

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

Supplementary Examinations – March/April 2025

Programme Name: B Tech (ME)

Semester: IV

Subject Code: UG11T4403

Subject Name: Marine Internal Combustion Engines and Technology 1

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| Date: 03.04.2025 | 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. Sulphur in fuel oil results in the following type of wear in a cylinder liner
 - a. Corrosive
 - b. Abrasive
 - c. Friction wear
 - d. Scuffing

2. A 'Reversible Adiabatic' process is also called:
 - a. Isochoric process
 - b. Isobaric process
 - c. Isentropic process
 - d. Isothermal process

3. Transverse Girder in the bedplate of a 2-stroke marine engine encloses the
 - a. Holding down bolts
 - b. Main bearing saddle
 - c. Cross head guides
 - d. Scavenge ports

4. In reference to crosshead guides, which is the right location of guide shoes
 - a) Fitted both in the forward and aft of cross head.

- b) Fitted on the piston rod passing through the stuffing box.
- c) Fitted over the bearing girder of bed plate.
- d) Fitted above the diaphragm plate.

5. Popular material used for the construction of connecting rods of 2 Stroke propulsion diesel engines is

- a) Low-carbon steel
- b) Aluminium alloy
- c) Drop forged steel
- d) Cast iron

6. Exhaust Valves on modern 2 stroke diesel engines are

- a. Hydraulically open and Air Spring close
- b. Air Spring open and hydraulically close
- c. Air Spring open and Air Spring close
- d. Hydraulically open and hydraulically close

7. A chain serves the following purpose in a marine internal combustion engine:

- a. Used to provide charge air for combustion
- b. Used to transmit motion from the crankshaft of the engine to the camshaft.
- c. Used to pressurise fuel for atomisation
- d. Used to absorb the thrust from the propeller and transmit to the hull.

8. What is the feature of tilting pad bearing that is advantageous for thrust blocks

- a) Easy to manufacture
- b) Adjustable oil wedge
- c) Can take excess load compared to other type of bearings.
- d) Dirty lubricating oil also perform the job perfectly.

9. Marine turbocharger blower side water washing carried out during:

- a) Engine stopped
- b) Engine running at low load
- c) Engine running at high load
- d) All of the above

10. What is the functional purpose of the cam lobes in the camshaft arrangement

- a) Opening the valves in proper time with required lift.
- b) Convert rotary motion of connecting rod to reciprocation of cross head.
- c) Run the cam shaft in link with crankshaft.
- d) Take the side thrust generated due to camshaft rotation.

Section B

Five Questions of 02 Marks each

11. Why are tie rods used for Marine Diesel Engines?
12. Distinguish clearly between: Flash point, Ignition point, and Fire point temperatures of a fuel oil.
13. Explain why replaceable lamellae are used in some of the modern diesel engines in the stuffing box glands.
14. Explain the reasons for crankshaft misalignment.
15. What is meant by turbocharger surging. Explain the causes of turbocharger surging.

Section C

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

16. a) What is compression ratio and fuel cut-off ratio in diesel cycle? What is the effect of fuel cut off ratio in cycle thermal efficiency? (4 marks)
(b) Explain in detail why theoretical otto cycle is different from real otto cycle? (3 marks)
(c) In a diesel engine 600 Joule heat is added by burning fuel, 360 joule heat rejected in surrounding in a cycle. Calculate thermal efficiency of the engine. (3marks)
17. A) What is SAC Volume of an injector? B) Draw a fuel injector with circulation and label. C) Explain its operating principle? (3+ 4+ 3)
18. Sketch valve timing diagram for a 2-stroke engine and a 4 stroke engine clearly marking the operation of exhaust valves, Inlet valves/ports and fuel injectors with respect to TDC or BDC. (5+5)
19. A) Sketch and describe a Tri metal bearing used as the main bearing in modern diesel engines. B) What is meant by nip/crush, bore relief and tangential run off in a plain bearing. (5+5)
20. A) Sketch and describe the cylinder liner of 2 stroke marine propulsion engine. (7)
B) List the mountings connected on the cylinder cover(3 marks)
21. Sketch and explain the Exhaust valve fitted on a typical 2-stroke propulsion engine (10)

22. (a) draw and describe constant pressure and pulse type turbocharging system. [7marks]
- (b) State advantages and disadvantages of constant pressure turbocharging system. [3marks]

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