



TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
(BSIT 13S)

ICS 2202: OPERATING SYSTEMS I

END OF SEMESTER EXAMINATION

SERIES: APRIL 2014

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions.

Attempt question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One (Compulsory)

- a) State **THREE** objectives of (I/O) management. **(3 marks)**
- b) Explain the importance of the following techniques in information technology: **(6 marks)**
(i) Buffering
(ii) Caching
- c) Describe the following memory allocation methods. **(4 marks)**
(i) Swapping
(ii) Segmentation
- d) What is a semaphore? Explain busy waiting semaphores. **(4 marks)**
- e) Explain **TWO** sources of interrupts. **(4 marks)**
- f) With reference to deadlocks, define the 'safe sequence' **(2 marks)**

- g) State THREE process attributes whose information needs to be stored in PCB. (3 marks)
- h) Assuming that a job of 4kb is placed in a memory of 6kb. Suggest TWO options the system can adopt if the job still requires more memory. (4 marks)

Question Two

- a) Describe the features of each of the following operating structures: (12 marks)
- (i) Monolithic
 - (ii) Layered
 - (iii) Client-server
 - (iv) Virtual machines
- b) Explain FOUR necessary conditions of deadlock prevention. (8 marks)

Question Three

- a) List the THREE main types of file design and briefly describe how the records are stored in each file design. (12 marks)
- b) CPU burst time indicators the time, the process needs the CPU. The following are the set of processes with their respective CPU burst time (in milliseconds) processes CPU. burst time:
- | | |
|----------------|----|
| P ¹ | 10 |
| P ² | 5 |
| P ³ | 5 |

Calculate waiting time and average waiting time:

- (i) Suppose that the processes arrive in the order P₁, P₂, P₃
- (ii) Suppose that the processes arrive in the order P₂, P₃, P₁ (8 marks)

Question Four

- a) Define the following terms: (5 marks)
- (i) Device interface
 - (ii) Device register
 - (iii) Input/output processor
 - (iv) Polling
 - (v) Data chaining
- b) (I) Define the term device driver. (2 marks)
- (II) State any TWO functions of a device driver. (2 marks)
- (II) Describe the functions of the following device drivers: (6 marks)
- (i) Clock device driver
 - (ii) Disk device driver
- c) Explain the concept of Direct Memory Access (DMA) with respect to I/O device management. (5 marks)

Question Five

- a) Explain race condition and its positive and negative impact in operating system. (6 marks)
- b) Explain properties which a data item should possess to implement a critical section. (6 marks)

- c) Draw the state diagram of a process from its creation to termination, including all transitions, and briefly elaborate every state and every transition. **(8 marks)**