

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

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FINAL EXAM

1. Put the words below in the right gap. There are two extra words. (15 p.)

scavenge rotor crankpin B.D.C. T.D.C. running exhaust turbine diffuser
compression crown stator combustion skirt gudgeon pin silencer compressor

- The three upper rings of the piston of a 4-stroke diesel engine are _____ rings.
- The _____ connects the piston to the connecting rod.
- The connecting rod is connected to the crankshaft with the _____.
- At the end of the 3rd stroke of a 4-stroke D.E. the piston is at the _____.
- In a 2-stroke D.E. two phases, _____ and _____, happen at the same time.
- The upper part of the piston is called _____ and the lower _____.
- The two main parts of a turbocharger are the _____ rotor and the _____ impeller.
- The turbine assembly has a _____, that is, stationary vanes which direct the exhaust gases to the _____.
- On the compressor's side of a turbocharger there is a _____ which contributes to further rising of the pressure of the compressed air.
- The _____ absorbs the noise of the vibration of the _____ components of the turbocharger.

2. Complete the sentences with the correct form of the words in parentheses. (10 p.)

- Salt water, evaporated into steam and then brought into a condenser produces _____ (**condense**), which is fresh water.
- In a sewage _____ (**treat**) plant human body waste is treated _____ (**biology**) before being discharged into the sea.
- Fin-stabilizers improve a ship's _____ (**stable**).
- The control systems on a shipboard boiler are designed to detect promptly _____ (**fail**) and malfunctions.
- The 4-stroke D.E. has lower fuel _____ (**consume**) than the 2-stroke one.
- The decrease in pressure causes the _____ (**expand**) of the steam.
- When the temperature of the steam falls below _____ (**permit**) limits, _____ (**condense**) takes place.
- The main engines are used for the _____ (**propel**) of the ship.

3. Supply the terms that match the following definitions. (10 p.)

- A great number of small tubes which heat the steam above the saturation temperature: _____
- It shows the level of water in the boiler: _____

- The upper drum of a water-tube boiler where the separation of water and steam occurs:

- A heat exchanger that transfers heat from the gases of combustion to the boiler feedwater:

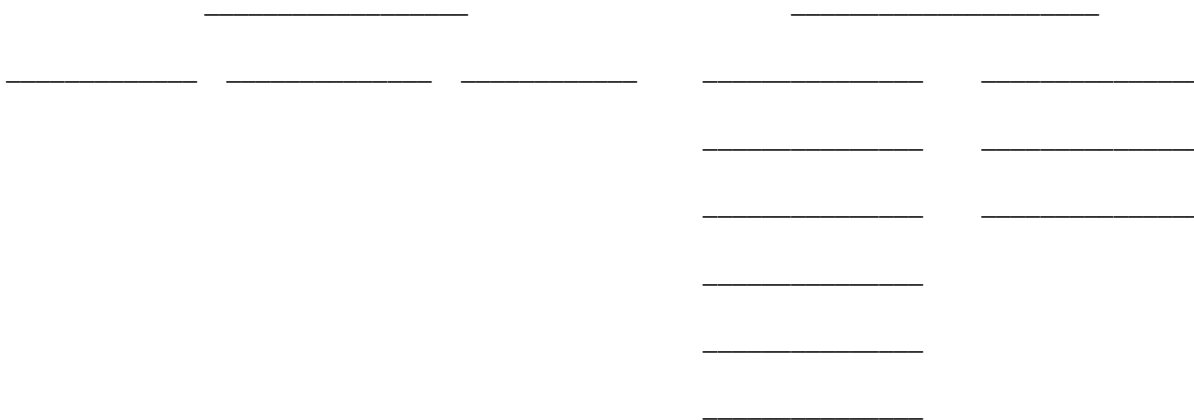
- The place in the boiler where the fuel is burnt: _____

4. Complete the diagram on pumps by filling in the 14 gaps. The words you need are given below. (14 p.)

lobe rotary double-acting diffuser centrifugal reciprocating volute piston

regenerative single-acting gear-wheeled vane-type displacement screw-type

PUMPS



5. Match the following words to their synonym or explanation. There is an extra synonym/explanation. (10 p.)

emission malfunction attemperator fireproof stationary gauge

evaporate inject charge combustion

- force liquid into.....
- fixed, not in motion.....
- turn from liquid into vapour.....
- measuring instrument.....
- irregular or abnormal function.....
- apparatus which increases temperature.....
- fill up with air.....
- not affected by fire.....
- discharge of gas, heat, radiation.....
- burning.....
- apparatus which decreases temperature.....

6. Which auxiliary machinery is used for... .. You can choose from the following: (15)

oil-water separator	fin stabilisers	heater	crane	incinerator
electric motor	generator	davits	capstan	windlass
oily water separator	air compressors	evaporator	cargo pump	fans

