Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2725402 **Date: 31/05/2016**

Subject Name: Digital Signal Processor- Architecture & Programming

Time:10:30 am to 01:00 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)**	Explain the generic architectural of programmable digital signal processors (P-DSPs). Describe, in brief, the real-time applications of P-DSPs.	**07**
	(b)	Explain the terms: quantization, dynamic range, rounding & truncation	**07**
Q.2	**(a)**	With the help of examples, explain the circular addressing and bit-reversal addressing modes of a P-DSP.	**07**
	(b)	"Floating-point DSPs are preferred over fixed-point DSPs for real-time applications". Describe the justification of the statement.	**07**
		OR	
	(b)	Describe various solutions for handling the overflow situation in digital signal processors.	**07**
Q.3	**(a)**	Explain single-precision and double-precision floating-point formats. Represent the numbers 29.87 and -87.972 in single-precision and double-precision floating point formats.	**07**
	(b)	Explain the Multiply-accumulate (MAC) unit of TMS320C54x processor.	**07**
		OR	
Q.3	**(a)**	Explain the fractional fixed-point presentation. Find the decimal value of 011101.1010111011. Represent the number -32.385 in Q15.0 format.	**07**
	(b)	Describe Compare, Select, and Store Unit (CSSU) of TMS320C54x processor.	**07**
Q.4	**(a)**	Explain the following instructions of TMS320C54x processor with example: i. ADDM #lk, Smem, ii. MACAR Smem [, B] iii. LD Xmem, dst || MAC Ymem, dst	**07**
	(b)	Explain the pipeline operation of TMS320C54x processor.	**07**
		OR	
Q.4	**(a)**	With necessary figures, describe the pipeline operation of TMS320C67x processor.	**07**

	(b)	Explain the following instructions of TMS320C54x processor with example: i. MPYHU, ii. MPYSP2DP, iii. RCPDP	**07**
Q.5	**(a)**	Write a C program to perform a circular convolution of two sequences.	**07**
	(b)	Write a C program to read 5000 samples of an ECG signal and apply an average filter for removing a high frequency noise.	**07**

OR

Q.5	**(a)**	Write a C program to generate a tenth order low-pass FIR filter.	**07**
	(b)	Write a C program to read an input image I1.dat and plot its histogram.	**07**

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