2005-PUNJAB UNIVERSITY

B.TECH VII SEMESTER DEGREE EXAMINATION

DIGITAL SIGNAL PROCESSING

(ELECTRONICS AND COMMUNICATION ENGINEERING)

TIME-3HOUR
MARKS-100

PART A[10*2=20 MARKS]

1(a) What is the difference between Vol-Neumann and Harvard Architeture?

(b) FIR filter has linear phase response. What are its implications?

(c) Why is it necessary to define ROC with every z-transform?

(d) What are basic elements of Digital Signal Processing?

(e) List the major applications of Digital Signal Processing.

(f) Compare the performance of FIR anmd IIR filters.

(g) What is Gibb's phenomenon ?

(h) Distinguish between decimation in time and decimation in frequency FFT algorithms.

(i) Determine the z-transform of the following signal and sketch the pole-zero pattern :

x(n) = (-1)n.(2)-n.u(n).

(j) Determine the region of convergence of two sided infinte duration signals.

PART B[10*8=80 MARKS]

2. Determine the z-transform and ROC of the signal:
x(n) = [3{2n)-4(3n)] u(n).

3. Why is it said that limit cycle problem does not exist in FIR digital filters realizations ?

4. What are the advantages of digital signal over analog signal processing ? Are there any limitations ?

5. What is bilinear transformation ? What is the relation between digital frequency and analog frequency ? Is this linear?

6. Show that for LtI discrete-time system to stable, all the poles should lie within the unit circle.

7. What are the various methods used for the design of FIR filters? Discuss window method in detail.

8. (a) What are the steps involved in the design of IIR filters ? Discuss impulse invariant method.

(b) Explain how the DFT can be used to compute N equispaced samples of the z-transform of an N-point on a circle of radius r.

9. Write short notes on any tow of the following:

(a) Properties of DFT
(b) Architecture of Digital Signal Processing
(c)Structure for the realization of discrete time systems.