namibia University
OF SCIENCE AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATICS
DEPARTMENT OF COMPUTER SCIENCE

QUALIFICATION: BACHELOR OF COMPUTER SCIENCE, BACHELOR OF COMPUTER IN CYBER SECURITY & BACHELOR OF INFORMATICS	
QUALIFICATION CODE: 07BACS, 07BCCS & 07BAIF	**LEVEL:** 5
COURSE: COMPUTER ORGANISATION AND ARCHITECTURE	**COURSE CODE**: COA511S
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DURATION: 2H	**MARKS:** 100

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER	
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THIS QUESTION PAPER CONSISTS OF 5 PAGES
(Excluding this front page)

INSTRUCTIONS
1. Answer ALL the questions on the answer scripts.
2. Write clearly and neatly.
3. Number the answers clearly.
PERMISSIBLE MATERIALS
1. Calculator.

SECTION A [15 MARKS]: Each Question Weighs 1 Mark.

1. A batch system allows the user to directly interact with the operating system whilst one or more programs are running.   [True/False]
2. RAM must be provided with a constant power supply.   [True/False]
3. PCI Advance is a slot found on the motherboard.   [True/False]
4. I/O channels are commonly seen on microcomputers, whereas I/O controllers are used on mainframes.   [True/False]
5. A characteristic of ROM is that it is nonvolatile.   [True/False]
6. In any number, the rightmost digit is referred to as the most significant digit.
                                                                                   [True/False]
7. The Instruction Set Architecture (ISA) defines the machine language instructions that a computer can follow.   [True/False]
8. Cache memory is a much faster memory than the register file.   [True/False]
9. Overflow can only occur if there is a carry.   [True/False]
10. Interrupt is one of the five states for a process.   [True/False]
11 Memory swapping is a situation where none of the processes in memory are in the ready state.   [True/False]
12 A sequence of hexadecimal digits can be thought of as representing an integer in base 2.   [True/False]

13. The instruction set is the programmer's means of controlling the   processor.
                                                                                   [True/False]

14. Memory references are faster than register references.   [True/False]
15. The Kernel is a special type of programming language used to provide instructions to the monitor.   [True/False]

7. The most fundamental type of machine instruction is the _____ instruction.

    A. conversion   B. data transfer

    C. arithmetic   D. logical

8. Binary 0101 is hexadecimal _____.

    A. 0   B. 5

    C. A   D. 10

9.The decimal system is said to have a base, or radix, of _____.

    A. 10   B. 16

    C. 2   D. 4

10. In any number, the leftmost digit is referred to as the _____.

    A. lease significant digit   B. a most common digit

    C. most significant digit   D. least common digit

11. The _____ determines the opcode and the operand specifiers.

    A. decode instruction   B. fetch operands

    C. calculate operands   D. execute instruction

12. The operand _____ yields true if either or both of its operands are true.

    A. NOT   B. AND

    C. NAND   D. OR

13. _____ instructions provide computational capabilities for processing number data.

    A. Boolean   B. Logic

    C. Memory   D. Arithmetic

14. A _____ is a dispatch able unit of work within a process that includes a processor context and its own data area for a stack.

    A. Process   B. Process switch

    C. Thread   D. Thread switch

Question 3

a) There are different types of operating systems. Their use depends on the type of Computer and the type of applications that will be run on those computers. Distinguish between the Batch OS and Interactive OS. (4 Marks)

b) List and explain the 2 main objectives of an Operating System. (4 Marks)

c) Explain your understanding of the following virtual memory concepts (3 marks)
   i) paging
   ii) demand paging

d) What is an ultimate importance of virtual memory management scheme? (2 marks)

Question 4

a) Binary 1100 0100 0010 represents _____ in hexadecimal. (3 Marks)

b) Penda's Grandpa is 75 years old. His Grandma is 10 years younger than Grandpa. Show a step by step binary arithmetic approach how a CPU would compute his Grandma's age. (8 Marks)

Question 5

a) What is Instruction pipelining? (2 Marks)

b) List the basic five instruction pipeline stages (3 Marks)

c) Show diagrammatically how instruction pipelining is implemented in typical modern microprocessor. Your diagram should emphasize how instructions, pipeline stages and clock cycle are related (8 Marks)

*****END OF PAPER*****