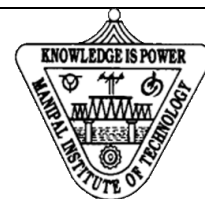


REG. NO									
---------	--	--	--	--	--	--	--	--	--



**MANIPAL INSTITUTE OF TECHNOLOGY**  
 (Constituent Institute of Manipal University)  
 MANIPAL-576104



**VI SEMESTER B.TECH.(COMPUTER SCIENCE AND ENGINEERING) DEGREE**  
**END-SEMESTER MAKEUP EXAMINATION-JUNE-JULY- 2015**  
**SUBJECT: PARALLEL COMPUTER ARCHITECTURE AND PROGRAMMING**  
**(CSE 306)**

**DATE: 06-07-2015**

**TIME: 3 HOURS**

**MAX.MARKS: 50**

**Instructions to Candidates**

- **Note:** Answer any **FIVE** full questions.

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

1.B. Define redundancy. If speedup is 0.8, efficiency 0.5 and redundancy 0.3 then calculate quality of parallelism.

1.C. Distinguish between clFlush and clFinish. What argument do they take?

1D. How do you discover and initialize platform? Write down the code snippet for the same. (4+2+2+2)

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

2.B. Explain Control dependency.

2.C. For the reservation table, as shown in Fig.Q.2.C compute the following

(i) Collision Vector.

(ii) State transition diagram.

(iii) Greedy cycle.

(iv) Efficiency.

(v) Maximum throughput given  $T=20ns$

(3+2+(1\*5))

	T1	T2	T3	T4
S1	X			X
S2		X		
S3			X	

Fig.Q.2.C

3.A. Explain masking and data-routing mechanisms with the help of matrix multiplication example on 2-cube.

3B. If you want to multiply two matrices of dimension 8X8 on a hypercube then

(i) How many bits are required to address the processing elements?

(ii) Which all processing elements will have rows of first matrix?

(iii) Which all processing elements will have rows of transposed second matrix?

3C. Using point to point communication routine write a program in MPI to calculate the partial sums given by equation  $S(k) = \sum_{i=0}^k A(i)$  where  $k=1,2,\dots,N$ .  
(3+(1\*3)+4)

4. Write an OpenCL program to sort N elements using parallel selection sort.  
(8+2)

5A. With neat figure explain VLIW. List its advantages and disadvantages.

5B. Explain OpenCL memory model with neat diagram.

5C. Briefly explain MPI\_Bcast. Write syntax of the same. (5+3+2)

6A. With the help of schematic explain distributed memory architecture.

6B. Briefly explain coarse grained multithreading.

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

3, 5, 3, 2, 3, 5, 3, 2, 1, 2

6D. When a memory system is coherent? Explain. (3+2+3+2)