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Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Specialized in Information Technology

Final Examination
Year 4, Semester 2 (2023)

IT4090 – Cloud Computing

Duration: 2 Hours

November 2023

Instructions to Candidates:

- This paper is preceded by 10 minutes reading period. The supervisor will indicate when answering may commence.
- This paper has 4 questions.
- Answer all questions in the booklet given.
- The total mark for the paper is 100.
- This paper contains 4 pages, including the cover page.
- Electronic devices capable of storing and retrieving text, including calculators and mobile phones are not allowed.

Question 1 (25 marks)

a) Explain "**Cloud Computing**" and its key characteristics. (3 marks)

b) Compare and contrast the key service models of Cloud Computing. Give examples for each service model. (4 marks)

c) Compare and contrast the major cloud deployment models. Give examples for each deployment model. (4 marks)

d) Assume you are a Chief Technical Officer (CTO) of a small business that is growing rapidly. Your current IT infrastructure is on-premises and is starting to show its age. You are concerned about the ability of your infrastructure to handle future growth and peak traffic periods. You are also concerned about the costs of maintaining and upgrading your on-premises infrastructure.

i. Discuss the potential challenges that arise if you decide to continue with on-premises resources. (4 marks)

ii. How would you develop a strategy to leverage the benefits of a cloud-based environment for the above scenario? Apply factors such as scalability, cost-efficiency, and agility in your response. (5 marks)

iii. Design a simple architecture diagram which represents how the cloud resources are provisioned. (5 marks)

Question 2 (25 marks)

a) Explain the term "**Cloud Security**". (3 marks)

b) Explain the "**Shared Responsibility Model**" in cloud security. List two (2) distinct responsibilities of cloud service providers and customers. (4 marks)

c) Assume you are a cloud security engineer at a large financial services company. Your company stores all its customer data in a cloud database. You are concerned about the security of this data and the potential for unauthorized access.

i. List the 3 examples of cloud databases that can be used in the above scenario. (2 marks)

ii. In the context of cloud security, develop the essential components and best practices that you should implement to safeguard your data and applications based on aspects Authentication and Authorization, Data Encryption and Identity and Access Management. (6 marks)

iii. Apply the steps that you can take to improve the security of your cloud database. (6 marks)

d) **"Shared Responsibility Model contributes to a more secure cloud computing environment."** Do you agree with the statement? Justify your answer. (4 marks)

Question 3 (25 marks)

a) Explain cloud-native applications. (3 marks)

b) Describe the terms "**Microservices model**" and "**Serverless model**". (3 marks)

c) Compare and contrast microservices and serverless architecture. (4 marks)

d) In the context of modern cloud-based application development, discuss the benefits and drawbacks of above architectures and provide examples of use cases where each architecture is well-suited. (6 marks)

e) Explain what **Function as a service (FaaS)** is and its key features. (3 marks)

f) Justify how the use of microservices, containers, and DevOps practices contributes to building and maintaining cloud-native architectures.

Additionally, provide examples of tools or technologies commonly employed in the development and deployment of cloud-native applications. (6 marks)

Question 4 (25 marks)

a) Explain the fundamental reasons why organizations consider migrating their IT infrastructure to the cloud. (3 marks)

b) Discuss challenges associated with cloud migration. (4 marks)

c) Compare and contrast 'lift-and-shift,' 're-platforming,' and 're-architecting' approaches, providing examples of scenarios where each strategy might be most suitable. Additionally, highlight key considerations and challenges associated with implementing these strategies. (6 marks)

d) Explain the term "Cloud Well-Architected Framework". (3 marks)

e) Evaluate how the key pillars of the Cloud Well-Architected Framework contribute to building robust cloud architectures. (5 marks)

f) **"Cloud Computing plays a vital role in modern enterprises."**
Do you agree with this statement. Justify your answer. (4 marks)

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