CONFIDENTIAL

UNIVERSITI KUALA LUMPUR
Malaysian Institute of Marine Engineering Technology

FINAL EXAMINATION
FEBRUARY 2025 SEMESTER SESSION

SUBJECT CODE	:	**LMD25303**
SUBJECT TITLE	:	**MARINE ELECTRO-TECHNIQUE 2**
PROGRAMME NAME (FOR MPU: PROGRAMME LEVEL)	:	**DET IN MARINE ENGINEERING**
TIME / DURATION	:	**9.00 AM – 12.00 PM (3 HOURS)**
DATE	:	**2 JULY 2025**

INSTRUCTIONS TO CANDIDATES

1. Please CAREFULLY read 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 TWO (2) questions ONLY.
5. Please write your answers on the 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 illustrations.

THERE ARE 8 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 electrical distribution

(a) Explain THREE (3) basic short-circuit faults and support it with a diagram.

(12 marks)

(b) A 20 A motor operates from a 220 V insulated system. The supply cables have a total impedance of 0.05 Ω. Calculate:

i. an open-circuit fault

(3 marks)

ii. an earth faults

(2 marks)

iii. a short-circuit fault

(3 marks)

Question 2

With reference to the AC generator

(a) Explain TWO (2) types of rotors AC generators.

(10 marks)

(b) The stator frame in Figure 1 is made of steel and supports the stator core and its three-phase windings. Identify the component and complete the diagram with the appropriate information. Use APPENDIX I and attach it together with the answers script.

(10 marks)

