Enrollment No......................................

Faculty of Engineering

End Sem Examination May-2024

IT3CO35 Distributed & Cloud Computing

Programme: B.Tech.   Branch/Specialisation: IT

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1   i.   What does DCE stand for in distributed computing?   **1**
      (a) Distributed Computing Environment
      (b) Decentralized Cloud Environment
      (c) Dynamic Communication Engine
      (d) Distributed Control Entity

  ii.   What is one of the deployment models in cloud computing?   **1**
      (a) Intrusive deployment   (b) Limited deployment
      (c) Public cloud   (d) On-premises only

  iii.   What is one benefit of virtualization?   **1**
      (a) Decreased hardware utilization
      (b) Increased energy consumption
      (c) Improved resource management
      (d) Reduced scalability

  iv.   What is Remote Procedure Call (RPC)?   **1**
      (a) A method for executing procedures on a local machine
      (b) A protocol for communication between distributed objects
      (c) A technique for sharing memory across distributed systems
      (d) A mechanism for protecting processes in an operating system

  v.   What is a characteristic of Lamport timestamps?   **1**
      (a) They provide physical time synchronization
      (b) They ensure global clock consistency
      (c) They guarantee mutual exclusion in distributed systems
      (d) They establish a partial ordering of events

  vi.   In the context of distributed systems, what does PaaS stand for?   **1**
      (a) Platform as a Server   (b) Programming as a Service
      (c) Platform as a Service   (d) Program as a Server

vii. What is the purpose of a naming system in a distributed file system? **1**
(a) To organize files into directories
(b) To assign unique identifiers to files
(c) To map logical file names to physical locations
(d) To provide encryption for file data

viii. Which aspect of cloud security focuses on evaluating and identifying **1** security vulnerabilities?
(a) Vulnerability assessment (b) Security architecture
(c) Identity management (d) Access control

ix. Which of the following is NOT a type of load distributing algorithm? 1
(a) Round-robin (b) Random selection
(c) Least connections (d) Centralized scheduling

x. Which cloud application development platform utilizes the Xen 1 hypervisor?
(a) AWS (Amazon Web Services)
(b) Google App Engine
(c) OpenStack
(d) Microsoft Azure

Q.2 i. Explain the concept of edge computing and its role in modern **2** distributed systems.

ii. Discuss the evolution of DCE and its impact on the development of **3** distributed computing.

iii. Discuss the role of virtualization in cloud computing and its impact on **5** resource management and scalability.

OR iv. Describe the various deployment models in cloud computing, including **5** public, private, hybrid, and community clouds.

Q.3 i. Explain the difference between full virtualization and para- **2** virtualization.

ii. List three benefits of virtualization in distributed systems. **3**

iii. Define Remote Procedure Call (RPC) and explain how it enables **5** communication between processes in distributed systems.

OR iv. Define Distributed Shared Memory (DSM) and explain how it enables **5** shared memory access across distributed nodes.

Q.4 i. What is the difference between logical time and physical time? **3**

ii. How does Lamport's Logical Clock algorithm achieve ordering of **7** events in a distributed environment?

OR iii. Define Software as a Service (SaaS) and outline its advantages for end- **7** users and businesses.

Q.5 i. How does file service architecture differ from traditional file systems? **4**

ii. Define vulnerability assessment and its role in cloud security. **6**

OR iii. What is identity management? Why is it essential for cloud security? **6**

Q.6 Attempt any two:

i. Describe the characteristics of static and dynamic load distributing **5** algorithms.

ii. Define fault-tolerant services and their importance in distributed **5** systems.

iii. Compare and contrast Xen Hypervisor, AWS, Google App Engine, and **5** OpenStack as cloud application development platforms.

*****

Marking Scheme

DISTRIBUTED AND CLOUD COMPUTING (DCC) IT3CO35

Q.1 i)   a) Distributed Computing Environment   1
     ii)   c) Public cloud   1
     iii)   c) Improved resource management   1
     iv)   b) A protocol for communication between distributed object   1
     v)   d) They establish a partial ordering of events   1
     vi)   c) Platform as a Service   1
     vii)   c) To map logical file names to physical locations   1
     viii)   a) Vulnerability assessment   1
     ix)   d) Centralized scheduling   1
     x)   c) OpenStack   1

Q.2 i.   Explain the concept of edge computing and its role in modern   2
          distributed systems.
          Edge Computing   1 Mark
          Role of edge computing   1 Mark
     ii. Discuss the evolution of DCE and its impact on the development   3
          of distributed computing
          Explain DCE   1.5 Marks
          Impact of DCE   1.5 Marks
     iii. Discuss the role of virtualization in cloud computing and its   5
          impact on resource management and scalability.
          Role of virtualization   2 Marks
          Impact of virtualization   3 Marks
OR   iv. Describe the various deployment models in cloud computing,   5
          including public, private, hybrid, and community clouds.
          Deployment model   1 Mark
          Public model   1 Mark
          Private model   1 Mark
          Hybrid model   1 Mark
          Community   1 Mark

Q.3 i.   Explain the difference between full virtualization and para-   2
          virtualization.
          full virtualization   1 Mark
          para-virtualization.   1 Mark
     ii. List three benefits of virtualization in distributed systems   3
          Three benefits   1 Mark each
     iii. Define Remote Procedure Call (RPC) and explain how it enables   5
          communication between processes in distributed systems.
          Explain RPC   2 Marks

Enables Communication with diagram   3 Marks
OR   iv. Define Distributed Shared Memory (DSM) and explain how it   5
          enables shared memory access across distributed nodes.
          Distributed Shared Memory (DSM)   2 Marks
          how DSM enables shared memory access   3 Marks

Q.4 i.   What is the difference between logical time and physical time?   3
          Three difference   1 Mark each
     ii. How does Lamport's Logical Clock algorithm achieve ordering of   7
          events in a distributed environment?
          About lamport's algo   3 marks
          Event order diagram with time   4 marks
OR   iii. Define Software as a Service (SaaS) and outline its advantages for   7
          end-users and businesses.
          Define SaaS   3 Marks
          Four advantages   4 Marks

Q.5 i.   How does file service architecture differ from traditional file   4
          systems?
          Compare file service architecture & traditional FS   4 Marks
     ii. Define vulnerability assessment and its role in cloud security.   6
          Vulnerability   3 Marks
          Role in cloud security   3 Marks
OR   iii. What is identity management, and why is it essential for cloud   6
          security?
          About identity management   3 Marks
          essential for cloud security   3 Marks

Q.6
     i.   Describe the characteristics of static and dynamic load distributing 5
          algorithms.
          characteristics of static load distributing algorithms   2.5 Marks
          characteristics dynamic load distributing algorithms.   2.5 Marks

     ii. Define fault-tolerant services and their importance in distributed   5
          systems.
          Services   2.5 Marks
          Importance   2.5 Marks
     iii. Compare and contrast Xen Hypervisor, AWS, Google App   5
          Engine, and OpenStack as cloud application development
          platforms
          Five comparisons with diagram   1 Mark each

*****

[2]

[3]