Introduction to Cloud Computing (CS4037)

Date: Sep 22nd 2025

Course Instructor:
Mr. Danyal Farhat

Name = Hasan + Yahya

Sessional-I Exam

Total Time: 1 Hour
Total Marks: 30
Total Questions: 06

Semester: Fall-2025
Campus: Lahore
Dept: CS / SE

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Student Name   Roll No   Section   Student Signature

Instruction/Notes
- Read entire question paper before attempt.
- Attempt all questions on the answer sheet.

CLO # 1: Learn about the concepts of the fundamental cloud computing.

Q1: DTGOV has assembled cloud-aware infrastructures in each of its data centers, which are comprised of the following components: [6 marks]

- Tier-3 facility infrastructure, which provides redundant configurations for all of the central subsystems in the data center facility layer.
- Redundant connections with utility service providers that have installed local capacity for power generation and water supply that activates in the event of general failure.
- An internetwork that supplies an ultra-high bandwidth interconnection between the three data centers through dedicated links.
- Redundant Internet connections in each data center to multiple ISPs and the .GOV extranet, which interconnects DTGOV with its main government clients.
- Standardized hardware of higher aggregated capacity that is abstracted by a cloud-aware virtualization platform.

Physical servers are organized on server racks, each of which has two redundant top-of-rack router switches (layer 3) that are connected to each physical server. These router switches are interconnected to LAN core switches that have been configured as a cluster. The core-switches connect to routers that supply internetworking capabilities and firewalls that provide network access control capabilities.

Given the above case study scenario, please provide following:

A view of the server network connections inside the DTGOV data center.

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Q2: With the help of diagrams, provide a difference between type 1 hypervisor and type 2 hypervisor. Diagrams should be self-explanatory. Do not write long sentences beating around the bush. [4 marks]

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Q 3: Make an architecture depicting that "NUMUN VM" deployed in an organization VDC network "ISBVPC01" and "FLEX VM" deployed in an organization VDC network "LHRVPC04"·"ISBVPC01" exists in organization VDC "ISBCampusVDC" and "LHRVPC04" exists in organization VDC "LHRCampusVDC". Both VDCs are virtually connected via their respective Edge Service Gateways and are part of a cloud organization "FAST".   [5 marks]

CLO # 2: Understanding AWS foundational services with the help of HOLs of AWS Academy platform.

Q4: Write the factors involved in order to select the right region while deploying resources. [4 marks]

CLO # 2: Understanding AWS foundational services with the help of HOLs of AWS Academy platform.

Q5: You have an assignment to deploy a "Windows with SQL Enterprise" instance in the UAE region. The instance type "m5.metal" has 96 vCPUs, 384 GB RAM, EBS attached storage and upto 26 Gbps network throughput. The on-demand hourly rate of the instance is **$46.066**. The on-demand per second rate of the instance is **$0.015**. This rate includes machine's virtual resources along with windows and SQL Enterprise subscriptions.   [6 marks]

Calculate the **annual cost** for the instance when you deploy it as a reserve instance.

a) Hourly based All Upfront Reserve Instance with 70% Discount: 121061.448

b) Hourly based Partial Upfront Reserve Instance with 50% Discount: 201769.08

c) Hourly based No Upfront Reserve Instance with 20% Discount: 312830.528

d) Per Seconds based All Upfront Reserve Instance with 70% Discount: 141912

e) Per Seconds based Partial Upfront Reserve Instance with 50% Discount: 236520

f) Per Seconds based No Upfront Reserve Instance with 20% Discount: 378432

CLO # 1: Learn about the concepts of the fundamental cloud computing.

Q6.a: Write down the names of cloud delivery models that are widely established.   [3 marks]

Q6.b: Write down the names of cloud deployment models that are widely established.   [2 marks]