



Undergraduate Programme
Department of Computer Science and Mathematics
Semester 2 Year 2018

FINAL EXAMINATION PAPER

ITC334 CLOUD COMPUTING

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. **This Final Course Examination Paper is worth 100 marks contributes 50% of the total course assessments.**
6. This paper contains three (3) sections A, B and C.
7. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
8. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-20	Multiple Choice	20	25 minutes
B	1-22	Open - Ended	60	80 minutes
C	1- 3	Essay	20	75 minutes
		TOTAL	100	180 Minutes

Section A: Multiple Choice

(20 marks)

Instructions:

**Write only the question number and the letter representing the best answer in the answer booklet.
Answer all the questions**

1. When networks are architected for cloud services, which quality addresses the ability to expand to meet variable data requirements?
A. Resiliency
B. Simplified management
C. Scalability
D. Throughput
2. _____ cloud services can provide interconnections between cloud functioning, allowing multiple clouds to be managed as a single cloud resource pool.
A. Hybrid
B. Federated
C. Layer 2
D. Layer 3
3. Which cloud standards body is focused on audit and security standards for cloud computing?
A. Cloud Security Alliance (CSA)
B. National Institute of Standards and Technology (NIST)
C. IEEE Standards Association (IEEE-SA)
D. Organization for the Advancement of Structured Information Standards (OASIS)
4. Adopting cloud services will impact an organization's financial management due to which of the following changes?
A. Cost of technical support escalations
B. Shifting technology from a capital to an operational expenditure
C. Changes in software licensing
D. Both B and C
5. Which of the following is not a critical success factor in selecting a cloud service provider?
A. The provider is able to provide the appropriate level of security for the organization's data.
B. The provider's offerings meet identified organizational requirements.
C. The provider uses open, Java-based standards.
D. The provider's uptime meets the organization's availability needs.
6. Prior to cloud services adoption, technical and business staff must work together to perform what action?
A. Identify business processes and their dependencies.
B. Determine changes to the organization's infrastructure.
C. Determine the impact to business processes.
D. Both A and C.

7. What type of application design is preferable for a cloud-based application?
 - A. A design that uses stateful objects
 - B. A design that uses stateless objects
 - C. A design that uses in-memory state management
 - D. A design that uses client-based state Management

8. Which of the following is not a risk associated with cloud-based applications?

A. Vendor lock-in	C. Security
B. Reliability	D. Lack of development tools

9. Which of the following risks leads to an increased cost for running a cloud-based application?

A. Security compliance	C. DDOS attacks
B. IT organizational changes	D. Cloud service maturity

10. Which of the following services requires a broader capacity of technical skills owned by the organization contracting a cloud service vendor?
 - A. SaaS
 - B. PaaS
 - C. IaaS
 - D. XaaS

11. What application can be used to move a service from an on-premises test environment to the public cloud in a hybrid cloud environment using Microsoft System Center and Azure?

A. Operations Manager	C. AppController
B. Configuration Manager	D. Virtual Machine Manager

12. What is the process of verifying a user's identity?

A. Authorization	C. Logging in
B. Authentication	D. Access control

13. Which ITIL volume provides guidance on incident and problem management

A. Service Strategy	C. Service Transition
B. Service Design	D. Service Operation

14. What are some examples of utility value provided by a cloud-based service?

A. Access from anywhere	C. Better security
B. Higher availability	D. Business continuity

15. How do you calculate the overall availability of a service composed of two tiers, where each tier is 99.999% available?
- A. Multiply the availability values.
 - B. Average the availability values.
 - C. Subtract each value from 100%, add the results, and subtract that from 100%.
 - D. Add the values, subtract from 200%, and subtract that from 100%.
16. Which of the following elements should be monitored by a consumer of a SaaS service?
- A. Network fabric
 - B. Storage fabric
 - C. Services on VMs
 - D. Connectivity to service
17. Which of the following is not an appropriate mitigation to protect against malicious insiders?
- A. Employee background checks
 - B. Security policies
 - C. Timely installation of security patches
 - D. Logging
18. Which security measures can be used to secure communications between cloud services and end users?
- A. VPN
 - B. SSL
 - C. Firewall
 - D. Both A and B.
19. Which of the following is not an appropriate mitigation technique against data exposure?
- A. Audit
 - B. Recovery
 - C. Data isolation
 - D. Encryption
20. Which of the following does not impact data confidentiality?
- A. Man-in-the-middle (MitM)
 - B. Cross-site scripting (XSS)
 - C. Denial of service (DoS)
 - D. Password theft

