Exam. Code : 107203
Subject Code : 1790

Bachelor of Computer Application (BCA) 3rd Semester

COMPUTER ARCHITECTURE

Paper—I

Time Allowed—3 Hours] [Maximum Marks—75

Note :— (1) The candidates are required to attempt **FIVE** questions. All questions carry **15** marks each.

(2) The students can use only non-programmable non-storage type calculator.

1. Explain Wilhe's Design of Hardwired and Microprogrammed Control Unit. 15

2. Answer the following :—

   (a) What is a pipelined processor ? Develop a set of formulae to compute efficiency and throughput of pipelined processor. What is the speedup gained due to pipelining ? 7

   (b) Consider the multiplication of two 40 × 40 matrices using a vector processor :

      (i) How many product terms are there in each inner product and how many inner products must be evaluated ?

      (ii) How many multiply-add operations are needed to calculate the product matrix ? 8

3. What is Vector Processing ? Explain with an example. 15

4. Answer the following :—

   (a) What is microprogramming ? Explain vertical and horizontal micro programmed controller. 7

   (b) Explain one-address, two address and three address instructions. Give an example for each. 8

5. What is Memory Hierarchy ? Explain Cache and Virtual Memory and also write difference between Cache and Virtual Memory. 15

6. Answer the following :—

   (a) Virtual memory system has a page size of 1K words. There are eight pages and four blocks. The associative memory page table contains the following entries :

Page	0	1	4	6
Block	3	1	2	0

   Make a list of all virtual addresses in decimal that will causes a page fault if used by CPU. 9

   (b) Why do we need virtual memory ? How is it implemented in computer system ? Discuss. 6

7. What are Computer Instructions ? Explain Design of a Basic Computer. 15

8. Answer the following :—

   (a) Write the basic difference between computer architecture and computer organization. 7

   (b) Construct a 16 to 1 multiplexer with two 8 to 1 multiplexer and one 2 to 1 multiplexer. Give the truth table for the same. 8