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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(Electronics Engg.) (2012 Onwards) (Sem.-6)

**DIGITAL SIGNAL PROCESSING**

Subject Code : BTEEE-601

M.Code : 72835

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****Write briefly :**

1. What do you understand by LTI system?
2. What are the advantages of digital over analog signal processing?
3. What is the z-transform of the finite duration signal?  
$$x(n) = \{2, 4, 5, 7, 0, 1\}$$

↑
4. Define sampling & Nyquist rate.
5. Distinguish between FIR and IIR filter.
6. What is Gibb's phenomena?
7. What are the advantages of bilinear transformation method for the design of IIR filter?
8. What are benefits of representing a digital filter in the block diagram form?
9. State the desirable features of DSP processors.
10. Explain symmetric and anti-symmetric FIR filters.

**SECTION-B**

11. Find the z-transform of each of the following sequences :

a.  $x(n) = 2^n u(n) + 3 \left( \frac{1}{2} \right)^n u(n).$

b.  $x(n) = \cos(n\omega_0)u(n).$

12. Discuss Linear filtering approach for the computation of DFT.

13. Consider the causal linear shift-invariant filter with system function :

$$H(z) = \frac{1 + 0.875z^{-1}}{(1 + 0.2z^{-1} + 0.9z^{-2})(1 - 0.71^{-1})}$$

Draw a signal flow graph for this system using :

a) Direct form I

b) Direct form II

14. Draw the architecture of TMS 320C5X.

15. Describe different types of finite word length effects present in Digital filters and ways to rectify them, with the help of examples.

**SECTION-C**

16. Find the Kaiser Window parameters,  $\beta$  and  $N$ , to design a low-pass filter with a cut off frequency  $\omega_c = \pi/2$ , a stop band ripple  $\delta_s = 0.002$ , and a transition bandwidth no larger than  $0.1\pi$ .

17. Discuss the importance of ROC in digital signal processing.

18. Write a short notes on :

a. Bilinear Transformation

b. Circular convolution

**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.**