Merchant Marine Academy of Macedonia- School of Engineers		
Course: Maritime English	**Academic year:2023-2024**	**Exam period: February**
Semester: C'	**Date: 28/02/24**	**Instructors: A. Birbili, E. Xenitidou**
Student's name:		
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	**Exam paper grade:**	**Instructor's signature**

Fill in the gaps of the following passage about lubrication with the following words- 15 points ***wear, heat, consult, distillation, performance, running, antifouling, sealing, coolant, corrosion, mineral, friction, metals, sticking, 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 of crude oil after its _____.

Match the following list of lub-oil additives to their functions.- 8 points
antioxidants, corrosion inhibitors, viscosity index improvers, wear preventers, pour point depressants, detergents, dispersants, antifoamants

Keep sludge, carbon and other deposits suspended in the oil:
Increase the VI of the oil:
Limit the damage that is caused by friction:
Reduce foam in the crankcase:
Keep the engine parts clean of deposits:
Lower the freezing point of oil:
Prevent the oxidation of oil:
Prevent the corrosion of metal surfaces:

Match the following words to form the correct collocations (phrases): 12 points

emergency/ ***drain / inlet/ needle/ pumping/ fractional/ sounding/ three- way / pressure/ gudgeon/ drip/ double***

…….. ……..... tank ……..…….. distillation ……..…..….rate

……...… chamber fuel ……..pipe ……stem

…….…. sampling …… ……..pin ……..….. hulled

……pipe ……..……button ……..valve

Match the terms to the appropriate explanation. There are two extra terms. -10 points

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

-- A measure of the density or weight of the fuel. It also serves as a rough check on viscosity, carbon content and other qualities: …….

-- 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: ……

-- The temperature at which the fuel vapours ignite when they are exposed to a flame: ……

-- The lowest temperature at which the fuel oil is observed to flow: ……

-- An indication of the ignition quality of diesel oil: ……..

-- The amount of heat given off on complete combustion of one pound of fuel: ……

-- Non-combustible solid material in the fuel which scratches the rubbing surfaces it comes in contact with: ……

-- The measure of the resistance of the fuel to movement. The higher it is, the more difficult it is for the fuel to flow: …….

-- Content in water and solid particles. The higher it is, the more possible it is to cause erratic combustion and corrosion: ……..

Match the words to their definitions/explanations below – 7 points

antifouling/ dismantle / scales/ corrosion/ friction/ purify/ sludge

oxidation leading to rust:…….. remove impurities, clean: …….

fighting dirt:…….. deposits of salts:…….rubbing between two metal surfaces:…… disassemble:…… mud, dirt:……

Fill in the gaps with one of the the following words. 10 points

gravity	*rate*	*fenders*	*eliminate*	*capacity*
consumption	*treatment*	*decrease*	*sulphur*	*particles*

- An adequate number of Yokohama …….are placed on the supply tanker depending on weather conditions.
- Fuel is an important criterion for the choice of the engine, since more than 50% of the total running cost of the ship is due to fuel ……. Marine diesel oil is best because it produces less dirt and does not need special ……., but it is expensive. It may be used when the vessel is manoeuvring. Heavy fuel oil is much cheaper but it produces sludge and dirtier exhaust gases. It contains more …….. than diesel and, having a higher viscosity, it cannot be pressed through injectors without treatment. It needs heating to ……..viscosity and purifying to…… water and dirt particles, too big to pass through the injector. Heating is done in fuel heaters mostly by electric heating, and cleaning is done in separators, centrifuges, where water and heavy ……. are separated from the oil.
- Usually two daily service tanks are installed, so that one tank can be filled while the other is being used. Each tank has the ……. to provide the engine with fuel for 24 hours.
- In most fuel systems the settling tanks and daily service tanks are also called ……. tanks.
- The pumping ……..is up to 600 m^3/h.+

Match the questions to the answers. 8 points

1. Where are the fuels stored?	---- Intermediate fuel oil.
2. How is the fuel cleaned?	----It adjusts the temperature of the fuel.
3. What is the source of marine fuels?	---- Distillate fuels
4. How do we call the fuels that are refined petroleum products?	---- In the storage tanks.
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.

Fill in the gaps with the following words- 10 points

Atomizers, assembly, case, seat, holder, stem, fitted, chamber, screwed, consists

A fuel injector ……. of three main parts. The injector ……, the needle with its …… and return spring and the nozzle ……. Inside the cylindrical holder there is a centrally formed cylindrical ……. where the needle stem and its return spring are …….. The nozzle assembly is ……at the bottom of the injection holder. It has one or more …….. through which the fuel is sprayed in the combustion ……The pressure chamber is a hollow space inside the assembly which ends to a tapered ……where the injection needle ends too.

Underline the correct alternative. - 20 points

-The crosshead and the guides are lubricated by **cylinder oil/ circulating lube oil/ turbine oil.**
-The properties of lubricating oils are ***similar to / different from*** those of fuel oils.
-Viscosity is the ***least / most*** important property of lube oils.
-The Society of **Automotive Engines/ Automotive Engineers** has **distributed/ *classified / divided*** oil viscosity from SAE 10 to SAE 250.
SAE 10 to SAE 20 oils are very ***thin / thick*** and are suitable for **medium/ *low /high*** temperatures.
SAE 30 to SAE 50 oils having a medium to high viscosity are ***unsuitable / suitable*** for diesel engines. The viscosity **indicator/ index/ ignition** or VI of the oil is of equal importance because it indicates how stable the oil is to variations of temperature.
-Chemical stability is an important specification of lube oil, too. The ***acid / base*** neutralising capacity of oil is represented by its TBN value, which indicates the oil's **residual/ *acid / alkaline*** reserve. The ***higher / lower*** the TBN is, the more acid neutralising capacity the oil has.
-The higher the viscosity of a fuel oil, the **more/ less** heating it needs to reduce it.
-The element which causes oxidation to the engine is **ash/ sulphur/ silicon**.
-The acronym CCAI stands for **calculated calcium aroma indication/ cracked carbon atom index/ calculated carbon aromaticity index**.
-The heating value of a fuel is commonly expressed in **r.p.m./ b.t.u./p.p.m.**
-The cylinder oil is drawn from the **sump/ storage/ drain** tank to a **small/ medium/ big** service tank by separate pumps. From there, the oil is supplied to lubricators by gravity and is led through the drillings onto the liner surface where grooves **distribute/ attribute/ divide** around the liner, and the piston **rings/ rod** spread it up and down the surface of the liner.