BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : VII/ADD**
BRANCH: CSE **SESSION : MO/18**

SUBJECT: CS8029 PARALLEL AND DISTRIBUTED SYSTEMS

TIME: 3 HRS. **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)	Explain the need of parallel processing.	[2]
Q.1(b)	Differentiate between parallel computing and distributing computing.	[4]
Q.1(c)	Prove that a *K*-stage linear pipeline can be at most *K*-time faster than that of non-pipeline serial processor.	[6]
Q.2(a)	What do you mean by suffix sums problem?	[2]
Q.2(b)	Write and illustrate an EREW PRAM algorithm for parallel reduction.	[4]
Q.2(c)	Present and illustrate the PRAM algorithm for list ranking. Comment on the time complexity of your algorithm.	[6]
Q.3(a)	Write a parallel algorithm for multiplying two $n \times n$ matrices on a 2-D mesh SIMD computer.	[2]
Q.3(b)	Present an illustration of your algorithm for 3×3 operand matrices.	[4]
Q.3(c)	Comment on the complexity of your algorithm.	[6]
Q.4(a)	What do you mean by a linear system?	[2]
Q.4(b)	Define upper and lower triangular matrix. Name the method that can be used to solve a triangular linear system.	[4]
Q.4(c)	Present an algorithm to solve an upper triangular linear system on a SISD model of computer and discuss its time complexity.	[6]
Q.5(a)	State the general leader election Problem.	[2]
Q.5(b)	Describe an $O(n^2)$ algorithm for leader election in asynchronous rings	[4]
Q.5(c)	Based on the idea of Q.5 (b) algorithm, present an $O(n \log n)$ algorithm for leader election in asynchronous rings.	[6]
Q.6(a)	Define mutual exclusion problem in distributed environment.	[2]
Q.6(b)	How can mutual exclusion problem be solved using powerful primitive like Binary Test & Set Registers? Write the pseudo code for the same.	[4]
Q.6(c)	What is Read-Modify-Write register? Present a solution for mutual exclusion problem using Read-Modify-Write registers.	[6]
Q.7(a)	Differentiate Broadcast and Multicast in distributed environment.	[2]
Q.7(b)	Describe broadcast service qualities in terms of ordering and reliability.	[4]
Q.7(c)	Present a symmetric algorithm to achieve totally ordered broadcast.	[6]

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