



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN INFORMATION AND COMMUNICATION TECHNOLOGY**

3RD YEAR 1ST SEMESTER 2015/2016 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: IIT 3312

COURSE TITLE: ADVANCED OPERATING SYSTEMS

EXAM VENUE:

STREAM: ICT

DATE: DECEMBER 2016

EXAM SESSION:

TIME: 2.00 HOURS

INSTRUCTIONS:

1. Answer Question 1 (Compulsory) and ANY other two questions
2. Candidates are advised not to write on the question paper
3. Candidates must hand in their answer booklets to the invigilator while in the examination room

QUATION ONE (30 marks)

- a) Draw a schematic diagram showing the relationships between operating system, computer hardware, utility programs and application programs. **(2 marks)**
- b) Outline FOUR services provided by the Operating system. **(4 marks)**
- c) Distinguish between network and Desktop Operating system giving TWO examples in each **(4 marks)**
- d) Distinguish between a Process and a Program. **(2 marks)**
- e) Briefly explain four functions of an operating system. **(8 marks)**
- f) Explain the following terms
 - i) Direct Memory Address
 - ii) Context Switching
 - iii) Hardware interrupts
 - iv) Device drivers
 - v) Threads **(10 marks)**

QUATION TWO (20 marks)

- a) Computer storage system can be split into four types. Name the storage types and arrange them in order of increasing capacity. **(3marks)**
- b) Explain briefly the operation of the following memory allocation schemes.
 - i. Contiguous allocation,
 - ii. Segmentation, and
 - iii. Segmentation with paging. **(6 marks)**
- c) Most Modern Operating Systems support memory management with paging. Explain the following.
 - iv. Page fault **(3 marks)**
 - v. MMU and how it works in paging systems. **(4 marks)**
- d) Discuss any two-page replacement algorithms. **(4 marks)**

QUESTION THREE (20 marks)

- a) Describe between the terms *Race Condition* and *mutual exclusion* as used in process synchronization. (4 marks)
- b) Describe with examples where necessary how the following techniques used to implement mutual exclusion. What are their limitations? (8 marks)
 - vi) Monitors
 - vii) Variable locks
 - viii) Semaphores
- g) What is deadlock? How does it occur and how can it be resolved? (6 marks)

QUESTION FOUR (20 marks)

- a) Distinguish between a file and a file system. (4 marks)
- b) What is a file control block? Outline its content. (6 marks)
- c) Explain two approaches that can be used to store files in a disk pointing out advantages and disadvantages of each. (6 marks).
- d) Describe two techniques that can be used to manage disk free space. (4 marks)

QUESTION FIVE (20 marks)

- a) Distinguish between a *Preemptive* and a *non-preemptive scheduling*. (4 marks)
- b) Discuss factors that can be used to determine a scheduling algorithm. (5 marks)
- c) Describe the operation of *FIFO*, *Round Robin* and *Multilevel Feedback Queues* scheduling algorithms. (9 marks).
- d) What is a system call? Discuss its role in a computer system (2 marks)