**Code: CS12**         **Subject: COMPUTER ARCHITECTURE**

## ALCCS – OLD SCHEME

**Time: 3 Hours**         **AUGUST 2012**         **Max. Marks: 100**

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

**NOTE:**
- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest.  Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

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**Q.1**   a. State the features of $5^{th}$ generation computers.

b. How index addressing is different from base register addressing?

c. What is stack pointer?  State its use in computer system.

d. What is Pseudo Instructions?  Give two examples of it.

e. What is control memory?  How it is different from others?

f. State three types of displacement addressing mode.

g. State four major characteristics of CISC architecture.         **(7×4)**

**Q.2**   a. Discuss DMA transfer with the help of a block diagram.  Explain different modes of DMA transfer.         **(9)**

b. Discuss:
   (i)   I/O Vs Memory Bus.
   (ii)  I/O mapped Vs Memory mapped I/O.         **(9)**

**Q.3**   a. Discuss different types of RAM.  How many 128 bytes RAM chips are required to provide memory of 2048 bytes?  Show details of connections, clearly indicate address, data and decoder configuration.         **(9)**

b. What is cache memory?  Discuss different mapping process while considering the organization of cache memory.         **(9)**

**Q.4**   a. Write a program to evaluate arithmetic expression
$$X = \frac{A - B + C*(D*E - F)}{G + H*K}$$
using
   (i)   general register computer with three address instructions.
   (ii)  accumulator type computer with one address instructions.
   (iii) stack organized computer with zero address instructions.         **(9)**

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b. With examples, discuss
   (i)   data transfer instructions.
   (ii)  data manipulation instructions.
   (iii) program control instructions.                                         **(9)**

**Q.5**  a. Briefly describe the execution of a complete instruction with help of fetch and execute phase.                                                                          **(6)**

b. Explain logical, circular and arithmetic shift micro-operation. Give a hardware design to implement the above shift operation for 4-bit data.                          **(12)**

**Q.6**  a. What is Von-Neumann architecture? How it is different from Harvard architecture? Discuss computer architecture presently in use.                                    **(9)**

b. Why do we need virtual memory? How it implemented in computer system? Discuss.
                                                                               **(9)**

**Q.7**  a. Design a 4-bit BCD adder and discuss its operation.                           **(8)**

b. Give the neat flow chart of addition and subtraction algorithm for signed binary number. Discuss each step of it with example.                                    **(10)**