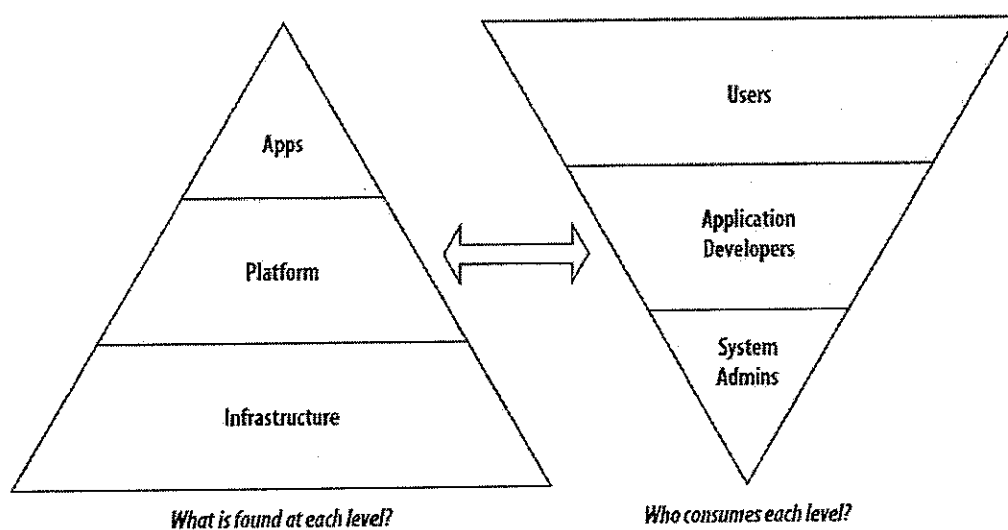
Section B: Open-Ended questions

(60 marks)

Instructions:

Answer all the questions.

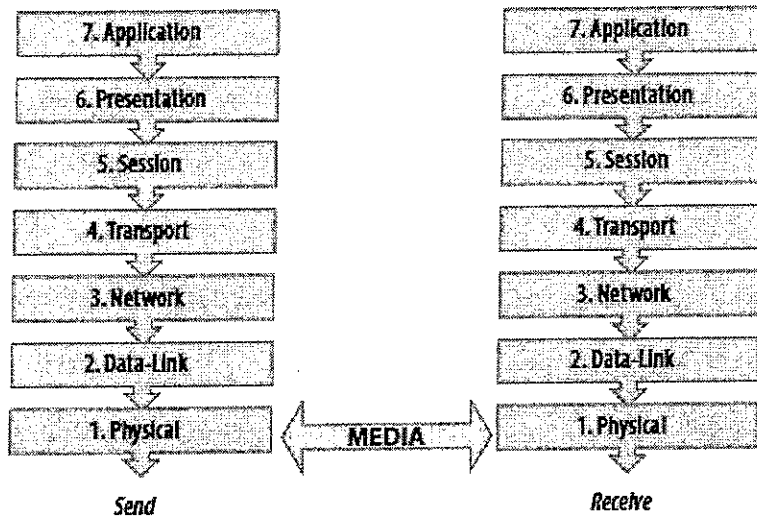
1. Explain what you understand by the term Cloud computing. (1 mark)
2. Explain the terms Private cloud, Hybrid clouds and Public Cloud. (3 marks)
3. These staff members work for a cloud provider. Network operation center staff, Vendor management staff, Support desk staff, Cloud architect, and Cloud service manager. Describe them. (5 marks)
4. Outline the term cloud bursting. (1 mark)
5. Define the term *Multitenancy*. (1 mark)
6. The Figure below aligns these roles using the same model layering. Explain what you understand by the figure shown. (3 marks)



7. Explain the term Software as a Service.(SaaS) and give three examples. (4 marks)

8. Traditional software requires a capital expense to purchase and operating expenses to install, update, and maintain. Traditional software application management follows a predictable process: Arrange the seven steps or process accordingly. (7 marks)
A-Install software update to client computers, B-Patch software in maintenance cycle,
C-Perform capital acquisition for identified software, D-Identify software meeting requirements,
E-Install software to client computers, F-Return to maintenance cycle until next software update,
G- Perform acquisition for software update.
9. The extended availability of SaaS applications also supports additional business processes. Many other organizational advantages become possible through SaaS.
Write at least three advantages. (3 marks)
10. What Is Vendor Lock-In? (1 mark)
11. The third category of cloud services, Infrastructure as a Service (IaaS), allows a client almost complete control over applications, languages, and fundamental resources supporting organizational services.
Mention at least three resources that support organizational services. (3 marks)
12. Explain the term Big Data. (1 mark)
13. Explain the term sharding. (1 mark)
14. The protocols and their functions are grouped into the Open Systems Interconnection (OSI) model, which specifies a seven-layer structure for network communication, as shown in Figure below. Give details on what happens on each protocol in the OSI model. (7 marks)

