Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/M.Tech (ECE-VLSI)/SEM-2/VLSI-201/2011
2011
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.

GROUP – A
(Objective Type Questions)

1.   Answer the following :   10 × 1 = 10

   i)   Compare Von-Neumann and Harvard architectures of a processor based system.

   ii)   What is the difference between fixed point and floating point DSPs ?

   iii) What do you mean by Precision and Range of floating point numbers ?

   iv)   What is Multichannel Buffered Serial Port (McBSP) in connection with TMS320C50 processor ?

   v)   Describe Intel Hex file format (•HEX) for translating Object file (•OBJ) created by an Assembler into Hex file.

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vi) Most instructions in ARM microcontroller are RISCy. Explain.

vii) Explain the importance of Watch Dog Timer in a Controller/Processor based system. How Watch Dog Timer is different than ordinary timer/counter resources in the processor ?

viii) IBM Power PC is a power optimized enhanced RISC processor. Explain this statement.

ix) Why is backward compatibility less important in an embedded device than in a general purpose device ?

x) Explain why supporting binary compatibility is problematic for VLIWs.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.   3 × 5 = 15

2. What is meant by Viterbi Operator in relation to programming of Digital Signal Processor ? Illustrate with example.

3. Explain the architecture of Configurable Logic Block (CLB) widely used in Programmable Logic Devices.

4. What are the functions of Barrel Shifter and MAC unit of TMS320C6X family of DSPs ?

5. Why Phase Locked Loop (PLL) resources are integrated with DSP processors ? Explain clearly with example, if any.
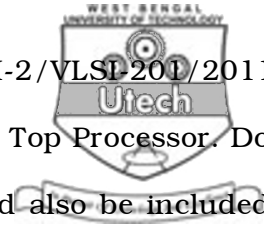
6. Boot Loader facility does not exist in Desk Top Processor. Do you think that Boot Loader feature should also be included in a Desk Top Processor ? Explain in detail with merits and demerits in this.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following. 3 × 15 = 45

7. Explain the Advanced Multi-Bus Architecture of TMS320C50 Digital Signal Processor (DSP) and highlight the salient features of the computational block of the processor. Explain the essential features of VLIW architecture.

8. Explain briefly the architecture of ARM processor with a block schematic representation. Also briefly highlight the features for which this processor is directly used as an integrated IP Core in the mobile communication segment compared to any other embedded processors.

9. Explain briefly the architecture of IBM Power PC processor with a block schematic representation.

10. a) Explain the features of RISC and CISC Processors adopted in Microchip PIC18f452 family of Processors. Also highlight the on-chip resources. 10

   b) Highlight the essential features of Reconfigurable Architecture and Reconfigurable Processor to resolve the basic issues of Reconfigurable computing. 5

11. Write short notes on any *three* of the following : 3 × 5

   a) Soft core Processor

   b) IEEE Floating Point Format

   c) Boot Loader

   d) Dual Access RAM (DARAM)

   e) Computation in Fixed Point DSPs

   f) IEEE 1588 Standard for timing synchronisation (UTC).

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