|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No. |  |  |  |  |  |  |  |  |  |  |  |  |



**PRESIDENCY UNIVERSITY**

**Bengaluru**

|  |
| --- |
| **End - Term Examinations – JANUARY 2025** |
| Date: 07 – 01- 2025 Time: 09:30 am – 12:30 pm |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** |
| **Marks** | **26** | **26** | **24** | **24** |

**Instructions:**

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

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | List the applications of parallel computing. | **2 Marks** | **L1** | **CO1** |
| **2** | How parallel computing works? | **2 Marks** | **L1** | **CO1** |
| **3** | Define the term superscalar execution. | **2 Marks** | **L1** | **CO1** |
| **4** | Expand: SIMD, MIMD | **2 Marks** | **L2** | **CO2** |
| **5** | What is the use of bus topology? | **2 Marks** | **L1** | **CO2** |
| **6** | Draw the diagram of static and dynamic tree network. | **2 Marks** | **L2** | **CO2** |
| **7** | Classify the types of decomposition techniques. | **2 Marks** | **L2** | **CO3** |
| **8** | List the characteristics of task interactions. | **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**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Answer the Questions Total 80 Marks.** | | | | | | | | | | | |
| **11.** | | **a.** | | Illustrate the parallel processing mechanism with a diagram. | | **20 Marks** | | **L3** | | **CO1** | |
| **or** | | | | | | | | | | | |
| **12.** | | **a.** | | Demonstrate the uniprocessor architecture with a diagram and explain super scalar execution with proper steps. | | **20 Marks** | | **L3** | | **CO1** | |
|  | |  | |  | |  | |  | |  | |
| **13.** | | **a.** | | Illustrate 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** | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **15.** | **a.**  **b.** | Solve the given problem using Recursive Decomposition  technique  (i). Find the Smallest of given Number  (ii). Sort the given list   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **5** | **12** | **11** | **1** | **10** | **6** | **8** | **3** | **7** | **4** | **9** | **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.** | Explain different types of parallel algorithm models with diagrams. | **20 Marks** | **L3** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **17.** | **a.**  **b.** | Write a program to find the smallest among N numbers  using OpenMP.  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** |