Reg. No.



ANIPAL

A Constituent Institution of Manipal University

VI SEMESTER B.TECH (COMPUTER SCIENCE AND ENGINEERING) MAKEUP EXAMINATIONS, MAY/JUNE 2017

MANIPAL INSTITUTE OF TECHNOLOGY

SUBJECT: PARALLEL COMPUTER ARCHITECTURE AND PROGRAMMING [CSE 3202]

REVISED CREDIT SYSTEM Time: 3 Hours MAX. MARKS: 50 17-06-2017 Instructions to Candidates: Answer ALL questions. Missing data, if any, may be suitably assumed. 1A. Explain with the help of diagram CUDA capable GPU Architecture. **3M** 1B. Explain Fixed Function GPU pipeline with help of a diagram. **3M** 1C. List PVM functions for process management. How do you run a PVM application? How do you program an application? 4M2A. List and explain different built in MPI reduction operators. **3M** 2B. Write a parallel MPI program using collective communication routine to multiply two 8x8 Matrices. **4M** 2C. With the help of an example program explain how error handling is performed in MPI. **3M** 3A. Write an OpenCL kernel code which converts input matrix A into output matrix B as follows: consider elements of matrix A into 4 equal parts. First part elements should be incremented by 1, Second part elements should be incremented by 2, Third part elements should be incremented by 3 and last part elements should be incremented by 4. i. Use element number of threads ii. Use only four threads. Example: Input : N=4

	Matrix A				Matrix B			
3	8	2	5	4	9	4	7	
2	3!	5	6	3	4	7	8	
2	4	3	1	5	7	7	5	
3	2	1	5	6	5	5	9	5M

3B.What are advantages and disadvantages of simultaneous multithreading? **3M**

3C. Depict different possibilities of the memory, scope and lifetime of a variable declaration in CUDA.
 2M

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4A.Write an OpenCL host code starting from creation of device buffer which performs merge sort in parallel. 5M

- 4B.Write an OpenCL kernel code which performs merge sort in parallel. 5M
- 5A.How do you handle errors in CUDA? How do you find the execution time of kernel in CUDA? Give an example program. 5M
- 5B. Write a parallel program in CUDA to multiply two Matrices A and B of dimensions MxN and NxP resulting in Matrix C of dimension MxP. Create M number of threads, and each row of the resultant matrix is to be computed by one thread.
 5M