



TECHNICAL UNIVERSITY OF MOMBASA

INSTITUTE OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY

CIT 4408: VIRTUALIZATION

END OF SEMESTER EXAMINATION

SERIES: MARCH 2025

TIME: 2 HOURS

DATE: 30 Oct 2024

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions. **Do not write on the question paper.**

Question ONE (30 Marks)

- a) Define the term “hypervisor”. Briefly explain the two major categories of hypervisors giving an example in each case. [7 marks]
- b) Explain the concept of “CPU overcommitment” in virtualization. [3 marks]
- c) Explain the three properties of hypervisors as described by Popek and Goldberg [6 marks]
- d) State one benefit of cloning virtual machines and state at least three applications of cloning virtual machines [4 marks]
- e) Discuss any three uses of virtualization today [6 marks]

- f) Briefly explain any two benefits of network virtualization [4 marks]

Question TWO (20 Marks)

- a) Describe how **virtual CPU (vCPU)** allocation differs from physical CPU allocation in virtualized servers. [4 marks]
- b) Explain any **four** factors to be considered when choosing a hypervisor for virtualization task [8 marks]
- c) List at least FOUR free or open source hypervisors [4 marks]
- d) Explain the importance of file system permissions in virtualization and their impact on security. [4 marks]

Question THREE (20 Marks)

- a) Explain any **three** security issues associated with virtualization. [6 marks]
- b) List any four ways that can be used to these security issues [4 marks]
- c) Explain the advantages and disadvantages of using templates versus snapshots for managing virtual machine configurations. [6 marks]
- d) Explain the concept of differential backup in virtualization and its effectiveness compared to full cloning. [4 marks]

Question FOUR (20 Marks)

- a) Explain two reasons why CPU allocation is critical in virtual environments. [4 marks]
- b) Using relevant use cases, explain the following virtualization concepts [8 marks]
- i. Virtual Desktop
 - ii. Virtual Desktop Infrastructure
- c) Explain any three goals that may make a company consider implementing application virtualization. [6 marks]

d) Explain any **four** benefits of server virtualization [8 marks]

Question FIVE (20 Marks)

a) Briefly explain how hypervisor works in virtualization technology [5 marks]

b) Define the term **memory ballooning** and explain its function in virtualization.

[3 marks]

c) Explain any **four** factors to be considered when choosing a hypervisor for virtualization task [8 marks]

d) Explain the difference between **snapshot** and **checkpoint** [4 marks]