

Time: 3 Hours

DECEMBER 2013

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. Program counter pc always keeps the address of instruction

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|-----------------------------|-----------------------------|
| (A) to be executed next | (B) which is being executed |
| (C) which has been executed | (D) which is not executed |

b. Any computer must at least consist of

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|-----------------|------------------|
| (A) Data Bus | (B) Address Bus |
| (C) Control Bus | (D) All of these |

c. The minimum time delay between the initiations of two independent memory operations is called

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|-------------------|------------------|
| (A) Access time | (B) Cycle time |
| (C) Transfer time | (D) Latency time |

d. An 8 bit unit used to code data is called

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|----------|--------------|
| (A) word | (B) data set |
| (C) Byte | (D) KB |

e. In a digital computer, binary subtraction is performed

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| (A) In the same way as we perform subtraction in decimal number |
| (B) Using 2's complement method |
| (C) Using 9's complement method |
| (D) Using 10's complement method |

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- f. Floating point representation is used to store
- (A) Boolean values (B) Whole numbers
(C) Real numbers (D) Integers
- g. A given memory chip has 12 address pins and four data pins. It has the following number of locations.
- (A) 2^4 (B) 2^{12}
(C) 2^{48} (D) none of these
- h. Which of the following comment (s) about the Program Counter is/are true?
- (A) It is a cell in RAM
(B) It is a cell in ROM
(C) During execution of the current instruction, its content changes
(D) None of these
- i. The CPU of a computer takes instruction from the memory and executes them. What is this process called?
- (A) Load cycle (B) Time sequence
(C) Fetch-execute cycle (D) Clock cycle
- j. Which of the following is a decision making operations performed by the ALU?
- (A) Greater than (B) Less than
(C) Equal to (D) None of these

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

- Q.2** a. Explain the basic interaction between the processor and the main memory in a typical computer. (10)
- b. Write the basic performance equation. How performance measurement is done practically? (6)
- Q.3** a. Explain any four addressing modes giving suitable example. (8)
- b. What is stack frame? Explain using a suitable example how is it used for nested subroutines. (8)
- Q.4** a. What are the three basic techniques to perform Input/ Output operations? (8)

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- b. How to ensure that an active interrupt request signal does not lead successive interruptions, causing the system to enter an infinite loop? (4)
- c. How can the processor recognize the device requesting an interrupt? Explain briefly. (4)
- Q.5** a. How the data transfer happens over the single bus arrangement? Explain the role of interface circuit. (8)
- b. Explain a parallel input interface scheme used to connect the keyboard to the processor. (8)
- Q.6** a. Explain the internal organization of bit cells in a memory chip which can store 16 words of 8 bit each. (8)
- b. Describe the working of a DRAM cell. (4)
- c. What do you mean by direct mapping method to determine the cache location to store memory block? (4)
- Q.7** a. What do you mean by virtual memory? How this is useful? Explain the basic hardwires required to implement the virtual memory. (8)
- b. Explain a method for virtual address translation. (6)
- c. What do you mean by a page fault? Which hardware is responsible for detecting the page fault? (2)
- Q.8** a. Using booth's multiplication algorithm to multiply the following, showing all the steps:
(i) 3×-4
(ii) -8×2 (8)
- b. Differentiate between single precision and double precision IEEE standard floating point representations. (4)
- c. Write an algorithm that performs restoring division. (4)
- Q.9** a. Differentiate between hardwired control and micro programmed control. (4)
- b. Explain the 'instruction cycle' for the processing of a single instruction in a computer. (6)
- c. Write short notes on the following: (6)
- (i) Control word (CW)
(ii) Microinstruction
(iii) Micro-program