Indian Maritime University

(A Central Un2iversity, Govt of India)

Sep/Oct'25 SE

Programme Name: B Tech (ME)

Semester: V

Subject Code: UG11T4502

Subject Name: MARINE INTERNAL COMBUSTION ENGINES AND TECHNOLOGY 2

Date: 08.10.2025 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. In a 2-stroke crosshead type of engine, the side thrust generated due to rolling and connecting rod and fore-aft thrust due to pitching motion of the ship is taken care of by the:

a. Piston and the liner
b. Connecting rod and the piston rod
c. Crosshead shoes and guides
d. Crankpin and thrust bearing

2. Which of the following best defines "overlap" in the context of starting air valves during the engine start sequence?

a. Sequential closure of two starting air valves
b. Simultaneous closure of two starting air valves
c. Sequential opening of two starting air valves
d. Simultaneous opening of two starting air valves

3. What does the area enclosed by a power card divided by its length signify in an indicator card?

a. The compression ratio of the engine
b. The maximum pressure achieved during combustion.

c. The mean indicated pressure produced during engine operation.
d. The rate of fuel consumption per unit time.

4. In a Scroll type fuel pump, what determines the zero-fuel rack condition?

a. The alignment of the vertical groove with the spill port in the pump
b. The positioning of the top part of the helix groove within the pump
c. The presence of a horizontal groove intersecting the spill port
d. The depth of the helix groove on the pump plunger

5. Which type of fuel combination is commonly utilized in modern marine DUAL FUEL engines?

a. LNG as the primary fuel with diesel as pilot injection
b. Diesel as the primary fuel with LNG as pilot injection
c. LNG exclusively
d. Diesel exclusively

6. Which statement accurately describes the V -Type configuration of a medium-speed engine as compared to an equivalent INLINE configuration?

a. The V-type has greater the overall engine length, height, and weight.
b. The V-type has reduced overall engine length, height, and weight.
c. The V-type has no impact on the engine length, height, and weight.
d. The V-type has reduced engine length but increased height and weight.

7. What does SSAS stand for in the maritime industry?

a. Ship Security Alert System
b. Ship Safety Alarm System
c. Ship Security Alarm System
d. Ship Surveillance and Alert System

8. What is the purposes of cylinder oil being alkaline in modern 2-stroke marine diesel engines?

a. To improve lubrication of engine components
b. To enhance fuel combustion efficiency
c. To neutralize sulfuric acid produced during combustion
d. To reduce carbon buildup in the engine.

9. What system oversees timely preventive maintenance of engine components based on running hours and past engine performance data?

a. Engine Monitoring Module
b. Fuel Efficiency Control Unit
c. Vessel Control System

d. Planned Maintenance System

10. How can slippage in a semi-built crankshaft be observed?

a. By measuring the temperature of the crankshaft
b. By inspecting the surface for signs of wear
c. By misalignment of markings between the crank web and the journal pin
d. By monitoring the engine's RPM fluctuation

Section B

Five Questions of 02 Marks each

11. What is "critical speed" of an engine. Why must engines not be allowed to run at this speed for long periods.

12. State 4 advantages an Electronic Camless Engine has over a conventional engine with a camshaft.

13. What is meant by Hunting and Dead band in a hydraulic governor.

14. Explain the principle of hydraulic tightening of nuts on modern day marine engines.

15. New engine developments have led to slide type injectors with zero SAC volume. Explain what is SAC and why is it advantageous to have zero sac volume.

Section C

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

16. A) State and define briefly the three basic types of vibrations that act on the engine when it is in operating condition. (3 marks)
B) Sketch and explain the working of an Axial Vibration damper fitted on a marine diesel engine. (7 Marks)

17. A) What are pre-departure checks an engineer should carry out before departure of a vessel from port for a voyage. (7 marks)
B) Explain the function of starting air distributor in the starting air system for a marine diesel engine. (3 Marks)

18. A) Sketch and explain the working of a simple hydraulic governor (7 marks).

B) What is droop and why is it necessary in governors? (3 marks)

19. A) Sketch and explain the principle of a port-controlled jerk pump. (6 marks)
B) Write a note on VIT. Explain it graphically. (4 marks)

20. Describe with sketch Sulzer Rt-flex engine using common rail fuel injection. (10 Marks)

OR

Describe with sketch a B&W ME-GI high pressure dual fuel engine burning LNG. (10 marks)

21. A) Sketch and describe the four types of indicator diagram. (4 Marks)
B) Briefly explain how the power of one unit of an engine is calculated through the power card. (6 marks)

22. Explain with sketch how cylinder liner calibration is carried out. State its purpose and interpretation of the measurements taken. (10 marks)