Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 8

M.Tech. (Power System) (2018 Batch) (Sem.–2)
ADVANCED DIGITAL SIGNAL PROCESSING
Subject Code : MTPS-203B-18
M.Code : 76135

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1.Attempt any FIVE questions out of EIGHT questions.
2.Each question carries TWELVE marks.

1. Compute the 16-point DFT of the sequence.   12

$$x(n) = \begin{cases} n, & 0 \le n \le 15 \\ 0, & otherwise \end{cases}$$

2. Explain the various properties of Z-transform in detail.   12

3. A requirement exists to simulate in a digital computer an analog system with the normalized characteristics $H(s) = \dfrac{1}{s^2 + \sqrt{2}s + 1}$

    12

    Obtain a suitable transfer function using impulse invariant and bilinear transform methods. Assume a sampling frequency of 5 kHz and a 3 dB cut-off frequency of 1 kHz.

    12

4. Discuss the following :

    a) A/D Conversion noise analysis   6

    b) Arithmetic round-off errors   6

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

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

12

6. What do you mean by all zero and all pole models? Discuss in detail various properties of all zero and all pole models.   12

7. a) What do you mean by spectral analysis of deterministic signals? Explain the DFT-based Fourier analysis system for continuous-time signals.   6

    b) Discuss in detail the design and implementation of a time-varying optimum FIR filter.   6

8. Explain the following

    a) Comparison of IIR and FIR digital filters   6

    b) Mean square error estimation   6

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.