

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

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Name:

Student number:

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FINAL EXAM

1. Put an appropriate word from the list in the gaps that follow. There are two (2) extra words. (12 p.)

blankets cylinder vibration asbestos fibrous liner quills

cold scuffing clover micro-seizure substitutes available hot

- Irregularities in the _____ and piston rings coming into contact during operation are the cause of _____.
- With severe _____ corrosion that is not addressed by the correct _____ oil, a liner can be damaged beyond useful life in less than 1,000 hours.
- Since the outlawing of _____, alternative insulation materials had to be found and adopted as _____.
- _____ insulation materials stand up well to high _____ conditions without breaking down.
- _____ leafing, which is a form of cylinder liner wear, takes place between each pair of lubricating _____.
- Insulation materials are _____ in various forms, depending on the product, such as flexible _____, and preformed pipe and elbow sections.

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

- The _____ (**axis**) marks on the liner surface may result from _____ (**sufficient**) lubrication or excessive loading.
- An _____ (**expand**) valve is controlled by a thermostat to regulate the flow of the refrigerant from the H.P. side of the system to the L.P. side.
- _____ (**remove**) insulation is ideal for any equipment that has to be repaired in remote areas.
- The systematic variation in alkalinity may produce uneven _____ (**corrode**) wear on the cylinder liner.
- A wear rate of 0.05 mm/1,000 hours in liners is _____ (**accept**).
- The valve to starting air _____ (**distribute**) is closed.
- _____ (**sulphur**) acid is formed due to the _____ (**absorb**) of condensate or moisture present in the combustion chamber.
- Improper refrigeration can lead to _____ (**oxide**) of temperature sensitive cargo.
- Insulation is critical for personnel protection, _____ (**reduce**) of ambient heat and fire _____ (**prevent**).
- _____ (**abrade**) wear is sometimes caused by _____ (**catalyst**) fines.
- If there is water in the fuel, you should drain off the water and clean the fuel more _____ (**effect**).

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

- Heavy residual fuel oils are heated prior to centrifuging to ____
- a. increase specific gravity b. separate fuel from lube oil
c. reduce fuel weight d. reduce fuel viscosity
- If the analysis of used lube oil indicates a high content of iron particles, this could indicate ____
- a. excessive cooling of lubricating oil b. excessive ring and liner wear
c. corrosive deterioration of a bearing d. inadequate air filtration
- Whether using a centrifuge or a simple filter, oil cleaning and filtration will be the most effective when the oil is at a ____
- a. low temperature and a high viscosity b. low temperature and a low viscosity
c. high temperature and a low viscosity d. high temperature and a high viscosity
- Diesel engine lube oil diluted with diesel oil is indicated by ____
- a. decreased viscosity b. decreased pour point
c. increased flash point d. increased viscosity
- In a diesel engine, the function of lubrication is to ____
- a. provide a film between the shafts and bearings b. cool the pistons and bearings
c. remove metal or dirt particles resulting from wear d. all of the above
- The possibility of damage from operating a diesel engine at critical speeds is reduced by the use of ____
- a. a vibration damper b. an isochronous governor c. elastic engine mounts
d. a cast iron bedplate with good flexible qualities
- "Loop", "uniflow", "cross flow" are terms used to describe various types of ____
- a. supercharging b. scavenging c. control air circuits d. turbochargers
- A diesel engine is supercharged in order to ____
- a. increase the no-load rpm b. provide more air for combining with the fuel
c. lower the no-load rpm d. provide more fuel for combining with the air
- Combustion knock will most likely occur as a result of using a fuel with ____
- a. low ignition quality b. high volatility c. low ignition delay
d. a high cetane number
- A centrifuge will satisfactorily remove ____ from fuel oil.
- a. lube oil b. water c. gasoline d. sulphur compounds
- The ignition quality of diesel oil is indicated by the ____
- a. octane number b. CCAI c. kinematic viscosity d. cetane number
- Burning fuel with a high sulphur content in a diesel engine will ____
- a. produce corrosion in the cylinder and exhaust systems at low loads
b. cause clogging of the fuel system
c. increase the ability of the engine to start in cold weather
d. increase thermal efficiency

- A decrease in the flash point of the diesel engine lube oil indicates that the lube oil is ____
 - a. contaminated with carbon
 - b. diluted with fuel oil
 - c. diluted with water
 - d. contaminated with sludge

