

Merchant Marine Academy of Macedonia
 School of Engineers
 Academic Year: 2017-18
 Exam period: September 2018
 Semester: D
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Name:
 Student number:
 Exam paper grade:

FINAL EXAM (Retakes)

1. Complete the following text on ballast system with appropriate words. The first letter is given. (15 p.)

The ballast system is used to **p**_____ seawater in or out of the ballast **t**_____. The basic reason for taking ballast on board or shifting **b**_____ once it is on board, is to improve the **s**_____ of the ship, especially when the ship does not carry **c**_____. An anti-heeling system is used to minimize the list in port that can occur during cargo handling. Pumps with large **c**_____ (1000 cubic metres/hour) are installed between two tanks (one on the port side and another one on the **s**_____ side). These pumps can transfer **w**_____ from one tank to the other at great **s**_____. In contrast to the valves of the bilge system, which are non- **r**_____ valves, the ones of the ballast system are two- **w**_____ valves, as the tanks must be able to be filled and emptied.

2. Fill in the gaps with a word from the list. There are two extra words. (15 p.)

choking, port, discharge, ejector, periodically, anti-heeling, sludge, pumps, centrifuging, overboard, homogenizer, strainers, oily, well, sea, suction, speed

- According to MARPOL regulations, bilge water must first pass through a(n) _____ water separator before being discharged _____.
- A(n) _____ system is used to minimise the list of the vessel in _____.
- A(n) _____ creates a vacuum by the _____ of the water flowing through it.
- Bilge wells are always provided with _____ to prevent solid particles from entering the bilge pump and _____ it.
- A _____ is used to disperse any water and _____ which could remain in the fuel after _____.
- Bilge wells are _____ emptied by pumping out the bilge with the help of bilge _____.
- All _____ lines are fitted with non-return valves which do not allow the liquid to flow back to the bilge _____.

3. Match the following parameters tested in fuel with their definitions: (15 p.)

*cat fines, sulphur, carbon residue, ash, water,
flash point, pour point, density, viscosity, sediment*

- It is expressed as per cent by volume; it may cause corrosion in the fuel system:
- It mainly affects the fuel separation:
- It indicates the coke-forming tendencies of a fuel:
- It is a measure of fuel's resistance to flow:
- It represents the incombustible components of fuel oil:
- Small particles of the catalyst:
- It consists of hydrocarbon sludge and is contained in all fuels:
- It must be known for safe transport and storage of the fuel (expressed in degrees centigrade):
- The lowest temperature at which the fuel will flow (expressed in degrees centigrade):
- Its compounds can be very corrosive to cylinder liners and piston rings:

4. Circle the correct alternative. (10 p.)

- The engine must be warmed up **quickly / gradually** by means of the **circulating / fuel** pumps.
- Temperatures below the **pour point / flash point** of a fuel lead to wax formation.
- The bilge-line arrangement is a safety **optional / compulsory** system since it is required by law.
- **Water / carbon residue** may cause corrosion in the fuel system.
- **Density / total sediment potential** is used to indicate and assess the stability and cleanliness of a fuel.
- The Calculated **Carbon / Calcium** Aromaticity Index is used as an indication of the ignition quality of a fuel.
- **Ash / aluminium and silicon** are small particles of the catalyst used in the refining process.
- **Sodium / vanadium** is normally present in the fuel as salt water contamination and can be removed by centrifuging.
- When you turn the engine with the **steering gear / turning gear**, the indicator cocks must be **open / closed**.

5. Match the following words to their synonyms/definitions. (10 p.)

*wear and tear, condensation, replenish, alter, saline,
dismantle, contaminate, trim, accumulate, sounding*

- gradually increase in quantity over a period of time.....
- damage due to continuous use.....
- the process for calculating the total quantity of fluid in a tank.....
- take apart, disassemble.....
- change.....
- the difference between the fore and aft draughts.....
- the process of steam or warm air changing to liquid.....
- with salt.....
- pollute.....
- refill.....

6. Complete the sentences with the correct form of the words in parentheses. (15 p.)

- Water in the lube oil system can cause _____ (**corrode**).
- Small amounts of water can _____ (**accumulation**) in the ship as a result of _____ (**condense**), pipe leakages, washing or rain.
- The _____ (**corrode**) effect of _____ (**sulphur**) acid is counteracted by adequate _____ (**lubricate**).
- Cat fines are highly _____ (**abrasion**).
- The use of homogenisers is a good way to deal with _____ (**incompatible**) problems.
- Report _____ (**ready**) of the engine to the bridge.
- The versatile _____ (**apply**) of marine water ejectors makes them an important part of a ship's engine _____ (**equip**).
- _____ (**catalyst**) fines are highly _____ (**abrade**).
- Check the _____ (**suitable**) of lub-oil in the sump tank.
- N/A in the checklist stands for *not* _____ (**apply**).

7. Complete the sentences with an appropriate preposition. You can choose from the following: (10 p.)

up, with, by, on, above, before, out, after, to, of

- Bilge wells are periodically emptied by pumping _____ the bilge with the help of bilge pumps.
- The temperature is too high, it is 20 degrees _____ normal.
- Several suction lines are mounted _____ a manifold.
- The holds are usually provided _____ four bilge wells.
- 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.
- 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- _____.

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

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| 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 | -- Carbon residue. |

rates are not reduced?

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?