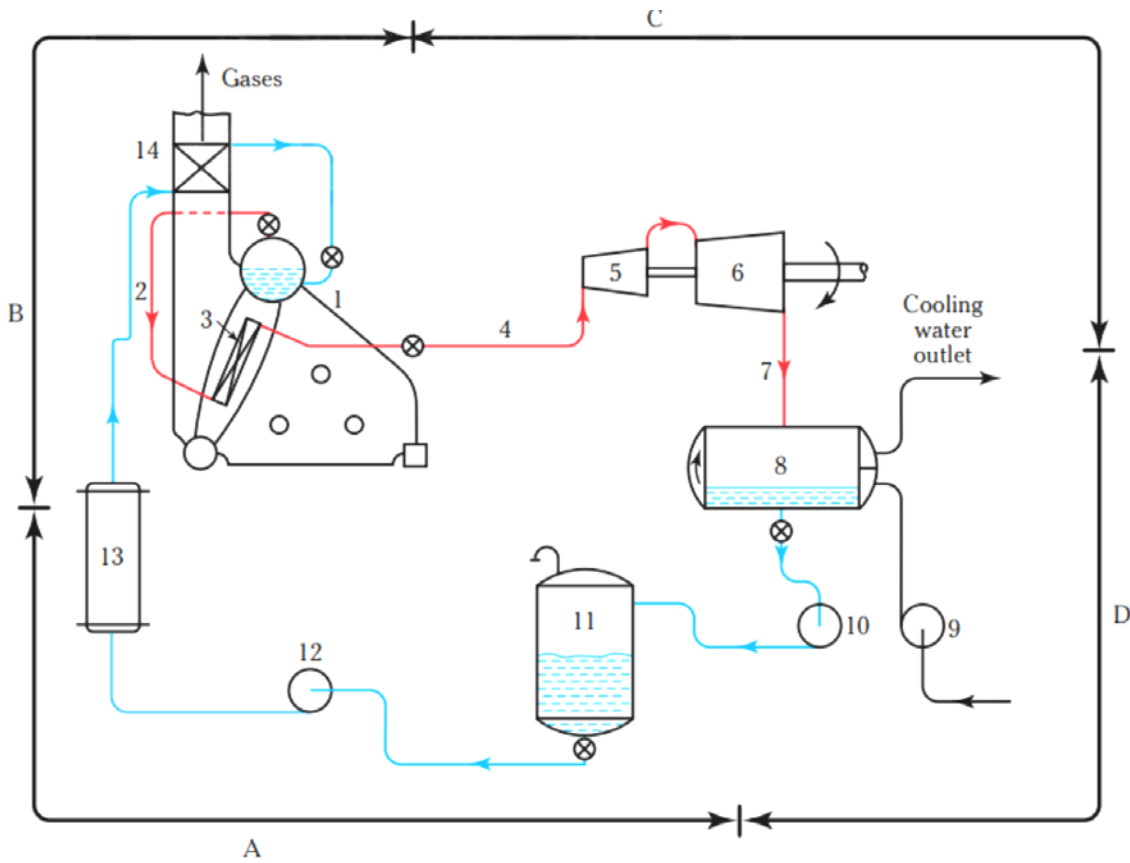
- Burning the garbage?
- Increasing the temperature of fuel and improving its viscosity?
- Lowering lifeboats to the sea?
- Supplying the ship with electrical power and lighting?
- Reducing the rolling of the ship?
- Providing forced ventilation to cargo holds?
- Producing distilled water ?
- Lifting heavy objects, containers, etc?
- Removing water and dirty particles from fuel?
- Cleaning the dirty bilge water before discharging it overboard?.....
- Handling the mooring lines?
- Providing the main engine with starting air?
- Loading and unloading crude oil?
- Handling the anchor?
- Giving motion to another machine?

7. Underline the correct choice. (8 p.)

- The **economizer / atomizer / attemperator** is part of the oil burner which sprays the fuel.
- Water changes into steam in the **generating / circulating / downcomer** tubes.
- In the **economizer / condenser /deaerator** the boiler feed water is heated under reduced pressure in order to remove dissolved air.
- In a 4-stroke diesel engine the piston is connected to the connecting rod with the **gudgeon / crosshead / crank pin**.
- The camshaft opens the valves with the help of the **connecting / push / tie** rod.
- The steam comes out of the **nozzles / ports / exhausts** at a high pressure.
- The piston rod reciprocates into and out of the **cylinder head / scavenge box / stuffing box**.
- The walls and floor of the furnace have an **isolation / insulation / insurance** of fireproof bricks.
- The cylinder block, the frame of the engine and the bedplate are connected together with the **frame rods / connecting rods / tie rods**.
- In a **gear-wheeled / centrifugal / displacement** pump, the liquid is thrown against the casing of the pump.
- A double-acting ram pump has **double pistons / double suctions and one discharge / double suctions and double discharges**.
- In reciprocating displacement pumps there is always a(n) **piston / gear / impeller** which moves up and down in the pump chamber.
- The L.P. turbine is larger due to the **exhaust / expansion / extension** of the steam because of the **decrease / increase** in pressure.
- The **crosshead pin / connection pin / crank pin** connects the connecting rod to the crankshaft.
- We use the **turning / steering / reduction** gear to manoeuvre the ship.

8. The terms below are parts of a steam power plant of a reaction turbine. Write what is shown in the diagram. (18 p.)

- | | | | |
|----------------------|------------------------------------|------------------------|------------------|
| Economiser | Condensate pump | Boiler | Steam generation |
| Preheater | L.P. steam turbine | Superheater | Condensation |
| DFT | Feed pump | H. P. steam turbine | Feeding |
| Exhaust Pipe | Condenser | Superheated steam pipe | Expansion |
| Saturated steam pipe | Sea water cooling circulating pump | | |



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
- A. _____
- B. _____

8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
- C. _____
- D. _____

GOOD LUCK!