

THARAKA



UNIVERSITY

COLLEGE

UNIVERSITY EXAMINATIONS

**SECOND YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN
COMPUTER SCIENCE**

COSC 0274: EMERGING TECHNOLOGIES IN COMPUTER SCIENCE

STREAMS: DIP. COMPSCI Y2S2

TIME: 2 HOURS

DAY/DATE: THURSDAY 16/04/2020

11.30 AN – 1.30 PM

INSTRUCTIONS:

- Answer question **ONE** and **TWO** other questions
- Do not write anything on the question paper
- This is a **closed book exam**, No reference materials are allowed in the examination room
- There will be **NO** use of mobile phones or any other unauthorized materials
- Write your answers legibly and use your time wisely.
- Marks are awarded for clear and concise answers.

QUESTION ONE (30 Marks)

- a. You are working for a cloud computing service provider and have been sent to explain to a client why they should adopt cloud computing. Discuss **THREE** main areas in which the client will experience the gains of cloud computing technology. (6 Marks)
- b. Briefly explain the structure and components of blockchains (6 Marks)
- c. Explain each of the following types of clouds:
 - i. Public Cloud (2 Marks)
 - ii. Private Cloud (2 Marks)
 - iii. Hybrid Cloud (2 Marks)
- d. Blockchain is the underlying foundation for the Bitcoin cryptocurrency. State and explain **THREE** advantages of Bitcoin over current transaction systems (6 Marks)

- e. Blockchain has the potential for revolutionizing business networks, briefly discuss each of the following key concepts of a blockchain. (6 Marks)
- i. Shared Ledger
 - ii. Smart Contract
 - iii. Consensus

SECTION B (Answer any TWO questions)

QUESTION TWO (20 Marks)

- a. While providing examples in each, state and explain THREE cloud computing models (6 Marks)
- b. Discuss each of the following FOUR major cloud computing challenges (8 Marks)
- i. Data Protection
 - ii. Data Recovery and Availability
 - iii. Management Capabilities
 - iv. Regulatory and Compliance Restrictions
- b. List any THREE cloud computing providers today together with the service or product they provide (6 Marks)

QUESTION THREE (20 Marks)

- a. Giving examples, state and explain THREE types of blockchains (9 Marks)
- b. Blockchains are now recognized as the “fifth evolution” of computing, the missing trust layer for the Internet. Discuss the validity of this conclusion. (5 Marks)
- c. Discuss each of the following as relates to the Blockchain Lifecycle:
- i. Bitcoin (2 Marks)
 - ii. Ethereum (2 Marks)
 - iii. Factom (2 Marks)

QUESTION FOUR (20 Marks)

- a. Discuss the framework of four common communication models used by IoT devices. (8 Marks)
- b. Describe the various technology and trends that have enable Internet of Things. (10 Marks)

- c. List any two applications of IoT in the world today. (2 Marks)

QUESTION FIVE (20 Marks)

- a. Briefly explain each of the following types of cyberattacks and the countermeasures to detect and prevent them:
- i. Phishing (1 Mark)
 - ii. Sniffing (2 Marks)
 - iii. Denial-of-service Attack (2 Marks)
 - iv. Zero-day Exploit (2 Marks)
- b. Cryptography plays a very important role in securing data. State and briefly explain FOUR main goals of cryptography (8 Marks)
- c. List any FIVE certifications a computer science student can pursue towards becoming a professional in cybersecurity (5 Marks)
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