Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VI SEMESTER B.TECH (COMPUTER SCIENCE AND ENGINEERING)

END SEMESTER EXAMINATIONS, MAY/JUNE 2016

SUBJECT: PARALLEL COMPUTER ARCHITECTURE AND PROGRAMMING [CSE 306]

REVISED CREDIT SYSTEM

Time: 3 Hours **09-05-2016** MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data, if any, may be suitably assumed.

1A. With the help of neat diagram explain Flynn's classification of computer organization. 4M

1B. Explain OpenCL memory model with neat diagram. 3M

1C. How do you find the execution time taken by kernel function? Specify all the statements required for this. 3M

2A. What are different types of data hazards? Explain each of them with the help of an example. 3M

2B. Remove the name dependency from the following code.

F0=F2/F4
F6=F0+F8
R1=F6
F8=F10-F14
F6=F10*F8 2M

2C. For the pipeline given in Fig.Q.2.C draw the reservation table for function X with 6 clock periods. Find the collision vector, state transition diagram, MAL and efficiency. 5M

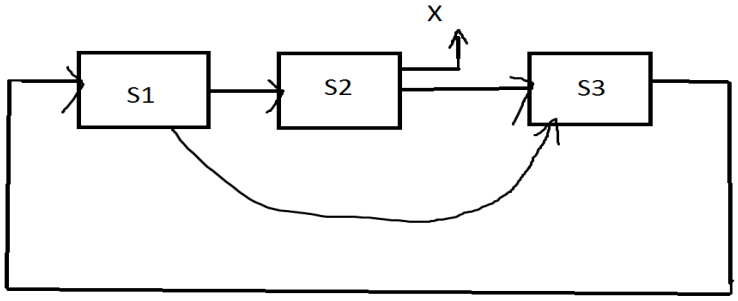

Fig.Q.2C

3A. Write a parallel MPI program using collective communication routine to transpose an 8x8 Matrix. 3M

3B. Using point to point communication routines write a parallel program in MPI to find the sum of N numbers using P processors. 4M

3C. How network design decisions are made? Explain. 3M

4A. Write an OpenCL kernel code which converts the given input string into output string in parallel as follows:

InputString: WORLD OutputString: WWWWWOOOORRRLLD 3M

4B. Write an OpenCL host code for the kernel code written in Q.4A. 5M

4C. Write an OpenCL kernel code which has the following effect:

InputString: WORLD OutputString: WOORRRLLLLDDDDD 2M

5A. With neat figure explain superscalar execution. List its advantages and disadvantages. 5M

5B. Write a kernel code which leaves the first row of matrix as it is, squares second row, cubes third row and so on. Write the global and local work size for the problem. Also write clEnqueueNDRangeKernel. 3M

5C. What are advantages and disadvantages of simultaneous multithreading 2M

6A. Give the diagrams for centralized shared memory architecture and distributed memory multiprocessor. 3M

6B. Trace the parallel selection sort on the following input

3 ,5, 3, 2, 3, 5, 3, 2, 1, 2 4M

6C. When a memory system is coherent? Explain. 3M