

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

**Course: Maritime English**

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**FINAL EXAM**

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

*corrosion sticking mineral friction metals sufficient wear heat  
erosion distillation performance running antifouling sealing  
consult coolant inadequate*

The main task of lubrication is to reduce \_\_\_\_\_ between the moving parts of an engine. In this way we ensure better \_\_\_\_\_ of the engine and reduction of \_\_\_\_\_ due to friction. Lubrication also acts as a \_\_\_\_\_ because it absorbs a considerable amount of \_\_\_\_\_ which is released from friction. Furthermore, it assists the piston rings in \_\_\_\_\_ the combustion chamber. Moreover, it protects the surfaces from \_\_\_\_\_, even when the engine is out of \_\_\_\_\_, thanks to the good tenacity lubricants have on \_\_\_\_\_. Finally, it keeps the metal surfaces clean due to the \_\_\_\_\_ property of lubricating oil. Correct lubrication of the engine is of great importance because \_\_\_\_\_ lubrication would lead to the seizing of bearings and \_\_\_\_\_ of the engine. The correct choice of lubricating oil is essential too, and we should always \_\_\_\_\_ the engine constructor's manual as to the recommended type of oil for the particular engine. The types of lubricating oils used in marine diesel engines are generally \_\_\_\_\_ oils, coming from the residues (base stock) of crude oil after its \_\_\_\_\_.

**B. Match the words to their definitions. There is one extra word. (10 p.)**

*particle stalling tenacity distil defective seizing residue dismantle  
alignment emission treatment*

- refine .....
- process for improving quality .....
- what remains left over .....
- tiny solid material .....
- sticking property .....
- discharge of gases, smoke, etc .....

- disassemble, disconnect, remove .....
- reduction of revolutions, eventual stopping of the engine .....
- faulty, damaged .....
- bringing back to a straight line .....

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

*cetane number*    *hydrogen sulphide*    *viscosity*    *pour point*    *density*  
*water and sediment*    *heating value*    *ash content*    *specific gravity*  
*sulphur*    *carbon residue*    *flash point*

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

**D. State whether the following sentences are True or False. (10 p.)**

- The higher the viscosity of a fuel oil, the more heating it needs to reduce it.
- Around the pour point the fuel can hardly be pumped and needs heating.
- Sulphur is extremely harmful to metal surfaces when it turns into sulphuric acid.
- Heavy fuel oils form more carbon deposits because they have a lower carbon residue figure.
- Carbon deposits can be formed in every part of the engine.
- The cetane number of a fuel oil should be proportional to the engine speed.
- High water content in the fuel does not affect combustion whatsoever.
- High specific gravity does not necessarily imply highly viscous fuel.
- Sediment is formed when suspending solid particles in the fuel coagulate and sink down.
- Heating value is the amount of heat given off on complete combustion of one litre of fuel.



**F. The following is a list of additives which are added to lubricating oils to improve their functional properties. Match them to the reasons for their use below. (8 p.)**

*dispersants*      *detergents*      *corrosion inhibitors*      *wear preventers*

*antioxidants*      *pour point depressants*      *VI improvers*      *anti-foamants*

- Keep the engine parts clean of deposits, especially carbon deposits .....
- Prevent the corrosion of metal surfaces by forming a tenacious oil film on them .....
- Prevent the oxidation of oil which destroys its lubricating properties .....
- Lower the freezing point of oil thus having free flow at lower temperatures .....
- Keep sludge, carbon and other deposits suspended in the oil .....
- Reduce foam in the crankcase .....
- Limit the wear due to friction .....
- Increase the VI of the oil .....

**G. Complete the sentences with the appropriate form of the words in parentheses. (15 p.)**

- Empty the \_\_\_\_\_ (**contain**) of this box on the floor.
- The HFO \_\_\_\_\_ (**purify**) separates water and \_\_\_\_\_ (**impure**) from the fuel.
- Chemical \_\_\_\_\_ (**stable**) is an important specification of \_\_\_\_\_ (**lubricate**) oils.
- \_\_\_\_\_ (**add**) in the lubricating oil improve its quality.
- The TBN value of a lube oil eliminates the \_\_\_\_\_ (**corrode**) influence of acid.
- Most fuel \_\_\_\_\_ (**inject**) are operated hydraulically.
- Highly \_\_\_\_\_ (**viscosity**) fuels need special treatment.
- \_\_\_\_\_ (**distil**) fuels have cleaner emissions than \_\_\_\_\_ (**residue**) fuels.
- The \_\_\_\_\_ (**remove**) of water and foreign particles in the lube oil is done in a centrifugal \_\_\_\_\_ (**separate**).
- Detailed \_\_\_\_\_ (**instruct**) on how to operate and maintain an engine are given by the engine constructors to ensure the efficient \_\_\_\_\_ (**operate**) of the machinery.

**H. Here are some problems of the engine components. What are the possible reasons for these? Choose an appropriate answer/reason from the phrases in italics and write it down next to each problem. (9 p.)**

- *abrasive particles, e.g. ash in fuel, iron chips in lubricant*
- *vibration, main bearing wear down, slackened tie bolts and chocks*
- *high thermal stresses*
- *inadequate lubrication causing major friction*
- *deposits of salt from cooling water*
- *HFO with high carbon content*
- *variations in temperature*
- *excessive lubrication*
- *residues from the combustion of fuel oil*

<b>PROBLEMS</b>	<b>POSSIBLE REASONS</b>
Accumulated deposits on exhaust valve after 10,000 hours of running on heavy fuel oil	
Cracks on piston or cylinder head underside	
Crankshaft deflection	
Major wear and deformation of piston crown	
Sticking of piston rings in their grooves	
Scale on cylinder head and externally on cylinder liner	
Piston crown with accumulated carbon deposits	
Scratches and abrasion on cylinder liner surface	
Scuffed cylinder liner	

**I. What maintenance work should be done to the following engine parts?**  
**Choose an appropriate answer from the ones below. (8 p.)**

- scored valve seats >.....  
.....
- seized piston >.....  
.....
- fuel cam nuts >.....  
.....
- stuffing box >.....  
.....
- noisy crosshead guides and slippers >.....  
.....
- sump tank >.....  
.....
- connecting rod screws >.....  
.....
- governor >.....  
.....

should be retightened	should be lapped with carborundum paste and reground	the guides should be aligned and the ply of slippers should be readjusted	replacement
should be cleaned of sediment	check the level and condition of oil	should be cleaned and its sealing elements (flange, gasket, packing) should be replaced	should be checked for correct tightness and retightened

***GOOD LUCK!!!***