

Code No: B5408/D7507**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****M.Tech II - Semester Examinations, March/April 2011****ADVANCED DIGITAL SIGNAL PROCESSING****(COMMON TO POWER ELECTRONICS & ELECTRIC DRIVES AND CONTROL SYSTEMS)****Time: 3hours****Max. Marks: 60****Answer any five questions
All questions carry equal marks**

- - -

1. a) Discuss various IIR filter realization structures and list out the merits and demerits of each.
b) Obtain the Cascade and parallel form realization structures of the given transfer function.
$$H(z) = (1+z^{-1}) / (1-0.25z^{-1})(1-z^{-1}+0.5z^{-2})$$
 [12]
2. a) Compare Bilinear and impulse invariant transformations of IIR filters
b) Design a Digital Butterworth HPF using bilinear transformation technique for the following specifications
$$0.707 \leq |H(w)| \leq 1 \quad ; \quad 0 \leq w \leq 0.2\pi$$
$$|H(w)| \leq 0.08 \quad ; \quad 0.4\pi \leq w \leq \pi$$
 [12]
3. a) Compare FIR and IIR filters
b) Design an FIR High pass filter using Hamming window of length 9 samples and cut-off frequency of 1.2 rad/s. [12]
4. a) What is the importance of DFT in Digital Signal processing.
b) Find 8 point DFT of the given time domain function $x(n) = \cos 2\pi n$. [12]
5. a) Define Finite Word length effects and explain how these effects w.r.t IIR filter structures.
b) What is scaling and how it can be used to prevent saturation? [12]
6. a) Prove that Period gram is an inconsistent estimate of power spectral density.
b) Discuss Bartlett method of power spectrum estimation. [12]
7. a) Discuss in detail about Addition overflow errors and their remedies.
b) Discuss Quantization effects in detail. [12]
8. Write short notes on
a) Welch method of power spectrum estimation. [6+6]
b) Limit cycles.
