



Name :

Roll No. :

Invigilator's Signature :

CS/M. Tech (ECE-VLSI)/SEM-2/MVLSI-201/2012

2012

PROCESSOR ARCHITECTURE FOR VLSI

Time Allotted : 3 Hours

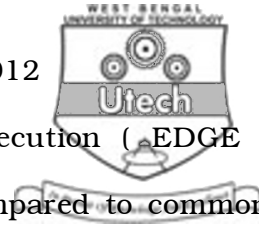
Full Marks : 70

The figures in the margin indicate full marks.

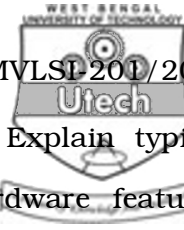
*Candidates are required to give their answers in their own words
as far as practicable.*

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

1. a) Why is cross-compiler used for embedded system. 1
- b) "The Code Density is an important characteristic for any instruction set." Justify. 2
- c) Why timer module is required in Micro-Controller ? 1
- d) "A real time system must be temporally correct." Explain. 1
- e) How is Instruction Set Architecture (ISA) distinguished from Micro-Architecture ? 1
- f) What is Vector Instruction ? 1



- g) How does Explicit Data Graph Execution (EDGE) improve computing performance compared to common processors like the Intel x 86 line ? 2
- h) What is RISC computer ? 1
- i) What is Flag register ? 2
- j) What are the non-functional requirements of an embedded system ? 1
- k) What is data parallelism ? 1
2. Define embedded system. How does embedded system differ from general purpose computing system ? With the help of architectural representation, explain different sections of an ideal embedded system. What are the design constraints for an embedded system ? What are the characteristics of RTOS ? 2 + 3 + 4 + 3 + 2
3. What do you understand by "Parallel Computing" ? Explain different types of parallelism. What is Parallel Slowdown ? Classify the applications of parallelism according to how often their subtasks need to synchronize or communicate with each other. 3 + 6 + 2 + 3



4. What is Digital Signal Processor (DSP). Explain typical characteristics of DSP. What are the hardware features commonly included in DSP ? Explain memory architecture and data operations in DSP.

2 + 4 + 6 + 2

5. a) What is Harvard architecture ? How does Harvard architecture differ from Von-Neumann architecture ?

2 + 2

- b) Explain any *two* of the following :

5 + 5

i) Explicitly Parallel Instruction Computing (EPIC)

ii) Very Long Instruction Word (VLIW)

iii) One Instruction Set Computer (OISC)

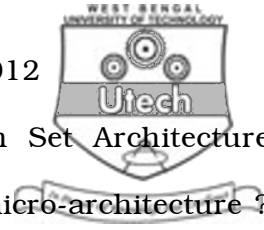
iv) Flynn's taxonomy.

6. Define microcontroller. Explain common features of microcontroller. What is interrupt latency ? How does microcontroller optimize interrupt latency ?

2 + 6 + 2 + 4

7. What is Peripheral Interface Controller (PIC) ? Explain different characteristics of PIC core architecture. What are the advantages and limitations of PIC architecture ? Explain PIC instruction set.

2 + 4 + 4 + 4



8. What do you understand by Instruction Set Architecture (ISA) ? How is ISA distinguished from micro-architecture ? What are the different instruction types ? Explain complex instruction with examples. Classify ISA according to the maximum number of operands explicitly specified in instructions. Explain typical characteristics of RISC.

1 + 1 + 3 + 3 + 4 + 2

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