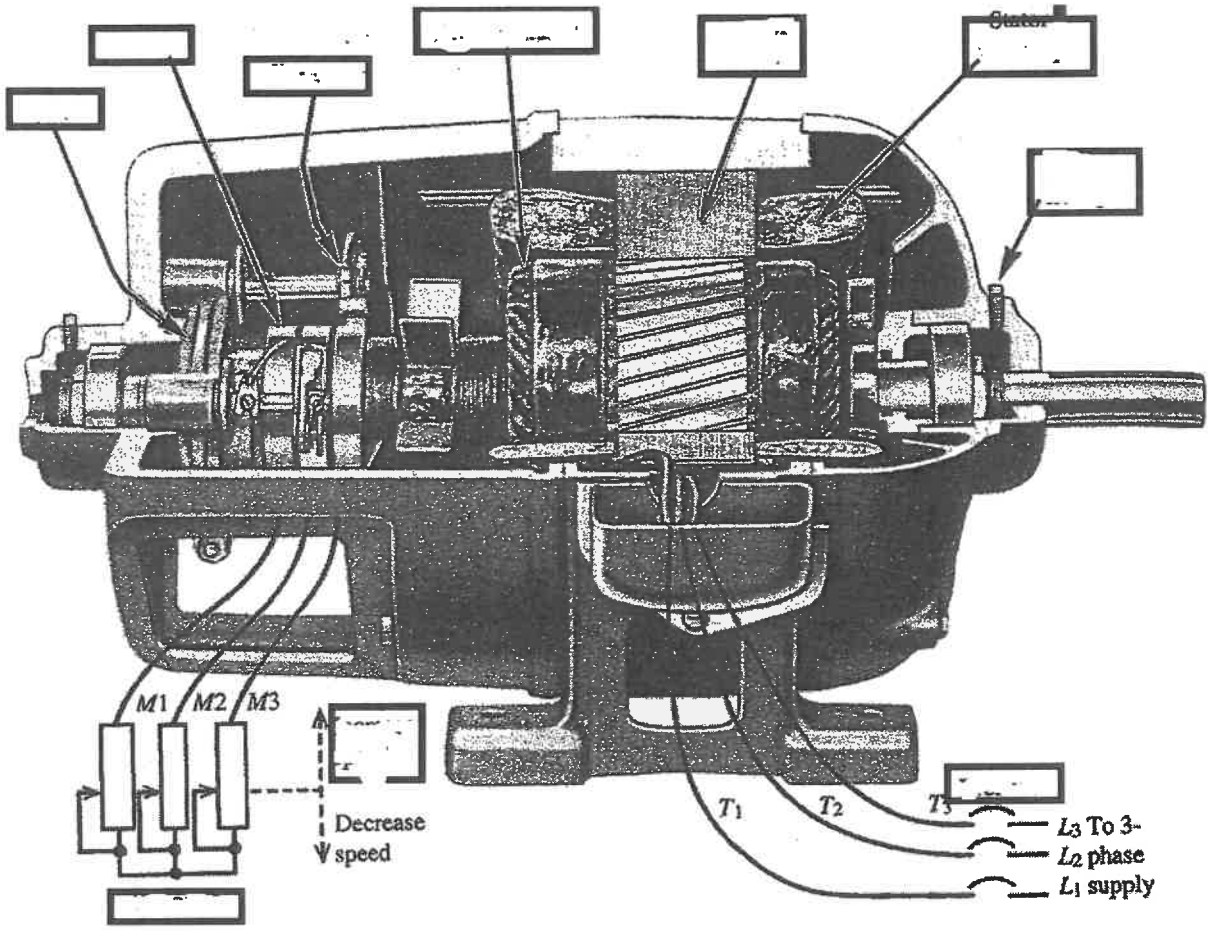


Figure 1

Question 3

With reference to Ancillary Electrical Services

(a) Explain the TWO (2) types of lighting systems on board the ship in accordance with International Maritime Organization standards (IMO).

(10 marks)

(b) Explain TWO (2) main types of rechargeable battery cells.

(10 marks)

SECTION B (Total:40 marks)

INSTRUCTION: Answer only TWO (2) questions.

Please use the answer booklet provided.

Question 4

With reference to the three-phase AC circuit

(a) If the resistance of 50 Ω and the inductive reactance of 70 Ω are connected in series with a supply voltage of 120 V, 60 Hz as illustrated in Figure 2, determine:

i. The total impedance.

(2 marks)

ii. The total current.

(2 marks)

iii. The total voltage across resistance.

(2 marks)

iv. The total voltage across inductance.

(2 marks)

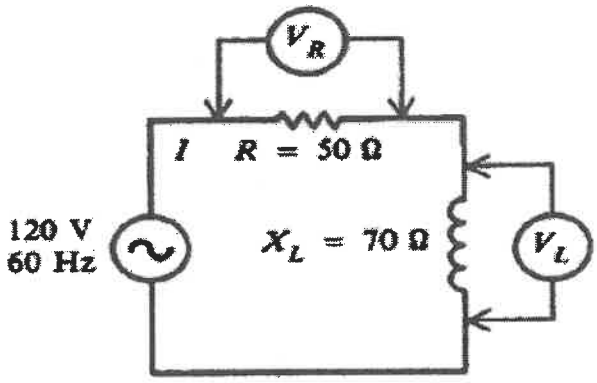


Figure 2

(b) Each phase coil of a wye-connected alternator generates an output of 120 V. the load connected to this three-phase alternator consists of three 10 Ω impedances connected in wye as shown in Figure 3. Each impedance has a power factor of 80 % lag. Determine the following:

i. Terminal voltage output of the alternator.

(3 marks)

i. Line current to the load bank

(3 marks)

ii. Three-phase power output of the alternator

(3 marks)

iii. Total kVA load on the alternator

(3 marks)

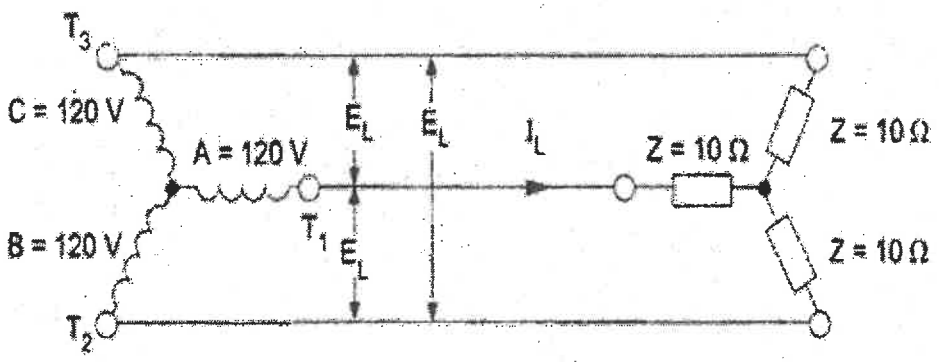


Figure 3

Question 5

With reference to the AC motor

(a) Explain TWO (2) types of rotors used in AC motors.

(8 marks)

(b) The A 220-V, three-phase, two-pole, 50-Hz induction motor is running at a slip of 5 %. Calculate:

i. The speed of the magnetic fields in revolutions per minute.

(3 marks)

ii. The speed of the rotor in revolutions per minute.

(3 marks)

iii. The slip speed of the rotor.

(3 marks)

iv. The rotor frequency in hertz

(3 marks)

Question 6

With reference to Special Electrical Practice for Hazardous Atmospheres

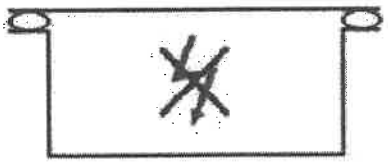
(a) Explain the THREE (3) zones that will be used on the ship to determine the level of risk and whether an explosive gas-air mixture is likely to be present in accordance with ATEX.

