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[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 1765

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Unique Paper Code : 2342013604

Name of the Paper : Cloud Computing

Name of the Course : **B.Sc. (Hons) Computer Science (DSC)**

Semester : VI

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1 (Section A)** is compulsory.
3. Attempt any **four (04)** questions from **Section B**.
4. Parts of a question should be attempted together.

Section A

- Q1 (i). Define the term utility-oriented computing and provide one specific example of an application that is well-suited for this model. (3)
- (ii). Define virtualization. State any two characteristics of a virtualized environment. (3)
- (iii). List any three candidate sectors suitable for Community Cloud deployment. (3)
- (iv). Distinguish between client responsibility and vendor responsibility in cloud security. (3)
- (v). Differentiate between Capital Expenditure (CapEx) and Operating Expenditure (OpEx) in the context of cloud computing. (3)
- (vi). How is parallel computing different from distributed computing? Explain using examples. (3)
- (vii). Define OAuth and explain any two advantages of using this protocol over the traditional method of sharing a username and password with a third-party application. (3)
- (viii). What is data-intensive computing? Give any two application areas where it is used. (3)
- (ix). Describe the fundamental architecture of the Google File System (GFS) and explain the specific roles played by the Master and Chunkservers (3)
- (x). Which type of hypervisor would you choose if you just need to test a new Linux distro or run a piece of legacy software on your personal computer without wiping your hard drive? Justify (3)

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Section B

- Q2 (i.) Explain the concept of Cloud Computing. List two key benefits and two significant limitations with a suitable example to support your answer. (9)
- (ii.) Explain the limitations of using traditional RDBMS for large-scale data-intensive applications. How does NoSQL address these limitations? (6)
- Q3 (i.) Explain the importance of hypervisors in the context of cloud computing. Differentiate between the types of hypervisors using suitable examples. (9)
- (ii.) For the following statements, state if true or false. Justify your answer. (6)
- a) Horizontal scaling is suitable for parallel computing.
- b) A private cloud is suitable for a collaboration between multiple hospitals that share a research database for cancer treatment.
- Q4 (i.) Explain the advantages of hardware virtualization. Describe the major hardware virtualization techniques in detail. (9)
- (ii.) Discuss the security service boundary in IaaS, PaaS, and SaaS. (6)
- Q5 (i.) Explain the three major milestones that led to the development of cloud computing. (9)
- (ii.) What are Service Level Agreements (SLAs)? Discuss their importance in cloud computing with key parameters. (6)
- Q6 (i.) What are the components of a distributed system? How do they form a unified system? (9)
- (ii.) A startup wants to build, deploy, and scale its own web application with low initial investment and fast setup. Which cloud service model and deployment type would you recommend? Explain with reasons. (6)
- Q7 (i.) Explain the classification of Cloud computing services and compare the different service models in terms of their characteristics, product types, and vendor offerings with suitable examples. (9)
- (ii.) What is the MapReduce programming model? Explain the specific roles of the Map and Reduce functions, and describe how the Shuffle and Sort phase bridges them. (6)