Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech., Winter 2017 - 18 Examination

Semester: 1 **Date: 30/12/2017**

Subject Code: 03204103 **Time: 2:00 pm to 4:30 pm**

Subject Name: Advanced Digital Signal Processing **Total Marks: 60**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) What is Multi rate Signal Processing? Explain its advantages and disadvantages. **(05)**

B) A digital filter has frequency specification as : **(05)**

Pass band frequency = $\omega_p = 0.2\ \pi$

Stop band frequency = $\omega_s = 0.3\ \pi$

What are the corresponding specifications for pass band and stop band frequencies in analog domain if,

(i) Impulse invariance technique is used for designing.

(ii) Bilinear transformation is used for designing.

Assume sampling time (T_s) = 1

C) For the given two 4 point sequence x[n] and h[n] where **(05)**

x[n] = cos ($\frac{\pi n}{2}$) n= 0,1,2,3 ; h[n] = 2^n n= 0,1,2,3

(i) Calculate 4-point DFT of x[n]. (ii) Calculate 4-point DFT of h[n].

Q.2 **Answer the following questions. (Attempt any three)** **(15)**

A) Determine the Circular convolution of the two sequences $x_1(n) = \{1,2,3,4\}$ and $x_2(n) = \{4,3,2,1\}$.

B) Compare IIR filter with FIR filter.

C) Give comparison between fixed and floating point processors.

D) Explain the steps necessary to create, build, and run a CCS (Code Composure Studio) project on TMS320C6713 based board, DSK6713, including CCS setup and build setup.

Q.3 A) Write short note on on-chip peripherals of TMS320C6713. **(07)**

B) Compute the eight point DFT of a sequence x(n) = (1/2, 1/2, 1/2, 1/2, 0, 0, 0, 0) Using decimation in time FFT algorithm. **(08)**

OR

B) Explain the Decimation In Time (DIT) FFT algorithm in detail. **(08)**

Q.4 A) Describe how sampling rate can be reduced by a non integer factor. **(07)**

OR

A) A certain discrete time LTI filter has following data : **(07)**

Poles are at 0.2 and 0.6.

Zeros are at -0.4 and origin.

Gain of filter is 5.

Show direct form-II realization and cascade form realization.

B) Write short note on IIR filter design using 'Approximation of Derivation' method. **(08)**