



## UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN  
COMPUTER SCIENCE

CSC 223: OPERATING SYSTEMS

**DATE: APRIL 11, 2018**

**TIME: 8:30 AM – 10:30 AM**

**INSTRUCTIONS:**

**Answer Question ONE and ANY Other TWO Questions.**

**QUESTION ONE (20 MARKS)**

- a) Differentiate between the following terms (5 marks)
- i) Preemptive scheduling and non-preemptive scheduling
  - ii) User mode and kernel mode
- b) In process management a Process Control Block (PCB) is very important. List at least **five** contents of a process control block. (5 marks)
- c) There are **two** techniques by which a program executing in user mode can request the kernel's services. Briefly discuss these techniques. (5 marks)
- d) Discuss the following roles played by computer operating systems (5 marks)
- i) Resource Allocator
  - ii) Control Program
- e) There are several reasons for providing an environment that allows for process cooperation within a computer system. List any **five** of such reasons (5 marks)

- f) A process runs on the CPU until it is context switched. Identify any **five** conditions that might lead a process to be context switched (5 marks)

---

**QUESTION TWO (20 MARKS)**

- a) In virtual memory management, pages have to be replaced between secondary memory and primary memory. Various different algorithms known as replacement policies are employed to determine the best page to replace. Explain such **five** strategies (10 marks)
- b) Nutt identified four common types of operating system strategies on which modern operating systems are built: batch, timesharing, personal computing, and dedicated. Explain each of these strategies (10 marks)

**QUESTION THREE (20 MARKS)**

- a) In your own words, describe how encryption enhances information security in a computer system (5 marks)
- b) Explain any **three** conditions necessary for deadlock to occur (6 marks)
- c) Various strategies are used to allocate space to processes competing for memory. Describe any **three** of such strategies (9 marks)

**QUESTION FOUR (20 MARKS)**

- a) Explain the concept of **device independence** as it applies in computer operating systems (4 marks)
- b) In your own words, discuss how a computer operating system manages files in a computer system. In your discussion include the definition of the term file and also the tasks performed by an operating system to manage files. (8 marks)
- c) Shown below is the workload for 5 jobs arriving at time zero in the order given below

Job	Burst Time
1	10
2	29
3	3
4	7
4	12

Now find out which algorithm among First Come First Serve Scheduling (FCFS), Shortest Process Next and Round Robin with quantum 10, would give the minimum average time. (8 marks)

**QUESTION FIVE (20 MARKS)**

- a) With the aid of a diagram explain the process states in an operating system (10 marks)
- b) Explain any **four** functions of operating systems. Additionally, give any **two** types of computer operating systems. (10 marks)

---END---



10