CONFIDENTIAL

UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION

JULY 2025 SEMESTER SESSION

SUBJECT CODE	:	**LMB31503**
SUBJECT TITLE	:	**MARINE AUTOMATION AND CONTROL**
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	**BACHELOR OF MARINE ENGINEERING TECHNOLOGY WITH HONOURS**
TIME / DURATION	:	**9.00 AM - 11.30 AM (2 HOURS 30 MINUTES)**
DATE	:	**22 DECEMBER 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** questions in Section A. For Section B, answer **THREE (3)** questions **ONLY**.
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 3 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION:

Section A consists of TWO (2) QUESTION

Answer ALL QUESTION **(Total: 40 marks)**

Question 1

With reference to the controller action in control system.

(a) Draw and label a graph to show system response to proportional, integral and derivative (PID) controller action and explain proportional controller operating a feedwater valve supplying a boiler drum.

(9 marks)

(b) With reference to the given controller gain formula, explain the formula to make the controller become high & low sensitive.

$$gain = \frac{100\%}{PB}$$

(11 marks)

Question 2

With reference to the controller and control signal in control system.

(a) Sketch and label FOUR (4) proportional controllers.

(10 marks)

(b) Explain proportional action in a control system action and system response of the above system. (Refer to Q2 (a))

(10 marks)

Section B consists of FOUR (4) QUESTION
Answer THREE (3) QUESTION ONLY **(Total: 60 marks)**

Question 3

With reference to the control measurement devices.

(a) Sketch, label FOUR (4) and explain viscometer to measure fuel viscosity.

(10 marks)

(b) Sketch, label TWO (2) and explain temperature thermocouple.

(10 marks)

Question 4

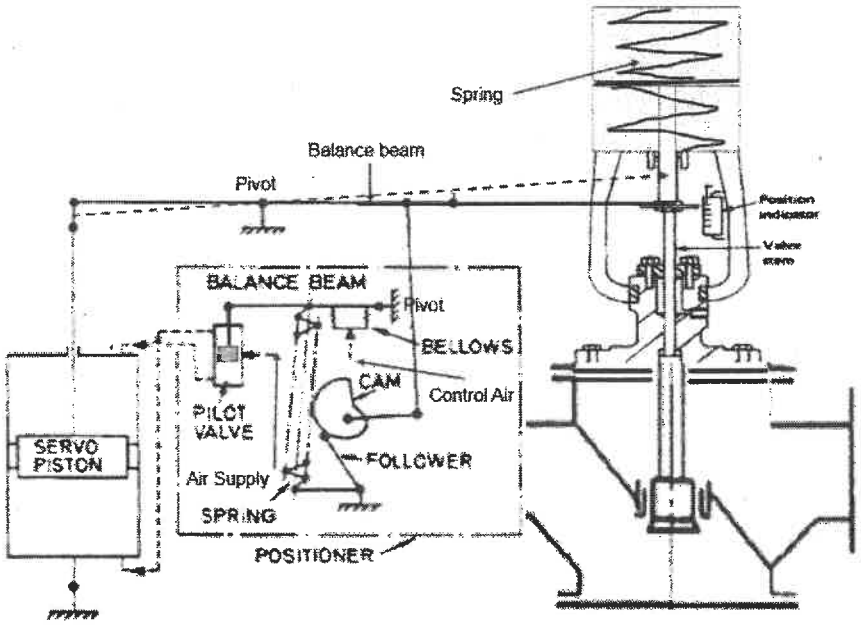

Figure Q4

With reference to the pneumatic piston servo for the controlled valve shown in figure Q4.

(a) Explain a pneumatic diaphragm valve with positioner working principle.

(12 marks)

(b) Explain FOUR (4) main component functions.

(8 marks)

Question 5

The purpose of an engine room machineries control system is to monitor and automatically adjust a process without human intervention. There are several control processes controls systems.

(a) Identify FOUR (4) engine room machineries process control system.

(4 marks)

(b) Sketch and labels FOUR (4) the main engine lube. oil temperature single terms process control system.

(8 marks)

(c) Explain single terms process control system. (Refer to (b))

(8 marks)

Question 6

With reference to control systems found onboard ships:

(a) Sketch water level control system for a high-pressure water tube boiler and label FOUR (4) main components.

(8 marks)

(b) Describe water level control system for a high-pressure water tube boiler. (Refer to Q (a))

(8 marks)

(c) Describe the safety and monitoring device provided to water level control system.

(4 marks)

END OF QUESTION