

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

End Semester Examinations – December 2023

Programme Name: B Tech (ME)

Semester: V

Subject Code: UG11T3503

Subject Name: Marine Internal Combustion Engines I

Date: 05.12.2023

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. What is the mean piston speed of a seven-cylinder, two-stroke/cycle diesel engine with a 580 mm bore and a 1700 mm stroke operating at 100 RPM?

- a. 2.8 m/sec
- b. 4.5 m/sec
- c. 5.7 m/sec
- d. 9.0 m/sec

2. If the valve tappets in a diesel engine are set at greater clearances than those specified by

the engine manufacturer, those valves will

- a: open late and close early
- b: open late and close late
- c: fail to open when the engine is cold
- d: fail to open at normal operating temperature

3. Internal combustion engine crankcase vent outlets must be equipped with

- A: hinged rain guards
- B: corrosion resistant flame screens
- C: dipsticks for measuring oil levels
- D: crankcase ventilation fans

4. The diameter of a piston is usually less at the crown than at the skirt, in order to _____

- a. facilitate the installation of piston rings
- b. allow for the expansion of the piston during operation
- c. prevent crankcase vapours from entering the combustion chamber
- d. reduce wearing of the upper cylinder liner

5. In a main propulsion turbocharged diesel engine, the speed of the turbocharger varies according to the _____

- a. governor droop
- b. speeder spring tension
- c. fuel rack lag
- d. load on the engine

6. Cooling the intake air supplied to a diesel engine will

- a: reduce mean effective pressure
- b: decrease average compression pressure
- c: decrease air charge density
- d: increase power output

7. Maintaining the lowest possible scavenging air temperature at all times is not recommended due to the possibility of the _____

- a: air charge density becoming too high
- b: piston crown surfaces becoming too cold
- c: formation of excessive quantities of condensate
- d: compression pressure being greatly reduced

8. Insufficient piston cooling for a large, low-speed, main propulsion diesel engine burning heavy fuels, can result in _____

- a. high temperature corrosion and burning of piston crown metal
- b. dangerous thermal expansion of the piston skirt
- c. excessive crosshead temperatures
- d. change in fuel cetane number

9. The intake valves in a diesel engine are re-seated by

- a: cam followers
- b: push rods

- c: combustion gases
- d: valve springs

10. The main function of the rods in the construction of large, low speed diesel engines is to
- a: stiffen the bedplate in way of the main bearings to increase the engine's longitudinal strength
 - b: accept most of the tensile loading that results from the firing forces developed during operation
 - c: mount the engine frame securely to the hull to prevent shaft coupling misalignment
 - d: connect the crosshead solidly to the piston rod

Section B

Five Questions of 02 Marks each

- 11. Describe the effects of liner temperature on ignition delay period
- 12. Describe the term "critical speed" & "barred speed range". Elaborate on their significance.
- 13. Write down the advantages of bore cooling in Engines
- 14. Explain how the stroke to bore ratio affects the unflow scavenging two stroke engines
- 15. Write short note on starting air line explosion & how it can be prevented.

Section C

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

- 16. a). Describe the Limiting factors in mean piston speed (7 marks)
- b). Explain how the actual four-stroke cycle differs from theoretical cycle. (3 marks)
- 17. Explain with the help of a diagram 2 stroke cycle power card, Draw card & Injection related faults for early injection, late injection, after burning & leaky fuel injector. (10 Marks)
- 18. Describe the cooling water system and its components for a large two stroke engines with the help of neat sketch (10 Marks)
- 19. a) Discuss the importance of correct cylinder lubrication in a large diesel engine, explaining the possible consequences of both over and under lubrication. (5 Marks)
- b) Evaluate Electronic Cylinder Lubrication system & describe the qualities required in a cylinder lubricant for use in an engine burning high viscosity (heavy) fuel oil. (5 Marks)

20. a). Interpret the term "scavenging" & outline different types of scavenging arrangements in marine diesel engine. Summarize Advantages of unflow scavenging over other methods. (5Marks)

- b). Analyse the surging phenomenon & enumerate possible underlying causes responsible for surging. (5 Marks)

21. (a) Outline the possible events leading to crankcase explosion of diesel engine. (3 Marks)

- (b) Describe, with the aid of a sketch, the operation of an oil mist detector. (4 Marks)

- (c) Mention crankcase safety fittings provided to avert crank case explosion. (3 Marks)

22. a). What are the Advantages of Super long stroke engines (5 Marks)

- b). briefly describe the concept of electronically controlled engines. (5 Marks)