

Indian Maritime University
(A Central University, Govt of India)
Supplementary Examinations – March/April 2025

Programme Name: B. Tech (ME)

Semester: 5th

Subject Code: UG11T4502

**Subject Name: MARINE INTERNAL COMBUSTION ENGINES AND
TECHNOLOGY 2**

Date: 12.04.2025	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. Which of the following is used for reducing the transverse vibration of an engine?

- A) Axial vibration damper
- B) Detuners
- C) Top Bracing
- D) All of the above

2. What is the main purpose or use of Power Card _____?

- A) Cylinder volume changes
- B) Pressure changes during exhaust
- C) Work done during a cycle
- D) Peak pressure variations

3. What is the calculated carbon aromaticity index (CCAI) used for in the context of residual fuel oil?

- A) Measuring exhaust temperature
- B) Assessing fuel atomization
- C) Evaluating ignition quality
- D) Determining combustion efficiency

4. In a cam less engine, find the component that exists in the engine.
- A) Camshaft drive.
 - B) Roller guides of the fuel pump.
 - C) Crankshaft.
 - D) Starting air distributor.
5. What is the critical speed of an engine?
- A) The maximum speed the engine can reach
 - B) The speed at which resonance occurs
 - C) The speed at which noise is minimized
 - D) The speed at which the engine is most efficient
6. What is the purpose of a Roto-cap in the exhaust valve of a medium-speed engine?
- A) Reduces noise levels
 - B) Increases exhaust gas flow
 - C) Extends valve life
 - D) Controls valve timing
7. What happens if the cylinder oil is injected too early during the piston's upward movement?
- A) The top piston ring will scrape the oil upwards to be burnt
 - B) The engine will experience scavenge fire
 - C) The oil film will be broken, causing increased wear
 - D) The oil consumption will decrease
8. How is the K value measured in a turbocharger?
- A) Using a depth vernier
 - B) By measuring the diameter of the rotor shaft
 - C) Using a magnetic transducer
 - D) By checking the labyrinth seal
9. Which of the following is one of the major advantages of resin chocks over cast iron chocks in holding down bolts?
- A) Better vibration damping
 - B) Better compressive strength
 - C) 100% contact, No need for surface preparation
 - D) None of the above
10. Which of these fuel oil impurities can cause maximum abrasive damage?

- A) Water
- B) Ash
- C) Catfins
- D) Sodium

Section B

Five Questions of 02 Marks each

- 11. Describe the common rail injection system?
- 12. State the purpose of a Slow Turning valve provided in a starting air system of a large 2 stroke marine engine.
- 13. What are the properties required for the L.O used in a trunk piston four stroke marine diesel engine
- 14. What is the function of labyrinth in turbocharger?
- 15. What are the most common causes of crankshaft slippage?

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

- 16a. Sketch and explain an Air Starting line system of a large 2 Stroke marine propulsion engine. --- (6 Marks)
- 16b. Sketch and explain the closed Loop Exhaust Gas cleaning system [Scrubber system] --- (4 Marks)
- 17a. With help of draw cards show the following faults of an engine (4 marks).
 - i) Early injection
 - ii) Leaking Exhaust valve
- 17b. Explain how indicated power of a cylinder can be calculated with the help of a power card (3 marks)
- 17c. What are Axial vibrations in a large 2 stroke marine diesel engine? What is the remedy for axial vibrations? (3 marks).
- 18a. Explain the working of port controlled jerk type helical grooved VIT Fuel pump with help of a diagram commonly employed by MAN BW engine Manufacturer --- (6 Marks)
- 18b. Explain the working of Electronic Fuel Injection System in ME Engines using FIVA Valves – (4 Marks)

19a. Explain the purpose of reduction gears ? Explain with a sketch single and double reduction gears employed on board . (3 Marks)

19b. Sketch and label layout of a twin-screw propulsion system using medium speed engines as prime movers (3 marks)

19c. Enumerate principal features of a V-type medium speed engine. (4 marks)

20a. Explain the four main types of protection systems used to safeguard propulsion engine giving one example of each. (4 marks)

20b. Explain the working function of electronic governor for main engine with a help of a sketch. - (6 Marks)

21a. Explain only the main steps during Piston Removal of a large 2 stroke engine - -- (6 Marks)

21b. Describe the procedure for tightening the tie bolts. (4 marks)

22a. Explain briefly Hot Corrosion and Cold Corrosion in a Diesel engine burning residual fuel (4 marks)

22b. What are the symptoms of Microbial infection in Engine lube oil? (3 marks)

22c. What is misfiring and state the main reasons for misfiring in a diesel engine? (3 marks)