DipIETE – CS (NEW SCHEME) – Code: DC57

Subject: COMPUTER ORGANIZATION

Time: 3 Hours **Max. Marks: 100**

JUNE 2010

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.**
- **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. In BCD each decimal digit is encoded by _____ bit.

(A) 5 **(B)** 4
(C) 7 **(D)** 3

b. The _____ holds the instruction that is currently being executed

(A) IR **(B)** PC
(C) MAR **(D)** MDR

c. The number $(11001)_2$ is numerically equivalent to

(A) $(27)_{10}$ **(B)** $(24)_{10}$
(C) $(25)_{10}$ **(D)** $(41)_{10}$

d. A group of wires that connects several devices is called a

(A) register **(B)** memory
(C) buffer register **(D)** bus

e. A _____ helps the programmer to find errors in a program

(A) Debugger **(B)** loader
(C) compiler **(D)** Assembler

f. The _____ controller allows direct data transfer between the device and the main memory without involving the processor

(A) MDR **(B)** MAR
(C) DMA **(D)** IR

g. Machine whose instructions generate 32-bit address can utilize a memory that contains up to _____ memory

locations.

(A) 8G **(B)** 2G
(C) 6G **(D)** 4G

h. The 2's compliment form (use of 6 bit word) of the number 1001 is

(A) 100111 **(B)** 110111
(C) 111011 **(D)** 100001

i. CISC stands for

(A) Computer Instruction Set Computer
(B) Complex Instruction Set Computer
(C) Complex Instruction Standard Computer
(D) None of the above

j. The circuit used to store one bit data is known as

(A) register **(B)** encoder
(C) decoder **(D)** flip flop

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

Q.2 a. Draw the connection between the processor and the main memory **(3)**

b. What is the role of a buffer register? **(2)**

c. Given 20 machine language instructions. The average number of basic steps per machine instruction executed is 15. If the clock cycle rate is 600 cycles/ second, find the program execution time. **(3)**

d. Write a program than can evaluate the expression $X = A \times B + C \times D$ using one address machine instruction and zero address machine instruction **(8)**

Q.3 a. What do you understand by addressing mode? Explain the types of addressing modes with example. **(8)**

b. Convert the following numerical arithmetic expression into reverse polish notation and show the stack operations for evaluating the numerical result.

(4*5) + (6*7) **(4)**

c Explain in brief subroutine nesting and processor stack. **(4)**

Q.4 a. Explain how DMA controller communicates and transfer data between peripheral devices and RAM **(8)**

b. Explain the process of enabling and disabling interrupts. **(8)**

Q.5 a. What is SCSI bus? Write the function of different SCSI bus signals. **(8)**

b. Draw the block diagram of a serial interface and explain it. **(8)**

Q.6 a. Discuss the different mapping techniques used for cache memory translation. **(8)**

b. Draw a block diagram of a $4M \times 32$ DRAM chip. Explain its operation. **(8)**

Q.7 a. Explain virtual memory. Explain how virtual address is mapped to actual physical address. **(8)**

b. Design an n bit ripple – carry adder. **(4)**

c. Subtract 8 from 9 using 2's complement. **(4)**

Q.8 a. Divide 1000 by 11 using non-restoring division algorithm. **(8)**

b. Explain Booth's algorithm for multiplication of signed 2's complement numbers. **(8)**

Q.9 Write short notes on any **TWO** of the following:- **(2×8)**

(i) Hardwired control
(ii) Microprogrammed control
(iii) Static & dynamic RAM