UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION

FEBRUARY 2025 SEMESTER SESSION

SUBJECT CODE : **LED31303**

SUBJECT TITLE : **MICROPROCESSOR BASED SYSTEM**

PROGRAMME NAME : **DIPLOMA OF ENGINEERING TECHNOLOGY IN**
(FOR MPU: PROGRAMME LEVEL) **ELECTRICAL AND ELECTRONICS (MARINE)**

TIME / DURATION : **09.00 AM - 12.00 PM**
(3 HOURS)

DATE : **30 JUNE 2025**

INSTRUCTIONS TO CANDIDATES

1. Please read **CAREFULLY** the instructions given in the question paper.

2. This question paper has information printed on both sides of the paper.

3. This question paper consists of **TWO (2)** sections; Section A and Section B.

4. Answer **ALL** question in Section A, and **TWO (2)** questions ONLY in Section B.

5. Please write your answers on this answer booklet provided.

6. Answer **ALL** questions in English language **ONLY**.

7. Answer should be written in blue or black ink except for sketching, graphic and illustration.

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

With reference to the Introduction to Microprocessor:

(a)   No matter how complex microprocessors become, they will still follow the same pattern of operations during program execution. Explain the process during microprocessor operation.

(10 marks)

(b)   Explain the action of microprocessors responding to special external circumstances.

(10 marks)

Question 2

With reference to the Introduction to Microprocessor & Software Architecture.

(a)   Describe **FIVE (5)** key features of the 68000 microprocessors.

(10 marks)

(b)   Indicate the registers and flags that get modified after executing each instruction in Table 1. Each instruction is independent from each other.

Register
D0 = $0012 34AA
D1 = $0101 1010
D2 = $0010 1011
D3 = $0001 1011
D4 = $1234 5678

Table 1

No.	Instruction	Register	NZVC
i.	ADD.B #$6B,D1		
ii.	SUB.B #$5A,D3		
iii.	CLR.B D2		
iv.	MOVE.W $6244,D4		
v.	ADD.B #$56, D0		

(10 marks)

Question 3

With reference to Software Architecture:

(a) Classify **FIVE (5)** primary addressing modes of the 68000 microprocessors with examples.

(10 marks)

(b) Identify the information given by hex file below and determine the value of XX and YY.

S1XX8100227C00008000103C000E4E4F103C00094E4FYY

(10 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer TWO (2) questions ONLY.
Please use the answer booklet provided.

Question 4

With reference to Hardware Architecture and Programming using Assembly Language:

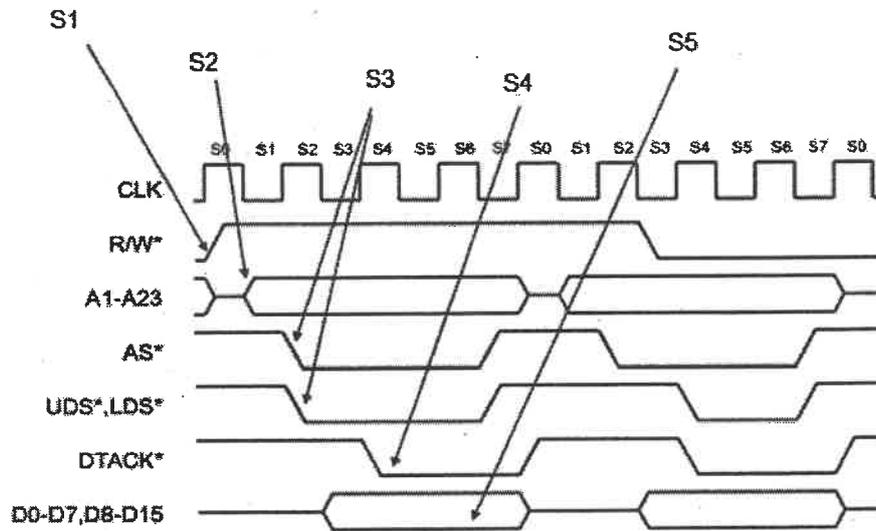(a)   Determine the operation at each state (indicated by arrow) as shown in Figure 1.

(10 marks)

Figure 1

(b)   Outline a program based on the flow chart given in Figure 4. [Hint: x = D0, i = D1 and y = D2]
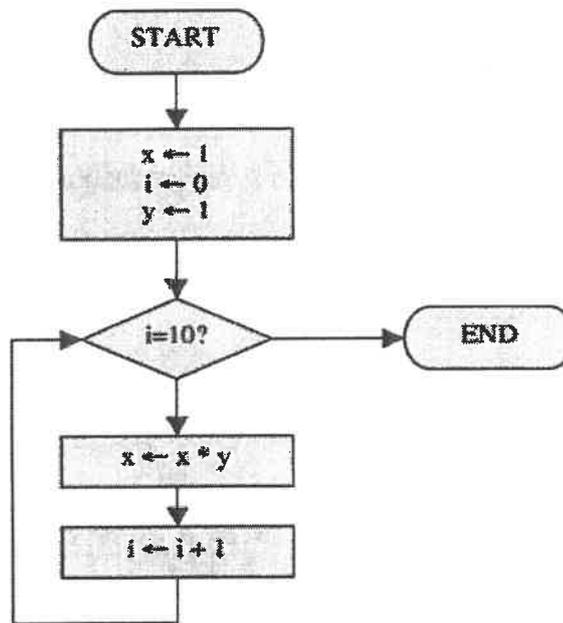
(10 marks)

Figure 2

Question 5

With reference to Hardware Architecture and Programming using Assembly Language:

(a)   Break down the process of handshake bus control as shown in Figure 3.
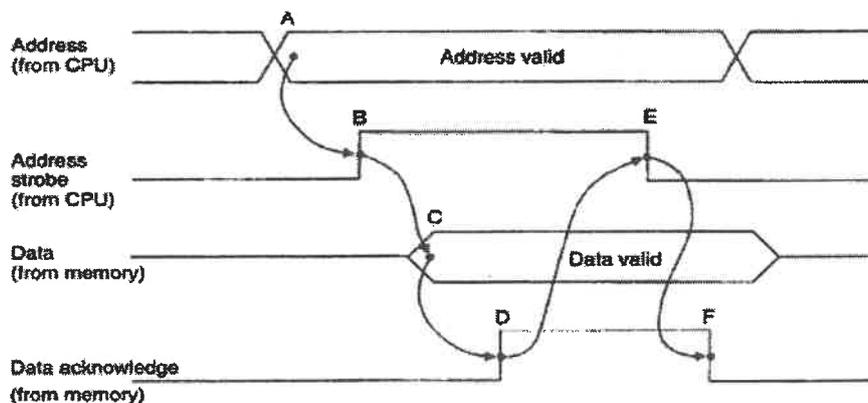
(10 marks)

Figure 3

(b)   Outline a program to sum all elements in an array as given in fragment of codes below.

(10 marks)

```
ORG        $3000
ARRAY1     DC.W       5, 6, 7, 11, 32, 52, 4, 3
SUM        DS.W       1
           END
```

Question 6

With reference to Hardware Architecture and Programming using Assembly Language:

(a)   Determine the sequence of events for the write cycle in 68000.

(10 marks)

(b)   Outline a program that will add 30 times the number of 10 and store the result into address $101B.

(10 marks)

END OF QUESTIONS