MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIVERSITY ORDINARY EXAMINATION

2024/2025 ACADEMIC YEAR

THIRD YEAR **FIRST** SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

SIT 312 – ELECTRONIC ACCESS CONTROL

DURATION: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Answer question ONE and any other two questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A – ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

a) Explain two types of access control. (4 marks)

b) Describe biometric technologies used for access control. (6 marks)

c) Describe three components of an electronic access control system. (6 marks)

d) You have been hired as a security manager of MUT. You are tasked with designing and implementing a comprehensive electronic access control system to secure multiple building; including classrooms, laboratories, offices. The university Has a workforce of 500 employees and 5000 students, all require different level of access across the campus.

i. Identify potential security risks the university faces in terms of authorized access. (4 marks)

ii. Explain how you would integrate the access control system with other security measures such as CCTV and alarms systems to provide comprehensive security with multiple buildings. (6 marks)

e) Describe how data security and privacy concerns related to cloud-based systems can be addressed particularly in the context of storing access logs and biometric data in the cloud. (4 marks)

SECTION B– ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO (20 MARKS)

(a) A large hospital has requested an upgrade of its biometric access control system to better secure sensitive areas such as operating rooms, drug storage and patient records. You are the consultant trusted with managing this project.

(i) Explain why biometric access control systems are preferable for securing high sensitivity areas in a hospital (4 marks)

(ii) Describe advantages of biometrics offer over traditional systems (2 marks)

(b) Describe the hardware components and software that you could recommend for hospital system, and explain how they would work together. (8 marks)

(c) Discuss how you would ensure compliance with regulations like HIPAH. (6 marks)

QUESTION THREE (20 MARKS)

(a) An organization has implemental a networked access control system in a large office building, but recent security incidents have raised concerns about system weakness. Explain the following types of physical security attacks that the organization may be vulnerable to and suggest how to prevent each: (8 marks)

(i) Dumpster diving

(ii) Impersonation

(iii) Piggy backing

(iv) Shoulder surfing

(b) Describe **THREE** Physical security measures the organization can implement to strengthen the security of its access control system. (6 marks)

(c) Explain three key benefits of switching from a traditional on-premises access control system to a cloud-based access control system. (6 marks)

QUESTION FOUR (20 MARKS)

You are the newly appointed Security Manager at a government Facility responsible for safeguarding sensitive documents and infrastructure. The facility requires multi- factor authentication and high security clearance of specific area.

(i) Explain how multi-factor authentication (MFA) enhances security. (6 marks)

(ii) Discuss the role of emerging technologies like Artificial Intelligence (AI) and internet of things (IoT) in enhancing the security of access control systems in government facilities. (6 marks)

(iii) Describe FOUR key components of an electronic access control system and the role each plays in securing high security government areas. (8 marks)