

Indian Maritime University
(A Central University, Govt of India)

End Semester Examinations – June 2026

Programme Name: B Tech (Marine Engineering)

Semester: IV

Subject Code: UG11T5401

Subject Name: Marine Diesel Engine - Components and Functions

Date: 02.06.2026

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. What is the primary method of fuel ignition in a marine diesel engine?
A. Spark plug ignition B. Compression ignition C. Glow plug ignition
D. surface ignition
2. Which of the following can be done to reduce the effect of cold corrosion due to high sulphur fuel
A. increase cylinder oil feed rate B. Using high TBN cylinder oil
C. increase scavenge air temperature D. decreasing cylinder oil feed rate
3. The period between the start of fuel injection and the commencement of combustion is called:
(A) Ignition lag.
(B) Compression phase.
(C) Afterburning.
(D) Post-scavenge.
4. What is the primary function of a "Rotocap" fitted to an exhaust valve in four stroke medium speed engine.
(A) To increase the opening speed of the valve.
(B) To assist in removing deposits between the seat and landing.
(C) To dampen vibrations in the helical valve springs.
(D) To measure the temperature of the exhaust gas

5. Modern large-bore cylinder covers are typically constructed from:

- (A) Cast iron.
- (B) Nodular cast iron.
- (C) Solid steel forgings.
- (D) Aluminium alloy.

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6. When tightening holding down bolts using a hydraulic jack, the pressure is determined by:

- A. The Chief Engineer's order
- B. The size of the hammer used
- C. The engine manufacturer's specified stretch
- D. The maximum pressure the pump can reach

7. TBN of Lubricating oil refers to its:

- A. Total Alkaline reserve
- B. Total Acid content
- C. Viscosity of the oil
- D. Self-ignition temperature

8. Scuffing in a cylinder liner is best described as:

- (A) Corrosive wear from sulphuric acid.
- (B) Abrasive wear from solid contaminants.
- (C) A form of local welding between the ring and liner surface.
- (D) Frictional wear from piston ring sliding.

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9. The side thrust on the guide shoes is at its maximum when:

- A. The piston is at Top Dead Centre (TDC)
- B. The piston is at Bottom Dead Centre (BDC)
- C. The connecting rod and crank throw are at a 90-degree angle (approx. mid-stroke)
- D. The engine is stopped

10. Labyrinth seals are utilized in turbochargers primarily to:

- (A) Increase the velocity of the exhaust gas.
- (B) Prevent oil leakage and exhaust gas cross-contamination.
- (C) Reduce noise in the inducer.
- (D) Match turbine speed to engine load

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Section B

Five Questions of 02 Marks each

- 11. Classify the diesel engines based on its speed
- 12. Describe the role of a diaphragm in a large crosshead-type engine
- 13. Why spring air is used in exhaust valve?
- 14. Describe the term "wiping" in main bearing
- 15. Why is a charge air cooler essential in a turbocharged engine system?

Section C

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

16 A. Describe the processes in each stroke of the four-stroke engine with its valve timing diagram. (4 marks)

B. Explain the types of scavenge process adopted in two stroke propulsion engine. (6 marks)

17. list key characteristics of fuel injectors in marine diesel engine and explain how these are achieved

18. A. Explain the necessity of tie-bolts in two-stroke main propulsion engine with its diagram. (7 marks)

B. Describe types of crankshaft used for diesel engines. (3 marks)

19. (a) Explain the constructional features of a modern cylinder liner that facilitate efficient cooling and accommodate thermal expansion. (5 Marks)

(b) Describe the procedure for gauging (measuring) a cylinder liner and specify the points in the liner where wear is usually most significant. (5 Marks).

20. Explain the procedure followed to conduct crankshaft deflection test.

21. a) Define "surging" in a turbocharger and list its detectable symptoms. (4 Marks).

(b) Analyse the potential causes of turbocharger surging and describe actions to be taken to rectify this during engine operation. (6 Marks)

22. A. Sketch and explain the chain wheel transmission in main engine. (6 marks)

B. Why is an auxiliary blower necessary for engines using a constant pressure system? (4 Marks)

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