Indian Maritime University

(A Central University, Govt of India)

Supplementary Examinations – March 2024

Programme Name: B Tech (ME)

Semester: IV

Subject Code: UG11T4403

Subject Name: MARINE INTERNAL COMBUSTION ENGINES AND TECHNOLOGY-1

Date: 18.03.2024 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) An ideal air standard Otto cycle has a compression ratio of 8.5. If the ratio of the specific heats of γ is 1.4, then what is thermal efficiency (in percentage) of the Otto cycle?

A) 57.5
B) 45.7
C) 52.5
D) 95

2) Which of the following properties a good fuel should have?
A) Low Calorific value
B) Moderate Calorific value
C) High Calorific value
D) High ignition temperature

3) What is the harmful effect of sulphur in a fuel?
A) It causes excessive smoking and soot at low firing rates
B) It does not readily burn when combined with oxygen.
C) It clogs fuel oil strainers more often
D) It forms a corrosive acid when mixed with water or water vapor.

4) The bearings used to support the crankshaft are generally called
A) line shaft bearings
B) connecting rod bearings
C) main bearings
D) support bearings

5) The time between injection and ignition of the fuel is known as
A) turbulence lag
B) after burning ratio
C) preignition lag
D) ignition delay

6). 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

7) Crank web deflection readings will give a positive indication of
A) worn main bearing journals
B) torsional stress deformation
C) slack thrust bearings
D) bearing shells shim dimensions

8) Modern 4 stroke medium speed diesel marine diesel engine exhaust valve spindles are rotated by providing
A) Nozzle rings
B) Tappet clearance
C) Spinners are vanes
D) Roto caps

9) One characteristic of a pulse type turbocharging system is
A) high average exhaust manifold pressure
B) greatly fluctuating inlet manifold pressure
C) constant exhaust manifold pressure
D) multiple exhaust pipes to the turbocharger

10) Forcing the exhaust gases from the cylinder of an operating diesel engine with the aid of a blower is known as

A) scavenging

B) forced draft
C) turbocharging
D) aspiration

Section B

Five Questions of 02 Marks each

11. Define 'heat-engine cycle' as a number of thermodynamic processes arranged in a given sequence and repealed over constant intervals of time

12.Define the Lower and higher heating values and why the fuel has 2 heating values?

13.What is the significance of trunk type and cross head type engine arrangements

14. What is an Entablature in Ship's Engine? Discuss briefly

15. Mention few causes of having a slack chain wheel during engine running.

Section C

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

16.a) Draw the port timing diagram of 2 stroke Marine Diesel engine **5M**

b) The minimum pressure and temperature in an Otto cycle are 100 kPa and 27°C. The amount of heat added to the air per cycle is 1500 kJ/kg.

(i) Determine the pressures and temperatures at all points of the air standard Otto cycle.

(ii) Also calculate the specific work and thermal efficiency of the cycle for a compression ratio of 8 : 1.

Take for air : Cv = 0.72 kJ/kg K, and γ = 1.4. m= 1kg **5M**

17.a) Explain the working of a Diesel fuel injector fitted on Marine Diesel engine with neat sketch **7M**

b) State that sodium and vanadium are also undesirable elements in a fuel **3M**

18a) a) Sketch and describe the construction of engine bed plate of Marine diesel engine **7M**

b) Explain briefly the types of chocks used in connection with bedplate **3M**

19 Sketch and describe the type of crankshaft that may be used in marine diesel engines **10M**

20. Sketch and explain the Exhaust valve fitted on a typical 2-stroke propulsion engine **10M**

21a) Write short notes on, i) Wiping ii) Fretting **4M**
b) Describe the procedure of hydraulic method of tightening connecting rod bolts **3M**
c) Mention few reasons for connecting rod bolt failure **3M**

22a) Explain with neat diagrams about Uniflow, loop flow & Cross flow Scavenge systems in Marine diesel engines **7M**

b) Explain briefly about turbocharger surging **3M**

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