ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF COMMERCE

BSC (HONS) DIGITAL TECHNOLOGY

COURSE: OPERATING SYSTEMS

CODE: CDT 104

DURATION: 3 HOURS 30 NOVEMBER 2018

INSTRUCTIONS AND INFORMATION TO CANDIDATES

1. ANSWER **ANY FOUR (4)** QUESTIONS IN THIS PAPER
2. THIS PAPER COMPRISES 3 PRINTED PAGES AND A TOTAL OF 6 QUESTIONS
3. EACH FULL QUESTION CARRIES 25 MARKS
4. WRITE LEGIBLY

Question 1

(a) Define the following terms as used in Operating Systems:

i) Operating System [2]

ii) Deadlock [2]

iii) Process [2]

iv) Thread [2]

v) Process control block (PCB) [2]

vi) Semaphore [2]

(b) Describe the five-state process model with the aid of a diagram [13]

Question 2

(a) State any one (1) constituent of a process control block (PCB). [1]

(b) Explain **any four (4)** conditions necessary for a deadlock to occur. [8]

(c) Explain **any three (3)** advantages of multiprogramming. [6]

(d) Explain the booting process of a computer [10]

Question 3

Consider the following table (Table 3) showing burst and arrival times of process.

Table 3 Burst and Arrival Times of Processes

Process	Bust Time (milliseconds)	Arrival Time
P1	15	0.0
P2	4	1.5
P3	6	3.5
P4	5	4.0

(a) Draw a Gantt chart for the processes based on each of the following scheduling algorithms:

i) First Come First Served (FCFS) [2]

ii) Shortest Job First (Non- Pre-emptive) [4]

iii) Pre-emptive Shortest Job First [4]

iv) Round-robin [Using a quantum of 4 milliseconds] [4]

(b) Based on Gantt charts you have drawn in (a) above, calculate **average waiting times** and **throughputs** for each of the above scheduling algorithms. [8]

(c) Based on your results in (b) above, recommend the best scheduling algorithm among the four algorithms. [3]

Question 4

(a) Explain **any five (5)** functions of Operating Systems [10]

(b) Explain how buffering can improve the performance of a computer system. [5]

(c) With the aid of a diagram, describe the swapping mechanism as far as memory management is concerned. [10]

Question 5

(a) List **the two (2)** types of threads. [2]

(b) Explain the relationship between an Operating System and computer hardware. [5]

(c) Describe the following page replacement algorithms:

i) First In First Out (FIFO) [4]

ii) Least Recently Used (LRU) [4]

(d) State **any five (5)** differences between processes and threads. [10]

Question 6

(a) Differentiate multiprogramming, multiprocessing and multitasking. [5]

(b) Explain **any five (5)** differences between paging and segmentation. [10]

(c) Explain **any five (5)** types of Operating Systems. [10]

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