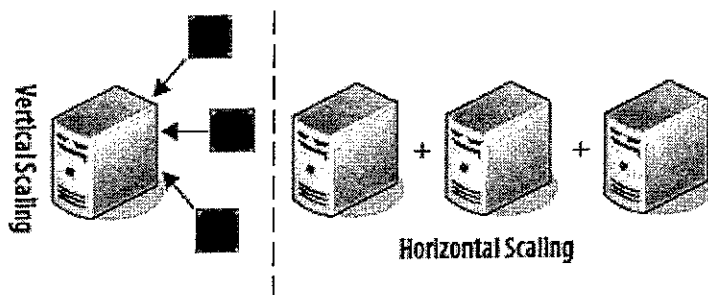
Communication as per the OSI Model



15. Identify three Business Drivers for Cloud Computing. (3 marks)

16. Find out the differences between Capital expenses vs. Operational Expenses. (2 marks)

17. Explain the diagram below. Vertical scaling vs. Horizontal scaling. (2 marks)



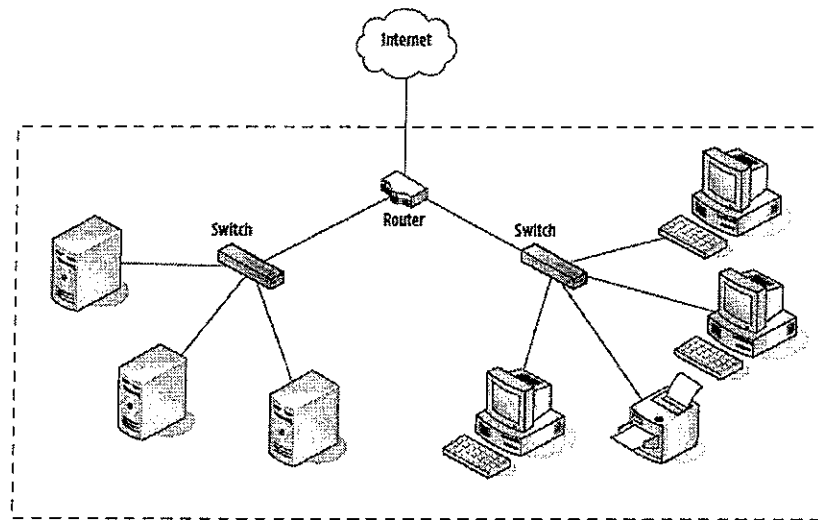
18. Explain the term "Return on Investment" (1 marks)

19. Define what you understand by the term scalability and resiliency. (2 marks)

20. In addition to changes in IP address systems, networks face additional challenges as their use continues to expand to meet new services and technologies. The biggest challenge for cloud networks is latency, which can result from several different factors. Network latency is the amount of time it takes for data to get from one network node to another. Mention three factors that contribute to network latency. (3 marks)

21. Explain the diagram below about traditional data center connectivity.

(3 marks)



22. A service-level agreement (SLA) outlines the expected level of service a customer can expect to receive from a service provider, the metrics used to measure said service, and the roles and responsibilities of both the service provider and the customer. It is a critical part of any service-oriented vendor contract. A typical service provider SLA would include the following components:
List six components. (3 marks)

Section C: Essay

(20 marks)

Answer any two questions out of the three questions given below.

Question 1

(10 marks)

- a) Identify an application that can be migrated from on-premises to a SaaS solution. Discuss the challenges an organization would face to execute the migration, and the skills necessary to make the transition.
- b) Identify an application that can be migrated from on-premises to an IaaS solution. Discuss the challenges an organization would face to execute the migration, and the skills necessary to make the transition.
- c) Explore cloud alternatives to traditional installed workstation applications.
- d) Identify cloud applications supporting mobile devices present in the classroom

Question 2

(10 marks)

- a) Identify a list of commonly used applications that are good candidates for becoming a cloud-based application.
- b) Identify who the customers for these applications would be, whether they are from within the organization or actual company customers.
- c) Identify a common data center job role and critically analyze changes as resources are transitioned to the cloud.
- d) Identify the business processes in your own organization or educational institution that would be enhanced by the integration of cloud computing resources.

Question 3

(10 marks)

Information security management system (ISMS) implementations are based on the Plan-Do-Check-Act (PDCA) process. Write about the ISMS and PDCA and their relationship.

