

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

Mar/Apr '26 SE
Programme Name: B Tech (ME)

Semester: 4th

Subject Code: UG11T4403

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

Date: 26.03.2026

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

1. For same compression ratio, the efficiency of dual combustion cycle is:
- Greater than otto cycle
 - Less than diesel cycle
 - Less than otto cycle and greater than diesel cycle
 - Greater than both otto and diesel cycle
2. In a 4-stroke engine the camshaft runs at _____ rotational speed of the crankshaft.
- Twice
 - Half
 - Same
 - None of the above
3. Diesel engine having rated speed of 100 RPM considered as:
- High speed engine
 - Medium speed engine
 - Low speed engine
 - None of the above
4. Sulphur in fuel oil results in the following type of wear in a cylinder liner
- Corrosive
 - Abrasive
 - Friction wear
 - Scuffing

5. Catalytic Fines found in residual fuel mainly consist of

- a. Sodium + Vanadium
- b. Aluminium+ Silica
- TMI c. Copper+ Silver
- d. Steel+ Cast iron

6. Exhaust Valves on modern 2 stroke diesel engines are

- a. Hydraulically open and Air Spring close
- b. Air Spring open and hydraulically close
- c. Air Spring open and Air Spring close
- d. Hydraulically open and hydraulically close

7. What is the feature of tilting pad bearing that is advantageous for thrust blocks

- a) Easy to manufacture
- b) Adjustable oil wedge
- c) Can take excess load compared to other type of bearings.
- d) Dirty lubricating oil also perform the job perfectly.

8. Marine turbocharger blower side water washing carried out during:

- a) Engine stopped
- b) Engine running at low load
- c) Engine running at high load
- d) All of the above

9. Popular material used for the construction of connecting rods of 2 Stroke diesel engines is

- a) Low-carbon steel
- b) Aluminium alloy
- TMI c) Drop forged steel
- d) Cast iron

10. Variable geometry turbocharging (VGT) is preferred over conventional turbocharger because:

- a) T/C efficiency is very high at high engine load.
- b) T/C has good starting characteristics.
- c) T/C is much cheaper and simple in design
- d) T/C efficiency is optimized for different engine load by changing nozzle ring geometry.

Section B

Five Questions of 02 Marks each

11. Explain why theoretical otto cycle is different from real otto cycle?

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12. Distinguish clearly between: Flash point, Ignition point, and Fire point temperatures of a fuel oil.
13. Explain why replaceable lamellae are used in some of the modern diesel engines in the stuffing box glands.
14. Explain the reasons for crankshaft misalignment.
15. Why are tie rods used for Marine Diesel Engines?

Section C

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

16. (a) What is compression ratio and fuel cut-off ratio in diesel cycle? What is the effect of fuel cut off ratio in cycle thermal efficiency? [4 marks]
(b) State the classification of engines based on the following parameters: Ignition System, Strokes/Cycle, method of Charging and Cylinder Arrangement [4marks]
(c) in a diesel engine 600 Joule heat is added by burning fuel, 360 joule heat rejected in surrounding in a cycle. calculate thermal efficiency of the engine [2marks]
17. Sketch valve timing diagram for a 2-stroke engine and a 4 stroke engine clearly marking the operation of exhaust valves, Inlet valves/ports and fuel injectors with respect to TDC or BDC. (5+5)
18. A) What is SAC Volume of an injector? B) Draw a fuel injector with circulation and label. C) Explain its operating principle? (3+ 4+ 3)
19. A) Sketch and describe a Tri metal bearing used as the main bearing in modern diesel engines. B) What is meant by nip/crush, bore relief and tangential run off in a plain bearing. (5+5)
20. A) Draw a simple sketch of a cross head in a 2-stroke engine and label it.
B) Why is it difficult to lubricate X-head bearing of a diesel engine.
C) Explain two methods which are in use to overcome this problem. (4+3+3)
21. (a) Draw and explain major parts of marine turbocharger. [6marks]
(b) what is meant by turbocharger surging. Explain the causes of turbocharger surging. [4marks]
22. (a) draw and describe constant pressure and pulse type turbocharging system. [7marks]
(b) State advantages and disadvantages of constant pressure turbocharging system. [3marks]
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