n - 2) + \delta(n + 2)$

   b) $x(n) = u(n) - u(n - 10)$

8. Consider the following specifications for a bandpass filter :

$$\begin{aligned} |H(e^{j\omega})| &\le 0.01 \qquad 0 \le |\omega| \le 0.2\pi \\ 0.95 \le |H(e^{j\omega})| &\le 1.05 \qquad 0.3\pi \le |\omega| \le 0.7\pi \\ |H(e^{j\omega})| &\le 0.02 \qquad 0.8\pi \le |\omega| \le \pi \end{aligned}$$

   Design a linear phase FIR filter to meet these specifications using a Kaiser window.

9. Write a short notes on :

   a. Linear Convolution

   b. Importance of ROC

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NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.

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