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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 13-01-2025 **Time:** 09.30 am – 12:30 pm |

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| **School:** SOCSE | **Program:** B. Tech CSE | |
| **Course Code :**CSE3079 | **Course Name :**Parallel Computing | |
| **Semester**: V | **Max Marks**:100 | **Weightage**:50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** |  |  |  |  |  |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Define concurrent computing. | **2 Marks** | **L1** | **CO1** |
| **2** | List the applications of parallel computing. | **2 Marks** | **L1** | **CO1** |
| **3** | Define the term uniprocessor system. | **2 Marks** | **L1** | **CO1** |
| **4** | What is meant by prefetching? | **2 Marks** | **L2** | **CO2** |
| **5** | What is the use of multi stage network? | **2 Marks** | **L1** | **CO2** |
| **6** | Draw the diagram of fat tree. | **2 Marks** | **L2** | **CO2** |
| **7** | Classify the types of parallel algorithm models. | **2 Marks** | **L2** | **CO3** |
| **8** | What is the use of speculative decomposition? | **2 Marks** | **L1** | **CO3** |
| **9** | Expand OMP and MPI. | **2 Marks** | **L2** | **CO4** |
| **10** | What is the use of distro\_Array? | **2 Marks** | **L1** | **CO4** |

**Part B**

|  |  |  |  |  |  |  |  |  |  |  |  |
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| **Answer the Questions Total 80 Marks.** | | | | | | | | | | | |
| **11.** | | **a.**  **b.** | | Illustrate arithmetic pipeline and instruction pipeline with diagram.   1. Explain CPU instruction steps with diagram 2. Compare tightly coupled systems with loosely coupled systems. | | **10 Marks**  **5 Marks**  **5 Marks** | | **L3**  **L3**  **L3** | | **CO1**  **CO1**  **CO1** | |
| **or** | | | | | | | | | | | |
| **12.** | | **a.** | | Demonstrate the parallel processing mechanisms with a diagram. | | **20 Marks** | | **L3** | | **CO1** | |
|  | |  | |  | |  | |  | |  | |
| **13.** | | **a.** | | Demonstrate One-to-all broadcast and all-to-one reduction using   1. Mesh topology 2. Ring topology | | **20 Marks** | | **L3** | | **CO2** | |
| **or** | | | | | | | | | | | |
| **14.** | | **a.**  **b.** | | Sketch the concept of granularity for adding 16 numbers.  Interpret the one to all broadcast using hypercube topology | | **10 Marks**  **10 Marks** | | **L3**  **L3** | | **CO2**  **CO2** | |

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| **15.** | **a.**  **b.** | Solve the given problem using Recursive Decomposition  technique  **(i).** Find the Smallest of given Number  **(ii).** Sort the given list   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **25** | **22** | **11** | **1** | **10** | **6** | **8** | **33** | **7** | **4** | **19** | **2** |   Consider the task dependency graphs of the two database query decompositions:  Find the critical path length, amount of work done and average degree of concurrency of the two task- dependency graphs? | **10 Marks**  **10 Marks** | **L3**  **L3** | **CO3**  **CO3** |
| **Or** | | | | | |
| **16.** | **a.**  **b.** | Explain any 5 different types of parallel algorithm models with diagrams.  Solve 15 puzzle problem with proper steps. | **15 Marks**  **5 Marks** | **L3**  **L3** | **CO3**  **CO3** |

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| **17.** | **a.**  **b.** | Write a program to find the largest among N numbers  using OpenMP.  Create a program to process 1 to send out a message containing the integer 42 to process 2 using send () and receive () primitives using MPI.Create a MPI program to scatter data {39,45,67,72} with 4 processors. | **10 Marks**  **10Marks** | **L6**  **L6** | **CO4**  **CO4** |
| **Or** | | | | | |
| **18.** | **a.**  **b.** | Write a program to find the sum of 100 natural numbers using OpenMP.  Create a program to process 1 to send out a message containing the integer 42 to process 2 using send () and receive () primitives using MPI. | **10 Marks**  **10Marks** | **L6**  **L6** | **CO4**  **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***