NATIONAL OPEN UNIVERSITY OF NIGERIA

PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI-ABUJA

FACULTY OF SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

B. SC. COMPUTER SCIENCE PROGRAMME

2023_2 EXAMINATIONS

COURSE CODE: CIT 315 COURSE TITLE: OPERATING SYSTEMS

COURSE UNIT: 3 TIME: 2 HOURS 45 MINUTES

INSTRUCTION(S): ANSWER QUESTION ONE (1) AND ANY OTHER THREE (3) QUESTIONS

Question One

(a) Consider the following segment table: what are the physical address for the following logical addresses? (i) 0430, (ii) 110, (iii) 2500, (iv) 3400 (v) 4112. **[10 Marks]**

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

(b) Define race condition in the context of concurrent programming and explain how it can occur. **[4 Marks]**

(c) Threads are divided into four categories. Discuss them. **[6 Marks]**

(d) Compare and contrast the operation of cache for read and write operations. **[5 Marks]**

Question Two

(a) i. Explain the steps involved in context switching. **[4 Marks]**

ii. What factors affect the speed of context switching? **[3 Marks]**

(b) How does a thread perform a system call? **[3 Marks]**

(c) Explain the concept of memory swapping and its purpose in memory management. **[5 Marks]**

Question Three

(a) Explain the concept of contiguous memory allocation and non-contiguous memory allocation in operating systems. **[4 Marks]**

(b) Describe fixed partitioning in memory allocation and discuss its disadvantages. **[4 Marks]**

(c) i. Explain the concept of a cache and its importance in computer systems design. **[4 Marks]**

ii. What are the two essential properties for a memory cache to be useful? **[3 Marks]**

Question Four

(a) i. Define the concept of interrupt in the context of computing. **[3 Marks]**

ii. Explain the difference between hardware interrupts and software interrupts. **[3 Marks]**

(b) Describe the implementation of user-level threads. **[4 Marks]**