

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

Course: Maritime English

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Instructors: A. Birbili, Dr M. Tsompanoglou

Name:

Student number:

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FINAL EXAM

A. Fill in the gaps using the words below. There are two extra words. (15 p.)

neutralises cracks clearances sufficient injection pressure

crankshaft cooler liner scale carbon sediment insufficient

heater worn head film

-- Incorrect _____ timing can cause lack of power or can cause the engine to produce white smoke as there is _____ temperature to properly burn the fuel.

-- The lubrication of the cylinder is very important, first because it forms a _____ of oil between piston rings and cylinder _____, and secondly because it _____ the acid products of combustion.

-- The lubricating oil passes through a _____ and an autoclean filter before it enters the main engine at a _____ of about four bars.

-- The cylinder _____ should be checked at the combustion side for _____ or burning damage and for _____ at the water spaces.

-- Piston rings should be checked for _____ deposits in their grooves and for proper _____ in order to avoid excessive wear, sticking and breakage.

-- _____ main bearings and vibrating forces are the main reasons for _____ deflection.

-- _____ is formed when suspending solid particles in the fuel coagulate and sink down.

B. Write down the appropriate lube oil additive(s) which would help with the following problems. (7.5 p.)

- Fouled surfaces:
- Difficulty in pumping the lube oil at low temperatures:
- Major accumulation of deposits on piston crown and cylinder liner:
- Signs of corrosion on metal surfaces:
- Scored, scratched cylinder liner surface:

C. Circle the correct choice. (12 p.)

-- The used fuel is mixed with a new charge in the ____ tank.

- a. settling b. double-bottom c. balancing

-- The acronym CCAI stands for:

- a. calculated calcium aromaticity index
b. calculated carbon aromaticity index
c. cracked carbon aromaticity index

-- The ____ the CCAI, the later the ignition takes place.

- a. higher b. lower c. clearer

-- The acronym TBN stands for:

- a. total balance number b. total base number c. thick base number

-- The fuel resists to flowing when its viscosity is ____.

- a. low b. high c. at a medium rate

-- The heating value of a fuel is commonly expressed in ____.

- a. r.p.m. b. p.p.m. c. b.t.u.

-- The element which causes oxidation to the engine is ____.

- a. carbon b. sulphur c. silicon

-- Lube oils with a viscosity around SAE 15 are ____ for diesel engines.

- a. suitable b. proper c. unsuitable

-- The cylinder liner is lubricated ____.

- a. circumferentially b. horizontally c. vertically

-- The crosshead and the guides are lubricated by ____ oil.

- a. cylinder b. circulating c. turbine

-- The viscosity index, VI, of a lubricant shows how ____ it is to variations of temperature.

- a. variable b. solid c. stable

-- The fuel needs heating when it is close to its ____ point.

- a. flash b. pour c. injection

-- The time of ignition of the fuel is directly influenced by:

- a. the cetane number b. the water content c. the ash content

-- The ____ the TBN is, the more acid neutralising capacity the oil has.

- a. lower b. better c. higher

-- The piston ____ spread the cylinder oil up and down the surface of the liner.

- a. rod b. pin c. rings

D. Match the words to their definitions. There is one extra word. (5 p.)

friction insulate erosion tenacity recondition antifouling

lap dismantle emission corrosion seizing

- oxidation leading to rust.....
- cover with, put on top of a surface.....
- fighting dirt.....
- rubbing between two metal surfaces.....
- major damage (of bearings, pistons) due to inadequate lubrication.....
- sticking property.....
- discharge of gases, smoke, etc.....
- protect against heat dispersal.....
- service, overhaul, bring in the former condition.....
- disassemble, disconnect, remove.....

E. The following list of terms includes the most important parameters of fuel oils for diesel engines. Match the terms with the appropriate explanation. There are two extra terms. (10 p.)

ash content specific gravity cetane number hydrogen sulphide viscosity

water and sediment heating value density carbon residue flash point

pour point sulphur

- Chemical element which can be very injurious to engine parts during combustion because it changes into acid: _____
- Unburned carbon during combustion which can deposit on engine parts: _____
- Non-combustible solid material in the fuel which scratches the rubbing surfaces it comes in contact with: _____
- A measure of the density or weight of the fuel. It also serves as a rough check on viscosity, carbon content and other qualities: _____
- A highly toxic, flammable gas which can be fatal in extreme cases: _____
- The lowest temperature at which the fuel oil is observed to flow: _____
- An indication of the ignition quality of the fuel: _____
- The amount of heat given off on complete combustion of one pound of fuel: _____
- The temperature at which the fuel vapours ignite when a flame is applied to it: _____
- The measure of the resistance of the fuel to movement. The higher it is, the more difficult it is for the fuel to flow: _____

F. Complete the sentences with the appropriate form of the words in parentheses. (10.5 p.)

- The HFO _____ (**purify**) separates water and _____ (**impure**) from the fuel.
- Chemical _____ (**stable**) is an important specification of _____ (**lubricate**) oils.
- Fractional _____ (**distil**) is the process through which the products of crude oil are obtained.
- High water _____ (**contain**) in the fuel causes erratic combustion and _____ (**corrode**).
- Most fuel _____ (**inject**) are operated hydraulically.
- Highly _____ (**viscosity**) fuels need special _____ (**treat**).
- _____ (**distil**) fuels have cleaner emissions than _____ (**residue**) fuels.
- The _____ (**remove**) of air from the cylinders is done with the help of air cocks.
- Detailed _____ (**instruct**) on how to operate and maintain an engine are given by the engine _____ (**construct**) to ensure the efficient operation of the machinery.

