

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

End Semester Examinations – June 2026

Programme Name: B Tech (Marine Engineering)

Semester: VI

Subject Code: UG11T4603

Subject Name: Marine Propulsion Plant: Configuration and Characteristics

Date: 05.06.2026

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. Which of the following parameters don't have a significant influence on the position of power curves in the power-rpm diagram of a propeller

- a) Pitch diameter ratio (P/D ratio)
- b) Propeller RPM
- c) Propeller diameter
- d) Propeller weight

2. How can misalignment in gear teeth be accurately detected during inspection?

- a) By observing surface flaking
- b) By installing a flexible coupling
- c) By applying blue dye to a tooth and examining contact patterns
- d) By checking for general wear marks on the gear face

3. Which of the following contributes to the improvement of efficiency of Rankine cycle in a Steam Power Plant?

- (a) use of high steam pressure
- (b) reheating of steam at intermediate stage
- (c) regeneration
- (d) all of the mentioned

4. Gas turbines plant works on which of the following cycle?

- (a) Diesel cycle
- (b) Brayton cycle
- (c) Rankine cycle
- (d) Otto Cycle

5. What is a key benefit of using a direct-drive diesel engine (without gearbox) in marine propulsion?

- a) Better fuel consumption at all speeds
- b) Simpler design with reduced mechanical losses
- c) Superior manoeuvrability at low speeds
- d) Lower cost of auxiliary systems

6. Which parameters construct the layout diagram of an diesel engine.

- a) MEP and propeller curve
- b) MEP and SFOC
- c) SFOC and RPM
- d) MEP and RPM

7. In comparison to exhaust valves, intake valves of diesel engines may be fabricated from low-alloy steels because_____.

- (a). the beveled edges of the intake valves provide for self-centering during seating
- (b). intake valves utilize stellite-coated valve seat inserts which reduce wear
- (c). the volume of air passing through intake valves is less than the volume of air passing through exhaust valves
- (d). intake valves are less affected to the corrosive action of exhaust gases

8. Which of the following conditions can lead to reduced power developed by a main engine?

- (a). High scavenge air temperature
- (b). Choked air suction filter of a turbocharger
- (c). Blow past in one or more units
- (d). All of the above

9. What type of propulsion motor is likely to be used in a diesel a-c electric-drive system?

- a) Asynchronous motor
- b) Synchronous motor
- c) Induction motor
- d) DC motor

10. The point, where the propeller characteristic curve meets the engine characteristic curve, is popularly known as

- a) engine overload
- b) propeller design point
- c) mean effective pressure
- d) wake fraction point

Section B

(5 x 2= 10 Marks) Short Answer type questions

11. What is the function of a clutch in gear drive?

12. What is SFOC? What are its units.

13. Compare the advantages and disadvantages of a Controllable Pitch Propeller (CPP) with a Fixed Pitch Propeller (FPP) in ship propulsion systems?

14. What are the methods of increasing efficiency of a slow speed diesel engine propulsion plant?

15. What impact does a "heavy propeller" have on a ship's overall performance?

Section C

7 Long Questions-Answer Any 5 (05 X 10 Marks)

16. Neatly draw the load diagram of a marine diesel propulsion engine and briefly explain all lines of concern. (10 marks)

17. (a). Describe the working principles of a marine reduction gear and its significance in ship propulsion? (5 marks)

(b). Briefly describe different types of lubricants used in gears system and its purpose? (5 marks)

18. (a) Sketch and describe the layout of a simple steam turbine plant used for marine propulsion duties. (5 marks)

(b) Briefly describe the couplings used for connecting reduction gear to propeller shaft. (5 marks)

19. What is the role of turbocharger in diesel engines? Explain the process of turbocharger matching. (10 marks)

20. (a) What do you understand by the term "Critical Speed"? Mention its significance. (5 marks)

(b). What is meant by "wake"? State its significance. (5 marks)

21. Explain the working of Hybrid Electric propulsion system with a neat sketch and state its advantages. (10 marks)

22. . Briefly explain, how the following factors influence the operational condition of the ship.

(a) Number of propeller blades

(b) Propeller area ratio

(c) diameter of the propeller (3 + 4 + 3 = 10 marks)