- In a diesel engine, pistons are attached to the crankshaft by ____
 - a. connecting rods
 - b. push rods
 - c. piston guides
 - d. lash adjusters

- A piston is at top dead centre when it is ____
 - a. farthest from the cylinder head
 - b. opening the exhaust ports
 - c. closing the fuel ports
 - d. nearest to the cylinder head

4. Match the words from the list to their synonyms/definitions below. There is one (1) extra word. (11 p.)

fabricated downtime gauge faltering deformation stalling
defective slow-steaming cladding alloy fouled volatility

- the property of changing readily from liquid to vapour/gas.....
- change of shape.....
- lower fuel consumption during low-load operation.....
- faulty.....
- irregular running of the engine.....
- a covering of hard material, used as protection.....
- time during which a machine is out of order
- measure.....
- manufactured.....
- mixture of metals.....
- dirty.....

5. Complete the following sentences with an appropriate word. The first letter is given. (15 p.)

- A reciprocating single or two-stage compressor is commonly used to raise the **p**_____ of the vapourised refrigerant.
- Different solenoid valves provide automatic opening and closing of the liquid lines controlling the **f**_____ of the refrigerant into the cargo hold.
- Onboard cylinder oil analysis tests the following two key parameters: iron content and **B**_____ Number.
- The **d**_____ ensures that the refrigeration system stays dry by removing any moisture from the refrigerant.
- The **c**_____ is used to liquefy the refrigerant and to subcool it below the saturation temperature.
- Cylinder liner wear due to **f**_____ takes place between the sliding surfaces of cylinder liner and piston **r**_____.
- When will **c**_____ oil washing start?
- The **b**_____ of a diesel engine cylinder describes the inside diameter of the cylinder.
- Is the **I**_____ Gas system operational?

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

in by on to with before into up

- High cylinder liner wear will cause increased blow-_____.
- Treat oil spill _____ dispersants.
- You have to dispose the sludge _____ the sludge tank.
- When the engine runs unevenly and will not pick _____ rpm, the fuel filter may be blocked.
- HFO has to be heated prior _____ centrifuging.
- Permanent insulation is cut and fitted _____ site.
- You have to keep contact _____ the oil terminal _____ VHF Ch.14.
- Spill waste has been contained _____ save-alls.
- The liner has to be cleaned and inspected _____ gauging.

7. Put an appropriate word from the list in the gaps that follow. There are two (2) extra words. (12 p.)

*pump particles mineral condense backpressure fabricated combustible
evaporate implemented scuffing firing ingress inerted maladjusted*

- The camshaft was in the wrong position. It was _____.
- Cylinder liners are _____ from a cast iron alloy.
- _____ is due to lack of lubrication, which results in localised welding between points on the rings and the liner surface with subsequent tearing of microscopic _____.
- What is the _____ for stripping?
- If one or more cylinders are not _____, you should check the suction valve and the puncture valve in the fuel _____.
- Fiberglass, _____ wool, Calcium Silicate and ceramic insulation are non-_____.
- Are your tanks _____?
- _____ of water inside the liner should be avoided.
- Temperatures below the dew point allow steam to _____.

8. State whether the following sentences are True (T) or False (F). (10 p.)

- A disadvantage of a 2-stroke diesel engine is the use of scavenge air.
- A diesel engine which is rated for normal operation at a crankshaft speed of 800 rpm is commonly classed as a slow-speed engine.
- Fuel oil daily tanks must be checked and cleaned at regular intervals in order to remove sludge, water, micro-organisms.
- A viscous type damper, as used on a marine diesel engine, is a device which dampens the torsional vibrations in the flywheel.
- Rapid increase in pressure and temperature occurs in the combustion chamber of a diesel engine cylinder shortly after ignition and before the piston reaches T.D.C.
- A disadvantage of a 4-stroke diesel engine over a 2-stroke one is greater weight per horsepower ratio.

- A scored cylinder liner will cause abnormally high cooling water temperature.
- Vibrations from diesel engines and engine driven equipment are isolated from the hull structure by flexible engine mountings.
- An electric drill is the best tool to use for removing the wear ridge at the top of the cylinder liner.
- Diesel engine lube oil can become contaminated by unburned fuel oil.

