Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: 735402 **Date: 27-11-2014**

Subject Name: Digital Signal Processor Architecture and Applications

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Describe the essential architectural features of programmable digital signal processors (P-DSPs).	**07**
	(b)	Explain the terms: *Precision, Dynamic Range* in context of fixed-point and floating-point DSPs. ñFloating-point DSPs are preferred over fixed-point DSPs for real-time applicationsò. Justify the statement.	**07**
Q.2	**(a)**	Describe various solutions for handling the *overflow situation* in digital signal processors.	**07**
	(b)	Explain the *fractional fixed-point presentation*. Find the decimal value of 011101**.**1010111011. Represent the number -28**.**575 in Q5.10 format.	**07**
		OR	
	(b)	Explain *single-precision* and *double-precision floating-point* formats. Represent the numbers 18**.**62 and -34**.**28 in single-precision floating point format. What is the result of *adding* and *multiplying* these floating point numbers?	**07**
Q.3	**(a)**	Explain the ALU structure of TMS320C54x processor.	**07**
	(b)	Explain the Barrel Shifter unit of TMS320C54x processor.	**07**
		OR	
Q.3	**(a)**	Describe various *data addressing modes* of TMS320C54x processor.	**07**
	(b)	Explain the following instructions of TMS320C54x processor with example: **i. ADDM #lk, Smem** **ii. LD Xmem, dst** **|| MAC Ymem, dst** **iii. MACAR Smem [, B]**	**07**
Q.4	**(a)**	Explain the *pipeline operation* of TMS320C54x processor.	**07**
	(b)	Explain the structure of *data paths* of TMS320C67x processor.	**07**
		OR	
Q.4	**(a)**	Explain the address mode register (AMR) and the control status register (CSR) of TMS320C67x processor.	**07**
	(b)	Give the overview of pipeline operation of TMS320C67x processor.	**07**
Q.5	**(a)**	Explain the following instructions of TMS320C67x processor with example: **i. ADDSP ii. CMPEQSP**	**07**
	(b)	Write a DSK6713 compatible C program to implement the low-pass FIR filter.	**07**
		OR	
Q.5	**(a)**	Explain the following instructions of TMS320C54x processor with example: **ii. LDW ii. SPTRUNC**	**07**
	(b)	Write a DSK6713 compatible C program to implement the low-pass IIR filter.	**07**