

THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY, PATIALA
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
CN- 016 DIGITAL SIGNAL PROCESSORS (M.E. FINAL YEAR EC) [07.12.2006]
TIME: 3 HOURS END SEMESTER TEST MAX.MARKS:45

Instructor: Balwant Singh

- Note:*
1. Attempt ANY FIVE Questions Sequentially.
 2. All questions carry equal marks.
 3. Make reasonable assumptions for missing information, if any.

- Q I Explain with the help of block diagrams the following
- i) DSP- Based Bio telemetry receiver
 - ii) DSP Based Position control system for Hard Disk Drive
 - iii) DSP Based Power Meter
- Q II
- a) What distinguishes a digital signal processor from a general purpose microprocessor with regard to basic capabilities? Explain.
 - b) Describe Features common to virtually all DSP processors with suitable examples.
 - c) Write a short note on Code Composer Studio.
- Q III Explain the operation of the following for TMS320C 54X Processor.
- i) CSSU
 - ii) Barrel Shifter
 - iii) Bus Structure
- Draw relevant diagrams for each of these.
- Q IV
- a) Describe Von Neumann architecture and Harvard Architecture. Explain different Multiple Access Memories with suitable examples from DSP processors
 - b) What is pipelining? Describe pipelining & performance and Interlocking with examples from different DSP Processor families.

Q V a) What do you mean by addressing? Explain different addressing modes of TMS320C 54X Processor.

b) Assuming the current contents of AR3 to be 200h, what will be the contents after each of the following TMS320C54XX Processor addressing modes is used? Assume that the contents of AR0 are 20h.

i) *AR3 + 0

ii) *AR3 - 0

iii) *AR3 +

iv) *AR3 -

v) *AR3

vi) * + AR3(40h)

vii) * + AR3(-40h)

Q VI a) Write an assembly language program of TMS320C 54X Processor to find the sum of the series $1 + 2 + 3 + \dots + 1000$.

b) If before execution $AR4 = 00800000$, $R1 = 11223344$ and contents of location $00800000h = 23459872$; Describe the instruction execution and determine what will be the resultant contents of different locations/ registers after execution of the following instruction:

LDI *AR4++ (2), R1

Q VII a) How does the TMS320C6X Processor architecture differ from that of TMS320C54X Processor architecture. Discuss.

b) List the functional units of TMS320C6X Processor and explain the functions performed by each of them.