IIIT Vadodara

B.Tech. (CSE): Semester VII

Introduction to Distributed & Parallel Computing (CS-401)

End Semester Exam

Max-Marks – 50 **Time: 3 Hours**

Instructions – Question 1 is compulsory with 2 marks each. Attempt any six from the rest. All questions are compulsory and carry equal marks. Answers must be specifically written.

1. All below questions are compulsory.
   a) Define distributed computing in a single sentence.
   b) What is the significance of load balancing in distributed systems?
   c) Differentiate between data-level parallelism and task-level parallelism.
   d) True or False: Distributed systems require middleware for communication. Justify.
   e) Why is shared memory architecture less scalable than distributed memory architecture?
   f) Google Colab supports GPUs for computing. State two advantages of this feature.
   g) What are the main differences between virtualization and containerization?
   h) What is the role of Remote Procedure Call (RPC) in distributed systems?
   i) Explain the term "latency" in the context of parallel computing.
   j) What are the advantages of using web services like SOAP and REST in distributed systems?
2. Define distributed and parallel computing with examples. Highlight their key differences in terms of architecture and use cases.
3. Explain the concept of virtualization with an example. Discuss how virtualization enables cloud computing. Differentiate between Type 1 and Type 2 hypervisors.
4. Describe the three widely used communication models in distributed systems. Discuss the role of message-oriented communication in real-time applications.
5. Compare Uniform Memory Access (UMA) and Non-Uniform Memory Access (NUMA). Discuss their advantages and disadvantages with examples.
6. Explain the application of parallel computing in scientific simulations. Discuss the limitations of parallel computing with examples of instruction-level and task-level parallelism.
7. Why is GPU preferred for image processing? Discuss the concept of parallelism in GPUs with an example.

8. Explain the components of web services: SOAP, WSDL, and UDDI. Highlight the features and advantages of web services in distributed systems.
9. Describe the layers of the OSI model and their functions. Compare the OSI and TCP/IP models in terms of design and application.
10. Explain the steps involved in client-server communication with an example. Discuss the advantages of the client-server model in distributed systems.
11. Differentiate between multithreading and multiprocessing. Explain their roles in achieving parallelism with examples.