G. Match the questions to the answers. There is an extra answer. (5 p.)

- | | |
|--|--|
| 1. Where are the fuels stored? | -- Intermediate fuel oil. |
| 2. How is the fuel cleaned? | -- It adjusts the temperature of the fuel. |
| 3. What do marine fuels come from? | -- Residual fuels. |
| 4. How do we call the fuels that are refined petroleum products? | -- MDO and HFO |
| 5. How do we call any fuel whose grade lies between HFO and MDO? | -- It raises the pressure of fuel. |
| 6. What is the function of the settling tank? | -- Crude oil. |
| 7. What does the viscosity regulator do? | -- By a centrifugal separator. |
| 8. What does the booster pump do? | -- It allows water and thick particles to sink down. |
| 9. What is the function of the buffer tank? | -- Distillate fuels. |
| 10. Which fuels are mainly used in marine diesel engines? | -- In the storage tanks. |
| | -- It allows the used oil from the engine to be mixed with a new charge. |

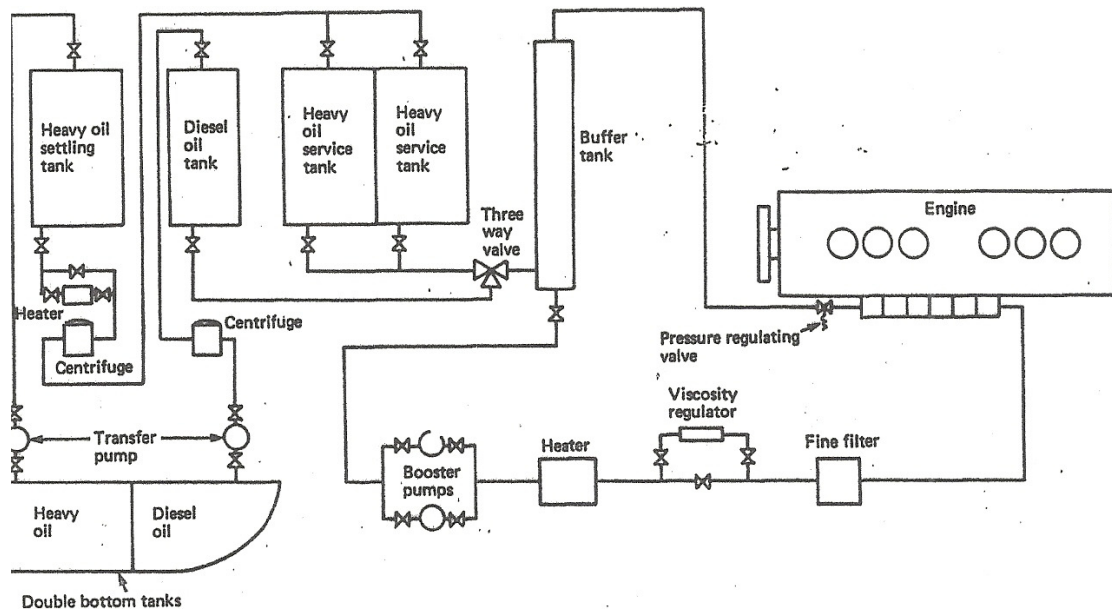
H. What maintenance work should be done for the following defects? Choose an appropriate answer from the words in italics. (10 p.)

scraping machining grinding aligning replacement reconditioning
retightening cleaning readjustment

- Incorrect clearances:
- Carbon deposits:
- Deflection:
- Incorrect injection pressure:
- Worn surfaces:
- Scale:
- Cracks, fractures:
- Surfaces out of roundness:
- Slackened tie bolts:
- Scored/scratched surfaces:

I. Write a paragraph comparing HFO and MDO in relation to their use and properties. (15 p.)

J. Insert the appropriate word (or words) in the gaps to complete the text on a typical fuel oil system. (10 p.)



From the storage tank, the HFO is pumped into the _____ tank where water and heavy dirt sink down. Then it is fed through a heater and next through a _____ where the oil is cleaned. Water and dirt go to the _____ tank. Then the clean oil is pumped into the HFO _____ tanks which are in duplicate, as one is in use, while the other is on standby. From there the oil, after passing through the _____ tank, is pumped by high pressure pumps into a _____ and right after into a _____, which automatically adjusts the temperature of the oil. Finally, the oil is discharged through a fine _____ to the main engine fuel _____ suction. A _____ valve allows us to operate the engine on diesel oil.

GOOD LUCK!!!