CONFIDENTIAL

UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION
FEBRUARY 2025 SEMESTER SESSION

SUBJECT CODE	:	**LED21902**
SUBJECT TITLE	:	**AUTOMATION SYSTEM**
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	**DET IN ELECTRICAL AND ELECTRONICS (MARINE)**
TIME / DURATION	:	**9.00 AM – 12.00 PM (3 HOURS)**
DATE	:	**26 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 B.
4. Answer ALL questions in Section A. For Section B answer TWO (2) questions only
5. Please write your answers on the answer booklet provided.
6. Answer all questions in ENGLISH language only.

THERE ARE 6 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 Intro to Automation System:

(a) Describe definition of manual repetitive, mechanization and automation system.

(6 marks)

(b) Describe each of the system functions of a basic automation system to pack and load rice into truck in Figure 1.

(4 marks)

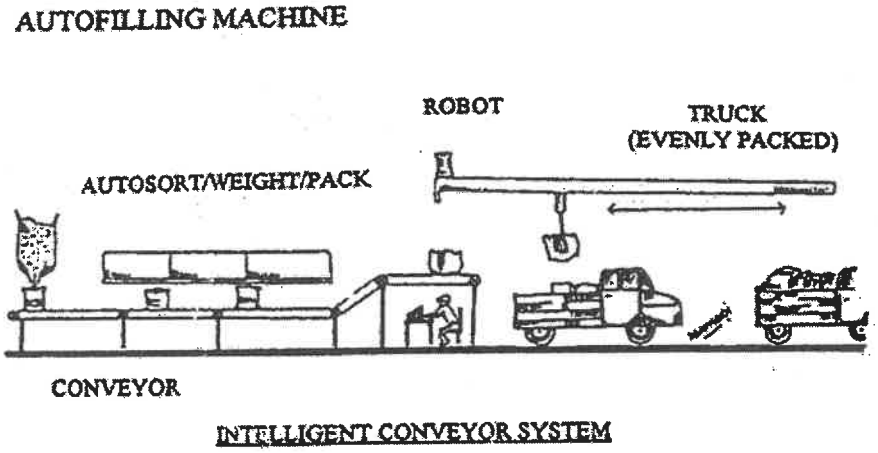

Figure 1

(c) Explain the meaning of contact sensor and contactless sensor.

(5 marks)

(d) Explain the meaning of analogue signal and digital signal.

(5 marks)

Question 2

With reference to Intro to Automation System:

(a) List **FIVE (5)** examples of input in an automation system.

(5 marks)

(b) List **FIVE (5)** examples of output in an automation system.

(5 marks)

(c) Draw a basic electric control circuit using pushbuttons as input, and relay as processor, to control **TWO (2)** lamps as output. Pushbutton START 1 will switch ON Lamp1, while pushbutton Start 2 will switch ON Lamp2. Both lamps will switch OFF when STOP pushbutton is being press.

(10 marks)

Question 3

With reference to Intro to Automation System:

(a) List **FIVE (5)** advantages of proximity sensor.

(5 marks)

(b) List **THREE (3)** advantages of thru beam sensor.

(3 marks)

(c) List **TWO (2)** advantages of diffuse sensor.

(2 marks)

(d) Explain the meaning of nominal sensing distance (Sn) and Real Sensing Distance (Sr) used for proximity sensor sensing range.

(4 marks)

(e) Explain the operation of the capacitive proximity sensor in Figure 2.

(6 marks)

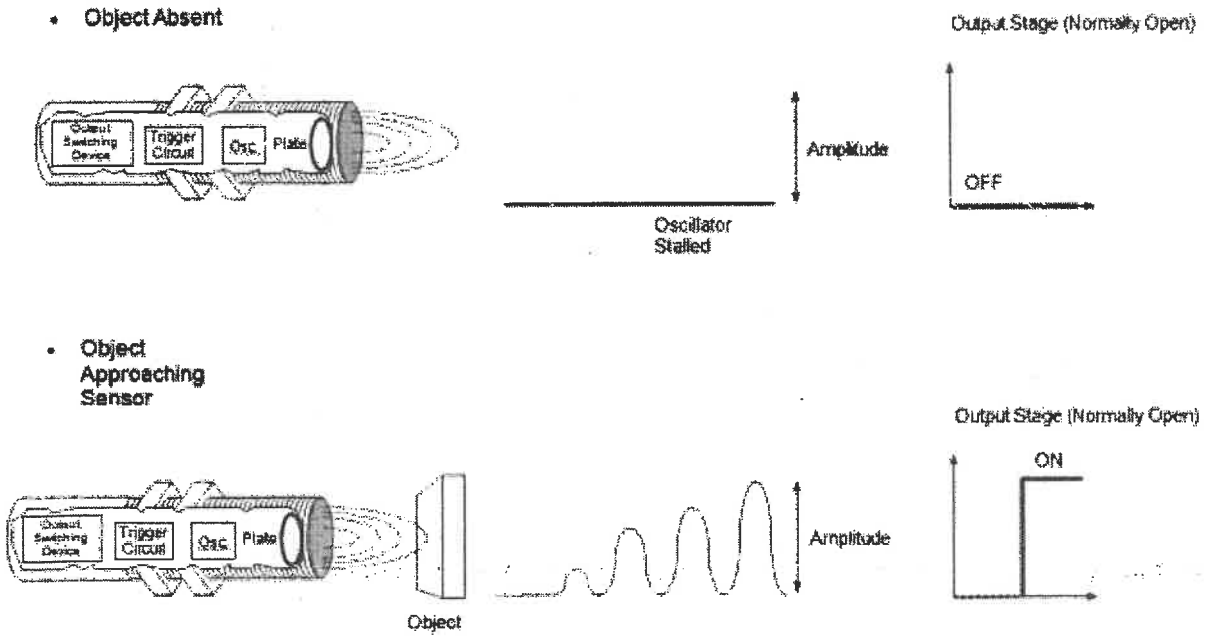

Figure 2

SECTION B (Total: 40 marks)

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

Question 4

With reference to Pneumatic System:

(a) The piston rod of a double acting cylinder is to advance when both push button is actuated. If either of these is released, then the cylinder is to return to the initial position. Construct a control circuit for the above pneumatic control system.

(5 marks)

(b) A double acting cylinder is to extend if one of the push buttons is operated. If the push button is then release, the cylinder is to retract. Construct a control circuit for the above pneumatic control system.

(5 marks)

(c) Construct an automatic pneumatic control circuit to control two double acting cylinders with the sequences of ABAB. Should include all the sensors needed.

(10 marks)

Question 5

With reference to Pneumatic System:

(a) Construct an automatic pneumatic control circuit to control two double acting cylinders with the sequences of AABB. *Note:* Idler rollers sensor to be used to eliminate opposing signals.

(10 marks)

(b) Construct a Displacement Step diagram for the control system in Question 5(a).

(6 marks)

(c) Construct a manual pneumatic control circuit to control one double acting cylinder without using directional control valve.

(4 marks)

Question 6

With reference to Electro-pneumatic Control System:

(a) Construct an electro-pneumatic control circuit that control two double acting cylinder which running automatically, complete with Start and Stop function. The sequence is ABAB.

(10 marks)

(b) Construct a Displacement Step diagram for the control system in Question 6(a).

(6 marks)

(c) Construct a basic manual electro-pneumatic circuit to control one double acting cylinder using directional control valve.

(4 marks)

END OF EXAMINATION PAPER