(8 marks)

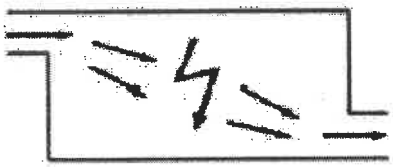
(b) Explain the function and application used in the below schematic diagram symbol.

i. 

(3 marks)

ii. 

(3 marks)

iii. 

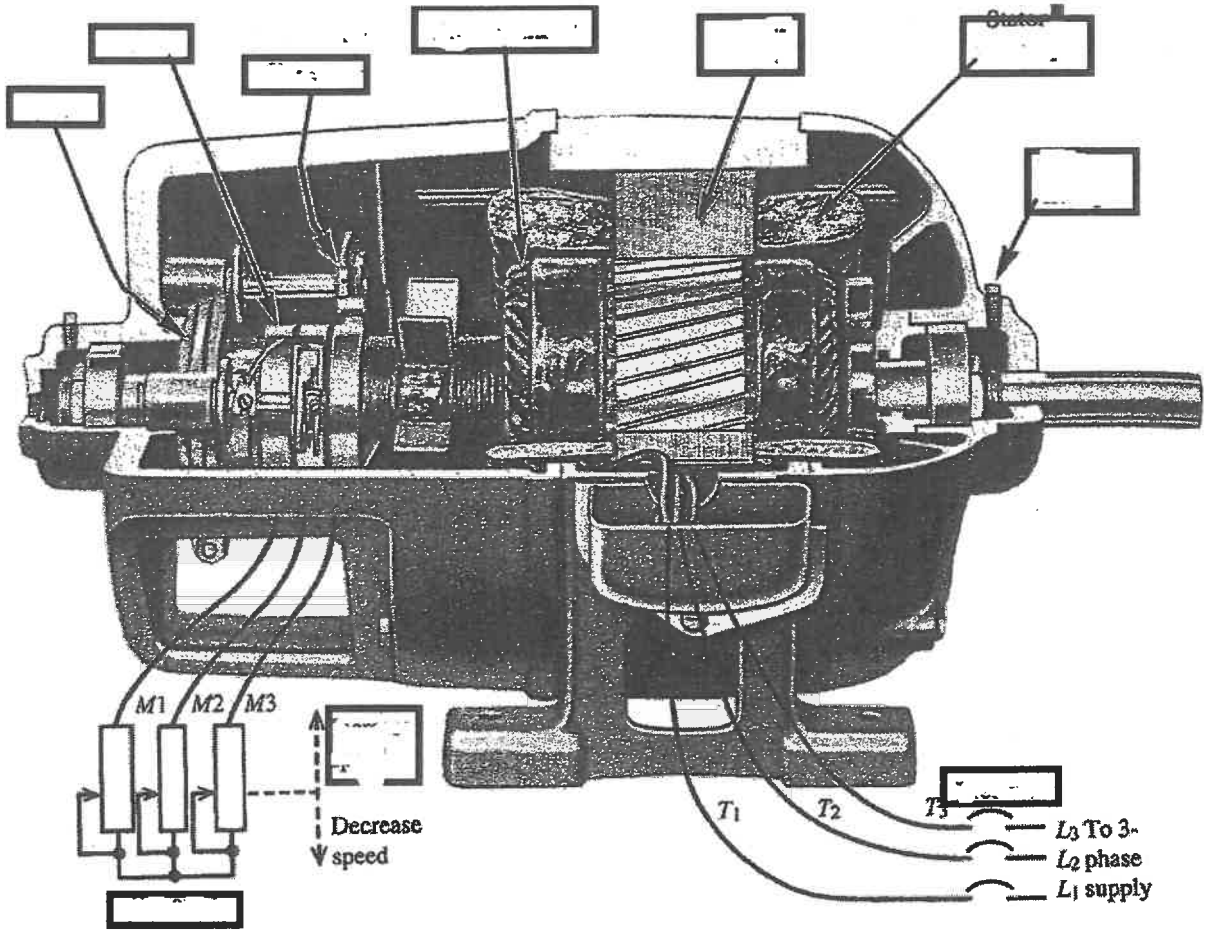
(3 marks)

iv. 

(3 marks)

END OF EXAMINATION PAPER

APPENDIX 1


Stator
M1
M2
M3
Decrease
speed
T1
T2
T3
L3 To 3-
L2 phase
L1 supply