

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

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Student number:

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FINAL EXAM (Retakes)

1. Fill in the gaps using the words in the list below. (14 p.)

*bilge, discharge, ballast, priming, sludge, bilge, stringent, trim
submerged, perforated, overboard, suction, separator, capacity,*

-- A strum box is a kind of filter on the suction line head, which is a _____ basket, easily accessible and detachable, necessary to prevent ashes and other particles from entering the pumps and choking them.

-- A bilge pump is a self-_____ pump, because it doesn't need another pump to supply it with water for starting.

-- The cargo holds are provided with four _____ wells.

-- The rules for the ballast system are less _____ than the rules for _____ systems.

-- There are three systems of bilge pumps. First, a small pump that pumps the dirty water into a bilge holding tank. From the tank, the water is pumped by another small pump through an oil water _____ overboard, only when it is sufficiently clean. If not, it goes to another storage tank, the _____ tank. A second bigger pump can pump the bilge water from the engine room straight _____, but this is only allowed in emergencies. A third possibility is to use the direct _____ of the main cooling water pumps, which has huge _____ for big leaks in emergencies.

-- During a _____ operation at night, while at a shipyard in order to _____ the vessel for drydocking, it was discovered that the engine room was flooded.

-- Damage to _____ electrical equipment occurred.

-- We will _____ double bottom tank.

2. Fill in the gaps with a suitable verb. The first letter is given. (15 p.)

-- **E** _____ that the correct grade of lub oil is being used. Take a sample at the purifier.

-- **W** _____ up the engine gradually using the circulating pumps to circulate the system.

-- **F** _____ up the fuel oil service tank with purified fuel oil.

-- **P** _____ up the starting air reservoirs to their maximum pressure and **d** _____ them of water.

-- **I** _____ Chief Engineer regarding arrival.

-- **S** _____ additional generator.

-- **M** _____ a visual inspection of the steering gear room.

-- **C** _____ over to high sea suction from low sea suction.

-- **E** _____ turning gear and turn engine for 10 minutes.

3. Underline the correct answer. (15 p.)

- Turning the engine with the turning **wheel/ gear/ steer** gives you the opportunity to make sure of the unobstructed move of the crankshaft.
- **Sulphur / Iron** compounds may corrode cylinder liners and piston rings.
- **Viscosity / density** is related to fuel quality.
- The Calculated **Carbon / Calcium** Aromaticity Index is used as an indication of the ignition quality of a fuel.
- The bilge-line arrangement is a safety **optional / compulsory** system since it is required by law.
- **Sulphur / carbon residue** may cause corrosion in the fuel system.
- Temperatures below the **pour point / flash point** of a fuel lead to wax formation.
- **Density / total sediment potential** is used to indicate and assess the stability and cleanliness of a fuel.
- **Sodium / vanadium** is normally present in the fuel as salt water contamination and can be removed by centrifuging.
- Present **revolution/ pitch/ output** of the main engine is 1000 kilowatts.
- Rules about the bilge line arrangement are made up by governments and Classification Societies and have to **comply with/ adhere/ deal with** international SOLAS rules.
- **Ash / aluminium and silicon** are small particles of the catalyst used in the refining process.
- The engine must be warmed up **quickly / gradually** by means of the **circulating / fuel** pumps.
- Cat fines are particularly responsible for **abrasive/ contamination/ recommended** wear.
- The traditional cylinder oil can be replaced by **crude oil/ circulating oil/ blended lube oil**.

4. Complete the sentences with the correct form of the words in parentheses. (21 p.)

- _____ (**impure**) in the fuel can cause damage to the fuel pumps.
- Obtain _____ (**permit**) from the bridge to test main engine ahead and astern on air.
- They use _____ (**add**) to improve lube oil quality and reduce the _____ (**possible**) of salt water _____ (**contaminate**).
- Cat fines can be very _____ (**harm**) to the engine components.
- Report _____ (**ready**) of the engine to the bridge.
- Is main engine warmed up through _____ (**sufficient**)?
- The versatile _____ (**apply**) of marine water ejectors makes them an important part of a ship's engine _____ (**equip**).
- The actual fuel _____ (**consume**) depends on the _____ (**efficient**) of the engine.
- Poor combustion can cause _____ (**accumulate**) of _____ (**viscosity**) residues in the scavenging air chambers.
- The _____ (**corrode**) effect of _____ (**sulphur**) acid is counteracted by adequate _____ (**lubricate**).
- The use of homogenisers is a good way to deal with _____ (**incompatible**) problems.
- You should check the _____ (**suitable**) of lube oil in the sump tank on a regular basis.
- CCAI 860 is _____ (**accept**) for slow speed engines.
- According to MARPOL, bilge water must first pass through an oily water _____ (**separate**) before being discharged overboard.

5. Match the following words to their synonyms/definitions. (12 p.)

*various, fouling, trim, accumulate, sounding, not enough
replenish, precautions, compulsory, condensation, heeling, stringent*

- insufficient: _____
- refill: _____
- gradually increase in quantity over a period of time: _____
- miscellaneous: _____
- preventive measures: _____
- the difference between the fore and aft draughts: _____
- the process of steam or warm air changing to liquid: _____
- list: _____
- strict: _____
- making dirty: _____
- something that has to be done: _____
- the process for calculating the total quantity of fluid in a tank: _____

6. Complete the sentences with an appropriate preposition. You can choose from the following: (13 p.)

on (x3), after, to, up, with, from, by, above, before, out, of

- Both the main bilge line and the suction lines are made _____ galvanized steel.
- The preparation for departure checklist must be filled _____ prior _____ commencement of stand- _____.
- Fuel is known to form deposits _____ hot spots, i.e. in the piston undercrown space.
- The level of cat fines should not exceed 10ppm _____ the centrifuge.
- Decide whether the harbour manoeuvres should be carried out on diesel oil or _____ heavy fuel oil.
- Several suction lines are mounted _____ a manifold.
- The holds are usually provided _____ four bilge wells.
- Installation of homogenizers _____ the centrifuge is not advisable.
- Bilge wells are periodically emptied by pumping _____ the bilge with the help of bilge pumps.
- Increased fouling of gasways could result _____ the use of inadequately cleaned fuel oil.
- The temperature is too high, it is 20 degrees _____ normal.

7. Match the questions to the answers. There is an extra question. (10 p.)

1. Which fuel can cause combustion deposits, especially when the engines run at low load? -- Viscosity.
2. What causes fouling of the gasways? -- Special lubricants with high TBN.
3. Which solid particles are particularly responsible for abrasive wear? -- Ash.
4. Which parameter is not actually a measurement of HFO quality? -- Fuel oil with high carbon residue.
5. What do engines designed for operation on high sulphur fuels use to minimise the effects of sulphur? -- By centrifuging and a fine filter.
6. Which areas will suffer high wear if cat fines rates are not reduced? -- Carbon residue.
7. How can you remove cat fines? -- Fuel pumps and injectors, the liners and piston rings.
8. What can replace the traditional cylinder oil? -- The pour point.
9. How can you remove vanadium deposits from turbocharger nozzle ring? -- Cat fines.
10. Which fuel property determines the requirements for tank heating and transferring? -- Blended lube oil.
11. Which parameter represents the incombustible components of fuel oil?