

**MERCHANT MARINE ACADEMY OF MACEDONIA
SCHOOL OF ENGINEERS**

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Student number:

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FINAL EXAM

A. Supply the missing words from the ones given below. There are three extra words. (15 p.)

T.D.C. crankshaft rotor tie propulsion compression pump silencer
scavenge pressure combustion connecting machinery impeller B.D.C.
exhaust camshaft osmosis

- Besides the main engines which are used for the _____ of the ship, there is also auxiliary _____ on board.
- Reverse _____ is another way of making fresh water on board.
- A _____ is a device which is used to transfer liquids from one point to another, under _____.
- At the end of the 2nd stroke of a 4-stroke D.E. the piston is at the _____.
- The _____ absorbs the noise of the vibration of the running components of the turbocharger.
- The two main parts of a turbocharger are the turbine _____ and the compressor _____.
- In a 2-stroke D.E. two phases, _____ and _____, happen at the same time.
- The _____ changes the reciprocating motion of the piston into rotating motion with the help of the _____ rod.
- The three upper rings of the piston are _____ rings.
- The cylinder block, the frame of the engine and the bedplate are all three connected together with the _____ rods.

B. Write the names of the four strokes of a 4-stroke diesel engine and describe the suction stroke. (15 p.)

**Names of the four strokes: 1. _____ 2. _____
3. _____ 4. _____**

C. Match the terms to their definitions. There is one extra term. (15 p.)

superheater condenser cylinder head capstan furnace atomiser
water jacket economiser salinometer deairating feed tank soot blower
air compressor water drum main bearings steam drum gudgeon pin

- The upper drum of a water-tube boiler where the separation of water and steam occurs: _____
- A device by means of which a liquid is reduced to very fine spray: _____
- A heat exchanger that transfers heat from the gases of combustion to the boiler feedwater: _____
- The place in the boiler where the fuel is burnt: _____
- A gauge which checks the salinity of water: _____
- A great number of small tubes which heat the steam above the saturation temperature: _____
- It connects the piston to the connecting rod: _____
- They support the crankshaft within the engine bedplate: _____
- It supplies compressed air for starting the engine: _____
- A cover on top of each cylinder which makes a gas-tight seal: _____
- It maintains the desired temperature of the cylinder: _____
- A vessel in which water gets rid of air and other gases: _____
- It removes the black carbon particles from the tubes of the boiler: _____
- It handles the ropes for mooring the ship: _____
- A device which cools exhaust steam back into water: _____

D. Circle the correct choice. (15 p.)

- 4-stroke diesel engines are connected to the propeller with **turning / reduction** gear.
- Fuel oil is cleaned in a **separator / evaporator**.
- When the viscosity of a fuel and/or lub oil is high, a **heater / cooler** can regulate it.
- In a(n) **impulse / reaction** turbine the steam is directed from the nozzles against the stationary blades and turns the rotor.
- In order to lower the boats to the sea we use the **steering / launching** gear.
- A **service / bilge** pump is used to remove water from the machinery space.
- A lot of garbage can be burnt in the **incinerator / separator**.
- Fin-stabilisers are used to improve the ship's **manoeuvrability / stability**.
- **Motors / Generators** supply the ship with electrical power and lighting.
- We use the **windlass / capstan** for handling the anchor.
- The 2-stroke D.E. does not have an **inlet / exhaust** valve; it has scavenge **valves / ports**.
- In the centrifugal pump there is a(n) **rotor / impeller** rotating at high speed inside the pump casing.
- The valve seats are housed on the cylinder **liner / head**.
- The walls and floor of the furnace have an **insulation / isolation** of fireproof bricks.

E. Which of the auxiliary machinery is used for... (15 p.)

- reducing rolling of the ship? _____
- driving another machine? _____
- handling the cargo? _____
- transferring liquids from one place to another? _____
- treating biologically human body waste? _____
- supplying water to the boiler? _____
- fire fighting? _____
- cooling oil or water? _____
- providing forced ventilation to holds? _____
- supplying the firemain with water? _____

F. Match the words to their synonyms/definitions. (5p.)

- | | |
|-----------------------------------|---|
| 1. stroke | -- fixed, not in motion |
| 2. evaporate | -- not affected by fire |
| 3. submerge | -- burning |
| 4. ignition | -- travel of the piston between the T.D.C. and B.D.C. |
| 5. simultaneously | -- hole on the cylinder liner |
| 6. stationary | -- place under water |
| 7. combustion | -- at the same time |
| 8. attemperator/
desuperheater | -- turn from liquid into vapour |
| 9. fireproof | -- firing |
| 10. port | -- device which decreases the temperature |

G. Correct the mistakes in the following sentences. (10p.)

- Steam changes into water in a compressor. _____
- The main part of a steam turbine is the piston. _____
- The cooling water circulating pump supplies the engine with fuel oil. _____
- The piston rotates inside the cylinder. _____
- Diesel engines are external combustion engines. _____
- The crankshaft operates the valves. _____
- Steam turbines need saturated steam. _____
- The safety valve is actuated when there is low pressure. _____
- The water tube boiler is less efficient than the Scotch boiler. _____
- In a 2-stroke diesel engine the cycle of operation is completed in two revolutions of the crankshaft. _____

H. Write 5 sentences describing the differences between a 4-stroke and a 2-stroke D.E. (10 p.)

1. _____

2. _____

3. _____

4. _____

5. _____

GOOD LUCK!!!