Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – December 2022

Programme Name: B Tech (ME)

Semester: V

Subject Code: UG11T3503

Subject Name: Marine Internal Combustion Engines-I

Date: 15.12.2022	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions: All Sections (A, B & C) are to be attempted.

Section A

Choose the correct answer as applicable **(10x1 = 10 MARKS)**

1. 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

2. Cylinder lubrication oil for low speed main propulsion diesel engines is admitted to each cylinder during
   A: the power stroke
   B: the compression stroke
   C: low load operation only
   D: periods of standby

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. A diesel engine is operating with excessively high exhaust temperatures at all cylinders. To correct this condition you should FIRST
   A. reduce the engine load
   B. increase the cooling water flow
   C. increase the lube oil pressure
   D. adjust the fuel rack

5. Which of the terms listed below represents the operational speed at which excessive engine vibration is created?
   A: Non-harmonic speed.
   B: Critical speed.

C: Maximum speed.
D: Design maximum speed.

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. With respect to the flow of lubricating oil through a diesel engine, the lube oil coolers are located after filters in order to
   A: allow filtration of less viscous oil
   B: decrease the pressure drop across the filter
   C: improve overall filtration
   D: all of the above

8. 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

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 **(5x2 = 10 MARKS)**

11. What do you understand by the terms 'interlock' & 'blocking devices' in starting & reversing mechanisms for main engine?.

12. List the forces & moments which may come about in a vertical multi cylinder engine. What effects will these forces & moments have?.

13. Describe the term "critical speed" &" barred speed range". Elaborate on their significance.

14. Illustrate all safety trips & safety devices fitted on main engine.

15. Write short note on starting air line explosion & how it can be prevented.

Section C

Seven Questions of 10 Marks each. Answer any 5 questions **(10x5 = 50 MARKS)**

16. 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 M)**

17. (A) Outline the possible events leading to crankcase explosion of diesel engine. **(03 M)**
    (B) Describe, with the aid of a sketch, the operation of an oil mist detector. **(04 M)**
    (C) Mention crankcase safety fittings provided to avert crank case explosion. **(04 M)**

18. A) Discuss the importance of correct cylinder lubrication in a large diesel engine, explaining the possible consequences of both over and under lubrication. **(05 M)**
    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. **(05 M)**

19. Devise the complete main engine starting air system from reservoir to cylinder valve & outline principal components involved. State the protection devices incorporated. **(10 M)**

20. With respect to efficient combustion of fuel oil inside combustion chamber breakdown the importance of following processes:
    1). Correct Viscosity 2). Atomization 3). Penetration 4). Turbulance **(10 M)**

21. A).Interpret the term "scavenging" & outline different types of scavenging arrangements in marine diesel engine. Summarize Advantages of uniflow scavenging over other methods. **(05 M)**
    B). Analyse the surging phenomenon & enumerate possible underlying causes responsible for surging. **(05 M)**

22. A). Illustrate the significance of Variable Injection Timing. **(05 M)**
    B). Differentiate between water cooled & oil cooled piston engi **(05 M)**

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