ROLL NO. _____

Code: DC57 **Subject: COMPUTER ORGANIZATION**

DipIETE – CS

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

(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

(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

(A) Access time **(B)** Cycle time
(C) Transfer time **(D)** Latency time

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

(A) word **(B)** data set
(C) Byte **(D)** KB

e. In a digital computer, binary subtraction is performed

(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

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)**

b. How to ensure that an active interrupt request signal does not lead to 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