

Indian Maritime University
(A Central University, Govt of India)
JUNE2022 End Semester Examinations
B Tech (Marine Engineering)
V- Semester
MARINE INTERNAL COMBUSTION ENGINES-I
UG11T3503

Maximum Marks: 70

Pass Marks: 35

Duration: 3 Hours

Date:19.05.2022

Part A (Part A is Compulsory)

Part A – Q.No.1; 10 MCQs (10 X 01 Mark)

(i) 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

(ii) The advantage of tie rods over an engine without tie rods is that:

- A. The engine is very easily aligned after any misalignment has taken place between different components of the engine
- B. The engine does not require thrust pads for transmission of thrust to the ship's hull as the same is being taken care of by the tie rods
- C. The engine components are much lighter leading in overall reduction in engine weight with a high power generation with the elimination of fatigue stresses
- D. There are no advantages of engines with tie rods, because tie rods require regular maintenance and replacement like connecting rods and overall engine becomes more expensive to operate

(iii) Which of the following is a disadvantage of water as cooling medium for pistons, when compared to oil?

- A. Chemical treatment is required
- B. Higher thermal stresses in piston
- C. Piston of more complicated design
- D. All of the above

(iv) Some 4-stroke engines are fitted with a rotocap on the cylinder head valves. For what reason?

- A. Rotate the inlet valve during operation.
- B. Distribute the exhaust gas or the air inlet better to improve combustion.

C. Improve the scaling surface function, increase the service time of the exhaust valve in the engine

D. To prevent the valve spindle from sticking

(v) What do you mean by surge limit of a turbocharger?

A. Characteristic curve of a turbocharger

B. Portion of compressor characteristic curve which lies on the left side of the point of maximum pressure

C. A line joining all the points of maximum pressure on compressor characteristic curves, drawn at various speeds of operation

D. Maximum rpm limit of T/C above which surging will start

(vi) Which of the following can be done to reduce the cold corrosion of Main Engine cylinder liners using high sulphur fuel oil

A. Increasing cylinder oil feed rate

B. Using high TBN cylinder oil

C. Increasing scavenge air temperature

D. Decreasing cylinder oil feed rate

(vii) In a 2-stroke engine a _____ separates the under piston space from the crankcase.

A. A-frame

B. Crosshead

C. Diaphragm

D. Scavenge space

(viii) The coating which is provided on the valve stem of exhaust valves of modern marine diesel engines is of:

A. Nickel

B. Stellite

C. Chromium

D. Nimonic

(ix) Which of the following types of crankshafts is much lighter at similar power requirements?

A. Fully built type

- B. Semi built, all welded type
- C. Semi built type
- D. Solid forged type

(x) Even if there is an oil mist concentration inside a crankcase, and there is also a hot spot, crankcase explosion will only take place when

- A. The hot spot provides the ignition temperature for the oil mist concentration
- B. When the oil mist - air mixture is in the flammable range
- C. Both A and B
- D. None of the above

Part B – Q.No.2;5 Short Questions (05 X 02 Marks)

- (i)** What are the constraints to increase the mean piston speed?
- (ii)** Discuss 2 stroke Cross Head Engine is fitted with Guide Shoe?
- (iii)** Is turbochargers are matched to the engine? If so justify
- (iv)** Name few causes of crankcase explosion
- (v)** What are the advantages of long-stroke engines.

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

- (3) a)** Draw the timing diagram of 2 stroke and 4 stroke diesel engine and what do you understand by Valve overlap. **(5M)**
- b)** Sketch and describe the construction of Main engine Bed plate **(5M)**
- (4)a)** Sketch and describe Cylinder Liner of a Large 2 Stroke Marine Diesel Engine where bore cooling method is used **(5M)**
- b)** Explain with neat sketch about Hydraulically operated Exhaust valve. **(5M)**
- (5)a)** With a sketch describe briefly Scavenge Manifold with Auxiliary Blower arrangement for a large two stroke diesel engine **(6M)**
- b)** Give the merits and demerits of pulse and constant pressure system**(4M)**
- (6)** How Turbocharging is taking in 2 stroke engines and explain in detail about series system turbo charging with neat sketches **(10M)**

(7) a) Explain the working of a Diesel fuel injector fitted on Marine Diesel engine with neat sketch **(6M)**

b) Explain how bunker oil fuel is prepared on board for efficient combustion**(4M)**

(8) What are the design aspects of combustion chamber of large two stroke diesel engine **(5M)**

b) Write briefly about Maintenance of coolant & cooling system on board ship **(5M)**

(9)(a) Give reasons for occurrence of scavenge fires. Explain how scavenge fires constitute a hazard **(5M)**

(b) What inspections are to be carried out after a scavenge fire? **(5M)**
