

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**Supplementary Examinations – September/October 2024**  
**Programme Name: B Tech ME**  
**Semester: VI**  
**Subject Code: UG11T4603**  
**Subject Name: MARINE PROPULSION PLANT CONFIGURATION AND CHARACTERISTICS**

Date: 26.10.2024

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. 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. The difference between the service propeller curve and the propeller curve during trial condition at CSR power and MCR speed is known as

- a) Engine margin
- b) Light running margin
- c) sea margin
- d) service margin

3. In hybrid propulsion system arrangements, which combination is NOT used

- a) Combined diesel engine and gas turbine
- b) Combined gas turbine and gas turbine
- c) Combined gas turbine and steam turbine
- d) Combined hydraulic turbine and gas turbine

4. In reference to gear tooth scoring, whenever two involute tooth surface force one to another in a gear drive, which motion exists between gear contact surfaces.

- a) Pure rolling motion
- b) Pure sliding motion

- c) Both rolling and sliding
- d) No rolling and sliding, only a line contact.

5. If the speed ratio of two meshing gears is to be say 10: 1 and the pinion is to have 25 teeth, then for a smooth engage and disengage, the number of teeth required on the gear are:

- a) 251
- b) 501
- c) 25
- d) 2.5 or 3

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 reference to steam turbine propulsion, which test is carried out to establish efficiency of turbine sections that are susceptible to deterioration

- a) Enthalpy drop test
- b) Brake dynamometer test
- c) Throttle governing test
- d) None of the above

8. In a simple open cycle gas turbine plant which unit does not exist

- a) Combustion chamber
- b) Condenser
- c) Air compressor
- d) Recuperator

9. Which one is a invalid combination of parameters for an electrical propulsion system

- a) 2500 kW, 400V, 60 hz
- b) 4000 kW, 3.3 kV, 50 Hz
- c) 2.5 kW, 1.1 kV, 150 Hz,
- d) 2.5 MW, 1.1 kV, 60 Hz

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**

Five Questions of 02 Marks each. Answer all questions

11. Write two advantages of controllable pitch propeller
12. Sketch a simple layout of CODOG plant.
13. What is the function of a clutch in gear drive?
14. What is SFOC? What are its units.
15. What is thrust deduction factor of a ship?

### **Section C**

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

16. 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]

17. Differentiate between

- (a) Engine margin and sea margin
- (b) MCR and CSR

[5 marks]

[5 marks]

18. Neatly draw the load diagram of a marine diesel propulsion engine and briefly explain all lines of concern.

[10 marks]

19. (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]

20. (a) Sketch and describe a simple epicyclic gear used in gear drives.

[5 marks]

(b) Why the double helical gears preferred in gears of propulsion systems.

[5marks]

21. In reference to steam turbine propulsion plant, briefly describe about the

(a) Gland Leakage losses

(b) Friction losses

That found in a steam turbine.

[5 + 5 marks]

22. Enumerate the advantages and dis-advantages of electrical propulsion systems that is making it a popular choice.

[10 marks]

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