

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**End Semester Examinations – December 2023**  
**Programme Name: B. Tech (ME)**  
**Semester: 5<sup>th</sup>**  
**Subject Code: UG11T4502**  
**Subject Name: MARINE INTERNAL COMBUSTION ENGINES AND TECHNOLOGY 2**

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Date: 05.12.2023

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

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General Instructions

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

**Section A**

**Choose the correct answer as applicable. [10 x 1 marks]**

Q1. 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

Q2. What is the purpose of a decompression device in a manual start system for marine diesel engines?

- A) To increase compression during starting
- B) To reduce compression during starting
- C) To regulate fuel injection
- D) To control exhaust emissions

Q3. Which indicator diagram shows the instantaneous pressure drop when the exhaust valve opens?

- A) Power Card Diagram
- B) Draw Card Diagram
- C) Light Spring Diagram
- D) Peak Pressure Diagram

Q4. In a VIT type fuel pump

- A) Raising the barrel delays end of injection
- B) Raising the barrel delays beginning of injection
- C) Lowering the barrel delays end of injection
- D) Lowering the barrel delays beginning of injection

Q5. 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.

Q6. 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

Q7. The function of a governor is

- A) Maintain the rpm of the engine irrespective of load
- B) Provide pilot air to starting air valves
- C) Change the ratio of rpm between camshaft and crankshaft.
- D) Control the vibration of engine parts

Q8. 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

Q9. Which of the following is **not** a reason for starting failure of a diesel engine?

- A) Turning gear is engaged
- B) Main lubricating oil pressure is zero.
- C) Air bottle valves are closed.
- D) Main seawater pump is not running.

Q10. An Intelligent engine does not have the ----- component

- A) Electronically controlled alpha lubricator
- B) Electronically profiled Injection
- C) Crankshaft position sensing system
- D) Camshaft with cams

## Section B

**Answer all questions. [5 x 2 = 10 marks]**

Q11. Describe the precautions for checking the crankshaft deflection and alignment in diesel engines.

Q12. Explain the concept of VIT in fuel pumps. How is VIT arranged in MAN B&W fuel pump?

Q13. State the purpose of a Slow Turning valve provided in a starting air system of a large 2 stroke marine engine.

Q14. Enumerate 2 points to differentiate between 4 stroke Trunk type piston and 2 stroke crosshead engine pistons.

Q15. What is Tappet clearance & why is it necessary?

## Section C

**Answer any 5 questions. Each question carries 10 marks.**

Q16a. Explain briefly Hot Corrosion and Cold Corrosion in a Diesel engine burning residual fuel (4 marks)

Q16b. What are the symptoms of Microbial infection in Engine lube oil? (3 marks)

Q16c. What is misfiring and state the main reasons for misfiring in a diesel engine? (3 marks)

Q17a. With help of draw cards show the following faults of an engine:

i) Early injection

ii) Leaking Exhaust valve (4 marks)

Q17b. Explain how indicated power of a cylinder can be calculated with the help of a power card (3 marks)

Q17c. What are Axial vibrations in a large 2 stroke marine diesel engine? What is the remedy for axial vibrations? (3 marks)

Q18. In reference to lubrication of a large 2 stroke marine diesel engine:

a) What is the purpose of cylinder lubrication? (5 marks)

b) Sketch a main engine lube oil system line diagram including coolers and filters. (5 marks)

Q19. With help of a neat labelled sketch, briefly explain the starting air system of a two stroke, slow speed marine diesel engine. (5+5 marks)

Q20a. Before starting the job of piston removal of a main engine what safety precautions need to be taken? (3 marks)

Q20b. Sketch and label layout of a twin-screw propulsion system using medium speed engines as prime movers (3 marks)

Q20c. Enumerate principal features of a V-type medium speed engine. (4 marks)

Q21a. Explain the four main types of protection systems used to safeguard propulsion engine giving one example of each. (4 marks)

Q21b. Sketch and explain working of a mechanical-hydraulic governor used on diesel engines. (3+3 marks)

Q22 a. Explain how Bosch type of plunger was modified for VIT control burning HFO. (4 marks)

b) Discuss the integration of VIT with FQSL for maximum cylinder pressure. (3 marks)

c) State typical injection pressures and viscosities for different grades of fuel. (3 marks)

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