Indian Maritime University

(A Central University, Govt of India)

Supplementary Examinations – September/October 2024

Programme Name: B. Tech. (ME)

Semester: IV

Subject Code: UG11T4403

Subject Name: MARINE INTERNAL COMBUSTION ENGINES AND TECHNOLOGY 1

Date: 04.10.2024	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. When using medium-speed engines or high-speed engines for main propulsion, what is typically required?
(a)Some form of speed increment. (b)Direct drive to the propeller.
(c)Variable-speed operation. (d)Some form of speed reduction.

2.. Precision engine bearing inserts are manufactured with a small portion of the bearing ends extending beyond the bearing housing or caps. The installation process of these bearings requires sufficient _____.
(a) overlap (b) crush or snip
(c) lap or lead (d) protrusion

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

A Chain Tightener C Chain Guide
B Chain Block 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 C Throttle valve
B Non-return 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. Define the Lower and higher heating values of fuel and why the fuel has 2 heating values?

12. Sketch the P-V diagram for Dual Cycle and briefly explain the gas exchange process.

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 the purpose of(i) End chocks and (ii) Side chocks

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) An engine of 250 mm bore and 375 mm stroke works on Otto cycle. The clearance volume is 0.00263 m^3. The initial pressure and temperature are 1 bar and 50°C. If the maximum pressure is limited to 25 bar, find the air standard efficiency of the cycle. (4 marks)

(b)Draw the valve timing diagram of a 4-stroke diesel engine. (6 marks)

19 a) Describe with a neat sketch about the working principle of Thrust block (5marks)

b) Sketch and label various parts of a piston rod gland assembly what is the functional purpose of it. (5 marks)

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

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

21.(a) Sketch the main bearing for a large marine diesel engine and discuss about the forces acting on it. (5 marks)

(b) Sketch and describe a Tie bolt in position in a large engine. Define the purpose of tie bolts. (5 marks)

22a). Sketch and illustrate a fuel injector for a diesel engine in respect to its working principle, needle valve lift and adjustment. (7 marks)

b) What is sac in a fuel injector and why do engine manufacturers aim to achieve zero sac. *(3 marks)*