Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

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

DIGITAL SIGNAL PROCESSING

Subject Code : BTEEE-601
Paper ID : [A2321]

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) Discuss the various elementary discrete time signal.

b) Write down the advantages of FFT over DFT.

c) Discuss the importance of ROC in Z transform.

d) What do you mean by pass band ripple? Explain.

e) Compare the different windows used for FIR filter design.

f) List the advantages and disadvantages of FIR filters.

g) Explain the basic elements of a DSP system.

h) List the advantages of DSP processors.

i) What do you mean by convolution? Explain.

j) Briefly discuss the effect of quantization of filter coefficients.

SECTION-B

2. Discuss the advantages, disadvantages and applications of digital signal processing in detail.

3. Find the inverse Z-transform of X (z) = $\frac{z}{(z-0.75)(z-0.5)^2}$.

4. Discuss in detail the use of DFT in linear filtering.

5. Describe the lattice structure of FIR and IIR filters. Also give a comparison between them.

6. By citing an example explain impulse invariance methodology used for the design of digital IIR filters.

SECTION-C

7. Compute the 16-point DFT of the sequence

$$x(n) = \begin{cases} n+2, & 0 \le n \le 7 \\ n+4, & 8 \le n \le 15 \\ 0, & \text{otherwise} \end{cases}$$

using the radix-2 decimation in frequency FFT algorithm.

8. Determine the cascade and parallel realizations for the systems described by the system function

$$H(z) = \frac{10\,(1-0.5\,z^{-1})\left(1-\frac{2}{3}z^{-1}\right)(1+2z^{-1})}{\left(1-\frac{3}{4}z^{-1}\right)\left(1-\frac{1}{8}z^{-1}\right)\left[1-\left(\frac{1}{2}+j\frac{1}{2}\right)z^{-1}\right]\left[1-\left(\frac{1}{2}-j\frac{1}{2}\right)z^{-1}\right]}$$

9. Discuss the architecture of TMS series of DSP processor in detail.