ELIZADE UNIVERSITY

ILARA-MOKIN

FACULTY: BASIC AND APPLIED SCIENCES
DEPARTMENT: MATHEMATICS AND COMPUTER SCIENCE
1st **SEMESTER EXAMINATION** 2020 / 2021 **ACADEMIC SESSION**

COURSE CODE: CSC 307

COURSE TITLE: Computer Systems Architecture

COURSE LEADER: Prf. Bolanle Ojokoh

DURATION: 2½ Hours

HOD's SIGNATURE

INSTRUCTION:

Candidates should answer any **FOUR** Questions.

Students are warned that possession of any unauthorized materials in an examination is a serious assessment offence

1a) What is Computer Architecture? With the aid of diagram, describe the Von-Neumann Machine.
b) What are registers? Make a list of three basic Registers for a basic Computer and their functions.
c) Mention four different types of instruction formats.

2a) In a truth table of three input variables x, y, z.

The output F1 = 0
1
1
1
0
1
0
0

Form a maxterm for each combination having output of 0, AND all of those terms, Represent F1 in terms of the input variables.

b) Add -12 and 56 using two's complement addition

c)Solve the following using Decimal Floating Point Addition: $2.839 \times 10^{-2} + 0.456 \times 10^{1}$

3a) Draw a logic diagram to implement the following Boolean Expression:

Y = A+B+B′(A+C)

b) Define the following:
   i)   Hit Rate
   ii)   Miss Rate
   iii)   Temporal Locality
   iv)   Spatial Locality

c) Outline the existing replacement strategies employed on a cache miss?

4a) Describe Memory addressing. With the aid of sample instructions, describe the existing addressing modes.

b) What are the factors that determine the type of instruction format to use?

c) If R1 = 1010 and R2 = 1100, find R3, R4 such that R3 = R1 ⊕ R2, R3 = R1^R2

5a) if R1=1010 1100 and R2 = 1011 0111

Using selective-complement operations, do the following:

i) Forcefully complement the lower nibble of R1

ii) Forcefully complement bits 2 and 4 of R2

b) Starting from an inital value R = 11011101, determine the sequence of binary values of R after a *logical shift left* followed by a *circular shift right* followed by a *logical shift right* followed by a *circular shift right*.

c) Describe Cache memory organization methods with their advantages and disadvantages.

6a) What is Pipelining? Calculate the execution time for 20 instructions in a six stage pipeline?

c) c) Outline the existing replacement strategies employed on a cache miss?