UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BMT 2112
COURSE	: INTRODUCTION TO MECHATRONIC
SEMESTER/SESSION	: 1/ 2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 4 questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) i) Give the definition of mechatronic. (2 marks)

ii) Give two (2) mechatronic advantages. (2 marks)

iii) Give two (2) disadvantages of mechatronics. (2 marks)

b) Explain 3 (three) classifications of sensors. (3 marks)

c) Explain the function of each sensor below:

i) Inductive proximity sensor. (2.5 marks)

ii) Ultra sonic sensor. (2.5 marks)

iii) Strain gauge sensor. (2.5 marks)

iv) Thermistor sensor. (2.5 marks)

QUESTION 2

a) i) Various computer platforms to run the control algorithm, give three (3) such computer platforms. (3 marks)

ii) A microprocessor is a computer processor, explain in detail how a microprocessor works. (5 marks)

iii) PLC stands for Programmable Logic Controller, explain how PLC works. (5 marks)

b) Give two (2) of linear actuators in pneumatics/hydraulic system. (4 marks)

c) PLC is very important for industry as a machine controller.

i) List four (4) programming languages for PLC. (4 marks)

ii) Produce a program in Ladder Diagram to control OUTPUT A, B and C as follows:
When **only** Input 1 is activated Output A will be active, when Input 2 **AND** Input 3 are activated Output B will be active, When Input 4 **OR** input 5 is activated Output C will be active. (14 marks)

QUESTION 3

a) i)

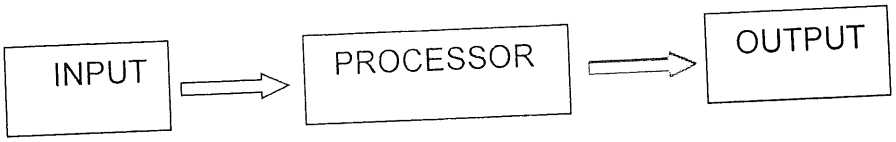

Figure 1

Figure 1 displays a general Block diagram, name 2 (two) examples that represent each part of the input, processor and output. (6 marks)

ii) What is the difference between a DC motor and an AC motor? (2 marks)

b) Give three (3) types of motors commonly used in industry. (3 marks)

c) Arduino is also important as a controller to build various devices that are compatible with it.

i) What is Arduino microcontroller? (2 marks)

ii) Give five 5 advantages of Arduino controller. (10 marks)

QUESTION 4

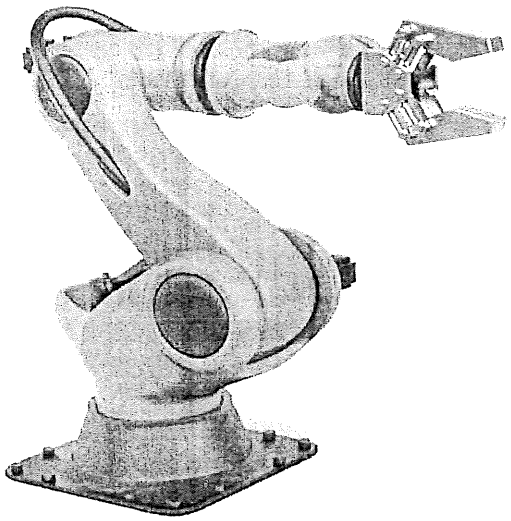

Figure 2

Figure 2 shows an industrial robot, please answer the questions below

a) i) How many Link and Joint is this robot? (3 marks)

ii) How many axes does this robot have? (3 marks)

iii) Using the numbering axis figure 3 below, show which is the Main Axis, and which is the wrist axis. (5 marks)

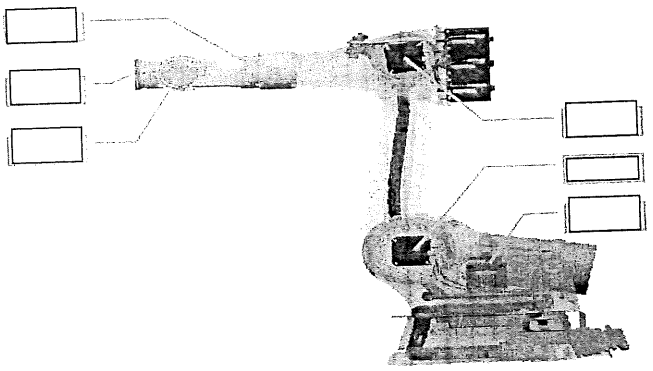

Figure 3

b) i) The end effector robot is used for various final tasks, give 3 (three) of the tasks. (6 marks)

ii) There are various types of configured robot arms, give 3 types of configured robot arms. (6 marks)

----------End of questions----------