

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

End Semester Examinations – December 2023

Programme Name: B. Tech. (ME)

Semester: IV

Subject Code: UG11T4403

**Subject Name: MARINE INTERNAL COMBUSTION ENGINES AND
TECHNOLOGY 1**

Date: 22.11.2023

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. Heat Engine Efficiency = (Energy supplied - _____) / Energy supplied

- A Energy supplied
- B Energy generated
- C Energy rejected
- D Energy required

2. Quality control of _____ is utmost important for service life of various bearings installed in Main Engine.

- A Fuel
- B Cooling water
- C Scavenge air
- D Lubricating oil

3. In Chain Wheel transmission, chain is inspected for slackness and adjusted by maker's procedure at _____.

- A Chain Tightener
- B Chain Block
- C Chain Guide
- D All of above

4. Main Engine Exhaust v/v assembly is provided with spring air. Compressed air at 7 Bar pressure is supplied via _____ to underside of Air Spring Piston.

- A Needle valve
- B Non-return valve
- C Throttle valve
- D None of above

5. Main Engine type: 6S70ME-B 7GI-TII, is fitted with _____ number of cylinder liners in-lined.

- A 7
- B 70
- C 6
- D II

6. Main engine sump LO is supplied to crossheads for all units via a _____.

- A Flexible pipe
- B Bore passage
- C Telescopic pipe
- D orifice

7. Catalytic fines are particles of _____ present in HFO, which are a common cause of high piston ring breakdown and cylinder liner wear.

- A Steel and brass
- B Sulphur and sodium
- C phosphor and lead
- D aluminium and silicon

8. In 4-stroke engine, the camshaft is connected via gear train to the crankshaft at _____ ratios.

- A 1: 1
- B 1: 2
- C 1: 3
- D 1: 4

9. Engine Total Displacement can be changed by changing _____.

- A Number of cylinders
- B stroke
- C bore
- D All of these

10. For same Compression ratio, thermal efficiency of _____ is greater than that of Diesel cycle.

- A Otto cycle
- B Joule cycle
- C Carnot cycle
- D Tricycle

Section B

Five Questions of 02 Marks each

11. What is Hybrid Turbocharger?

12. Define Fuel Atomization and Penetration.

13. Draw construction of bed plate of a marine diesel engine. Identify main bearing pocket.

14. Explain functional purpose of chain wheel transmission. What are advantages of chain wheel transmission in main engine?

15. What is functional purpose of tie rod in marine diesel engine? Sketch and label its construction.

Section C

Seven Questions of 10 Marks. Any 05 questions to be answered.

16a). What are the cylinder head mountings of a 2-stroke marine diesel engine? (3 marks)

b) Sketch and explain working of exhaust valve. (7 marks)

17a). Explain functional purpose of crankshaft. (3 marks)

b) Describe the procedure for crankshaft deflection. (7 marks)

18.a) Sketch and label details of piston rod gland assembly. (3 marks)

b) Explain functional purpose and construction materials. (4 marks)

c) Identify consequences of improper Clearances. (3 marks)

19a). Why crosshead lubrication is difficult. (3 marks)

b) Describe related design changes adopted in modern diesel engines by makers like SULZER RTA and MAN B&W. (7 marks)

20a). Explain latest development in Variable Geometry Turbocharger with labeled sketch. (7 marks)

b) State the advantages of VGT. (3 marks)

21. Describe various causes of main bearing failures. (10 marks)

22a). Name the parts of a fuel injector nozzle assembly. (3 marks)

b) Discuss how to achieve Efficient Combustion in Marine Engines? (7 marks)

