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MCA ✓
PCS 2001

2ND SEMESTER EXAMINATION – 2006

COMPUTER SYSTEM ARCHITECTURE

Full Marks – 70

Time – 3 Hours

The figures in the right hand margin indicate full marks for the questions.

Answer any six questions including Question No. 1 which is compulsory.

1. Answer the following : 2×10
- (a) What is memory mapped I/O ?
 - (b) What are the steps carried out during program execution?
 - (c) What are the programs that are executed by a general purpose computer?

P.T.O.

- (d) What are the types of instructions ? Define and differentiate between instruction interpretation and instruction execution.
- (e) What are the two possibilities for increasing the clock rate ?
- (f) What is RISC architecture? What are the key elements used in RISC system design ?
- (g) What is the merit-demerit in using a single I/O ?
- (h) Why was microprogramming preferred on many earlier processor ?
- (i) Draw the block diagram of Von Neumann stored-program computer Architecture ?
- (j) What do you mean by op-code encoding techniques ?
2. (a) Explain DMA data transfer mechanism with burst mode and cycle stealing. 5

- (b) On which principle the cache memory is based ? Discuss various mapping techniques employed in cache memory organization. 5

3. (a) Define and differentiate between multiprogramming and multiprocessing in the context of computer Architecture. 5

- (b) What are the steps perform to execute a instruction in CPU ? Explain your answer with reference to the CPU with single-bus organization. 5

4. (a) Describe Pipelining. Draw the space-time diagram for a six-segment pipeline showing the time it takes to process eight tasks.

State how Pipelining improves the performance by adding parallel processing of instructions inside computer. 5

- (b) Explain the data transfer mechanism between CPU and IO device, using

programmed IO. If programmed IO is used and each one word IO transfer requires the CPU to execute two instructions, estimate the maximum IO data-transfer rate for the IO device. 5

5. (a) What are different addressing formats of instructions ? Explain their advantage and disadvantages with example ? 5

(b) Discuss the basic hardware component for multiply operation ? 5

6. (a) What is the difference between a micro-programmed control and hardwired control. 5

(b) How many times does the CPU need to refer to memory when it fetches and executes an indirect-mode instruction ? If the instruction is :

(i) A computation requires a single operand

(ii) A branch. 5

7. (a) Discuss the virtual memory management with diagrams showing how the address gets translated inside the system. 5

(b) What is an interrupt ? How many different types of interrupts are there ? Discuss the use of interrupts in handling many I/O devices. 5

8. (a) Why are computers' memory systems typically built as hierarchies ? $2\frac{1}{2}$

(b) Explain why maintaining inclusion between different levels of the memory hierarchy makes implementing write-memory-back memory hierarchy easier. $\frac{1}{2}$

(c) What is the pros and cons of using a standard I/O bus in a design, as opposed to a direct connection between the processor and each I/O device? $2\frac{1}{2}$

(d) Define the following : Instruction Cycle, Memory Cycle, Interrupt Cycle, and Control memory ? $2\frac{1}{2}$

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