H Roll No. 2194026

TCS–451

B. TECH. (CSE)
(FOURTH SEMESTER)
END SEMESTER
EXAMINATION, June, 2023

VIRTUALIZATION AND CLOUD COMPUTING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any ***two*** sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Explain the different perspectives on cloud computing, considering the viewpoints of end-users, businesses and IT professionals. (CO1)

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(b) According to the National Institute of Standards and Technology (NIST), what are the essential characteristics, service models, and deployment models of cloud computing ? (CO1)

(c) What are some popular computing platforms and technologies used in cloud computing ? Discuss Amazon Web Services (AWS), Google AppEngine, Microsoft Azure, Hadoop, Force.com and Salesforce.com. (CO1)

2. (a) What is virtualization and how does it work ? Explain its concept in computing. (CO2)

(b) Explain the taxonomy of virtualization techniques. Discuss the different types of virtualization approaches. (CO2)

(c) Differentiate between full virtualization, partial virtualization and para-virtualization in terms of hardware virtualization. (CO2)

3. (a) Provide a case study of Intel VT-x. Explain its features and how it enables virtualization on Intel processors. (CO3)

   (b) How do system virtual machines provide resource virtualization ? Explain the virtualization of processors, memory and input/output devices. (CO3)

   (c) Discuss the concept of process virtual machines. How do they emulate memory architecture, instruction execution and operating systems ? (CO3)

4. (a) Describe different approaches to parallel programming, including task parallelism and data parallelism. Explain how they distribute computational tasks across multiple processors. (CO4)

   (b) Explain the difference between parallel computing and distributed computing. How do they differ in terms of architecture and resource utilization ? (CO4)

(c) Explain different models for inter-process communication in distributed computing, such as message passing and remote procedure call (RPC). (CO4)

5. (a) Explain the Cloud Computing Reference Architecture (CCRA). What are the key components and layers in the CCRA ? (CO5)

(b) Explain the concept of workload distribution architecture in cloud computing. How does it distribute workloads across multiple cloud resources ? (CO5)

(c) What is cloud bursting architecture ? Explain how it enables the scaling of resources beyond the capacity of the primary cloud. (CO5)