FOUNTAIN UNIVERSITY, OSOGBO, NIGERIA.

P.M.B.4491, OSOGBO, OSUN STATE.

COLLEGE OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICAL AND COMPUTER SCIENCES

2021/2022 FIRST SEMESTER EXAMINATION

CPS 205: COMPUTER HARDWARE **Credit Unit/Status: 2 (C)**

Time Allowed: 2.00Hours. 22/03/2022

INSTRUCTION(s): ATTEMPT ALL QUESTIONS IN SECTION A AND ONLY ONE (1) QUESTION IN SECTION B.

SECTION A

Question1

a) Explain the following terms in relation to Computer Hardware Design. **[12½marks]**

(i) Logic Gates. (ii) Integrated Circuits. (iii) Combinational Circuits

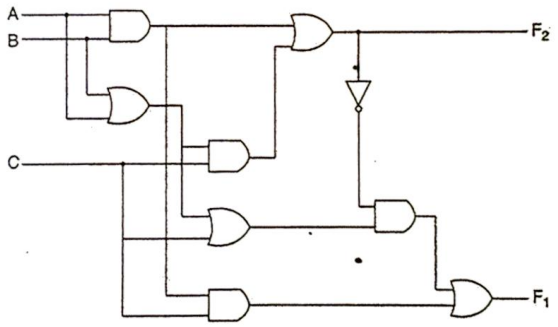
(iv) Sequential Circuits (v) Karnaugh maps.

b) Enumerate the types of Integrated Circuits and their applications. **[5marks]**

c) Why must System Designer strive to build less complex circuits? **[2 ½ marks]**

d) Analyze the two-output combinational circuits shown in Figure below.

(i) Derive the truth table of the circuit and obtain the Boolean functions for the two outputs (F1 & F2) of the circuit operation. **[4marks]**



(ii) Find the value of F1 and F2 if A =1, B=0 and C=1. **[1mark]**

Question 2

a) Write short note on the following devices: **[12 ½ marks]**

(i) Peripheral devices (ii) Printers (iii) Primary Memory

(iv) Magnetic devices (v) Character recognition device.

b) Among the selling points of microcomputers are:

(i) The size of the RAM;

(ii) The speed of the processor.

(iii) The size of the hard disk.

Write an essay of not more than 70 words to justify each of the selling points. **[5marks]**

c) Highlight the factors to consider when you want to buy an appropriate printer. **[2 ½ marks]**

SECTION B

Question 1

a) Assuming the FUO management is planning to install an Alarm Bell in the Server room, to protect it from unauthorized entry. The sensor device provides the following logic signal: C= 1 when the Control system is active; D = 1 if the Door is closed; M=1 if there is a Motion in the room; and Q = 1 if the motion is open to the public. Design a digital circuit that will be used to control the Alarm bell. **[5marks]**

b) Differentiate between the following devices: **[10marks]**

i. Primary and Secondary Storage.
ii. Hard disks and Magnetic Tapes.
iii. DRAM and MPUs.
iv. Combinational circuits and Sequential circuits.
v. Laser and Inkjet printers.

Question 2

a) With the aid of an illustration, describe how Computer components interact to make a functional computing system. **[5marks]**

b) A 4-bit binary number is applied to a circuit on four lines **A, B, C,** and **D**. The circuit has a single output, '**O**', which is true if the number is in the range 3-12, inclusive.

i. Draw a truth table for this problem, and obtain a simplified expression for **O** in terms of the inputs. **[8marks]**

ii. Implement the circuits in terms of logic gates. **[2marks]**