2 Indian Maritime University

(A Central University, Govt of India)

Supplementary Examinations – September/October 2024

Programme Name: B Tech (ME)

Semester: V

Subject Code: UG11T3503

Subject Name: Marine Internal Combustion Engines I

Date: 14.09.2024	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 tie 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 uniflow 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 uniflow 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)