



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.Tech(ECE-VLSI)/SEM-2/MVLSI-201/2013**  
**2013**  
**PROCESSOR ARCHITECTURE FOR VLSI**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer question No. 1 and any *four* from the rest.

**GROUP - A**

1. Answer the following questions :  $7 \times 2 = 14$

- a) If there is  $n$ -number of instructions and  $k$ -stage pipeline, then calculate the time required for a pipeline processing [ consider as a time period of each clock pulse ].
- b) What do you mean by array processor ? Give an example.
- c) What do you mean by scalar processor and vector processor ?



- d) What are the fetch, decode and execution stages used by a TMS C6000 series DSP processor ?
- e) What are main architectural advantages of a DSP processor over General Purpose Processor ?
- f) Describe the role of a Co-processor as a processor accelerator with example.
- g) What is the difference between ARM and Black finprocessor ?

**GROUP - B**

Answer any *four* questions from the following.

$4 \times 14 = 56$

- 2. a) Explain different types of Hardwired Controlled technique. 9
- b) Describe the steps of Microprogrammed Control. 5
- 3. a) Write the difference between RISC and CISC architecture. 4
- b) Write down the salient features of a SHARC Architecture. 4
- c) Let us consider a hypothetical architecture where there are 16 General Purpose Register ( eg. R0, R1, R2, ..... R15 ) and 4 operation codes/Instructions ( e.g. Addition, Subtraction, Multiplication, Division ). Then for the instruction  
    MUL R3, R4  
what will be the horizontal and vertical micro instruction ? 6



4. a) Describe the different types of pipeline hazards and their solution. 10
- b) Describe Flynn's Architectural classification schemes of a computer system. 4
5. a) What are the architectural feature set of an ARM processor ? 4
- b) A C-language assignment is given like that  $X = a + b$  how ARM processor solves this problem ? 5
- c) Solve  $(-7) * 3$  using Booth's Multiplication Algorithm. 5
6. a) What are the advantages and disadvantages of multi-core processors ? 5
- b) Describe the generic architecture of multi-core processors. 4
- c) What are the salient features of coarse grained parallelism ? 5
7. a) Briefly explain the architecture of a processor implementing hyper-threading technology with the help of block diagram. 4
- b) Explain pictorially how a hyper-threading processor executes multiple threads distributed over multiple applications. 5
- c) What are the salient features of fine grained parallelism ? 5
8. Explain two examples where a customizable data-plane can have performance benefits.