Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Specialized in Information Technology

Repeat Examination
Year 4, Semester 2 (2022)

IT4090 – Cloud Computing

Duration: 2 Hours

June 2022

Instructions to Candidates:

- ♦ This paper is preceded by 10 minutes reading period. The supervisor will indicate when answering may commence.
- ♦ This paper has 5 questions.
- ♦ Answer all questions in the booklet given.
- ♦ The total marks 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 (20 marks)

'ABC' is a software company which handles various services. The company has a small data center at its main branch where the company's servers and data storage are located. All the staff of the company use different types of personal computers to connect with the company data center. The directors of the company have received a report from a group of consultants that recommends the following.

- The company should consider using Office 365 as a SaaS service for office productivity applications and email.
- Some of the company software could be run as a PaaS service for internal users but could also be supplied as a platform for other users to access as a service.
- The company can move some of its aging computing infrastructure to an IaaS service to avoid the capital cost of replacement.

a) Describe the benefits and drawbacks of using SaaS, PaaS and IaaS models.

(6 marks)

b) Explain what you can do for the second suggestion given by the consultants regarding the software.

(6 marks)

c) Company management decides that the infrastructure should be created in a public cloud. Consider the cloud provider as AWS and briefly explain what steps you would take to secure the infrastructure.

(8 marks)

Question 2 (20 marks)

Cloud security is a collection of procedures and technology designed to address external and internal threats to business security. Organizations need cloud security as they move towards their digital transformation strategy and incorporate cloud-based tools and services as part of their infrastructure.

a) Explain the term "*Software Defined Security*" (SDS) and three benefits of using SDS in applications. (5 marks)

b) Discuss about Multi Factor Authentication (MFA) and explain a real world example where MFA is included.

(5 marks)

c) Compare and Contrast Federated Identity and Single Sign on (SSO).

(5 marks)

d) Discuss the term *"Cloud Monitoring"* and benefits of cloud monitoring in different cloud services.

(5 marks)

Question 3 (20 marks)

A cloud database is a database that is built, deployed, and accessed in a cloud environment, such as a private, public, or hybrid cloud. Mainly two types of database models as Relational and Non-relational.

a) Discuss how flexibility, complexity and performance of different Non-relational databases varies.

(5 marks)

b) Compare and Contrast Data Warehouse and Data Lake.

(5 marks)

c) Explain the term *"Database Caching"*. Give two examples for caching systems.

(5 marks)

d) Compare and Contrast Online Transaction Processing (OLTP) and Online Analytical Processing (OLAP).

(5 marks)

Question 4 (20 marks)

Cloud Migration is the process of moving data, applications or other business elements to a cloud computing environment.

a) Assume that you have developed a shopping cart application. Describe the type of Cloud Native architecture that that you can use for this.

(5 marks)

b) Compare and Contrast Monolithic and Microservices application approach.

(5 marks)

c) Discuss the importance of SecOps operating model and benefits of SecOps in development.

(5 marks)

d) Justify the "Rehost strategy" in AWS's 6 R's cloud migration.

(5 marks)

Question 5 (20 marks)

Innovation is a key to a particular company's success. Some organizations excel at inspiring innovation while others lag behind.

AWS Well-Architected helps cloud architects build secure, high-performing, resilient, and efficient infrastructure for a variety of applications and workloads.

a) Describe the three main barriers for IT Innovation.

(5 marks)

b) Describe the five pillars in AWS Well Architectured Framework.

(5 marks)

c) Discuss three design principals for reliability in the cloud as per the AWS Well Architected Framework.

(5 marks)

d) Briefly explain the concept of multi-cloud integration.

(5 marks)

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