MERCHANT MARINE ACADEMY OF MACEDONIA
SCHOOL OF ENGINEERS

Course: Maritime English
Academic year: 2018 – 2019 **Name:**
Exam period: September 2019 **Student number:**
Semester: E΄ (Retakes-Old students) **Date: 12/09/2019**
Instructor: A. Birbili **Exam paper grade:**

FINAL EXAM

1. Fill in the gaps using the words below. **(15 p.)**

Azipods propeller governor oil conformity addition thrust straight

regulations bearings load properties manoeuvrability unburnt speed

-- As the _____ is used to lubricate the engine, its _____ deteriorate over a period of time due to the _____ of impurities which could include _____ fuel, water, acids, suspended particles and so forth.
-- Once the _____ of the engine has been set, the role of the _____ is to maintain that speed despite the variations in _____.
-- _____ are used to support the shafting in a _____ line between the main engine and the _____.
-- A marine diesel engine has to be maintained in _____ with the various international rules and _____ as well as the advice of the manufacturer.
-- _____ are the most advanced option when _____ is really valuable to the vessel since these systems can turn 360 degrees and _____ can be directed at any direction.

2. Choose the correct alternative of the words in italics. **(15 p.)**

It is a bit difficult to read the early signs of a crankcase explosion. This is because the indications are ***similar / different*** to many other emergency situations. But there are few pre-explosion signs that can be read. Crankcase explosion will lead to:

- Sudden increase in the ***inlet / exhaust*** temperature
- Sudden ***increase / decrease*** in the load of the engine
- ***Regular / irregular*** running of the engine
- Incongruous noise of the engine
- Smell of the white mist.

In case of these indications, engine ***load / speed*** should be brought down immediately and the supply of fuel and air should be stopped. The system should then be allowed to cool down by ***opening / closing*** the indicator cocks and turning on the internal cooling system.

Crankcase explosions can be prevented by avoiding the generation of hot spots. They can also be prevented in the following ways:

- By providing proper lubrication to the reciprocating parts, thus avoiding high ***temperatures / pressures***.
- By avoiding overloading of the engine
- By using bearings with ***black / white*** metal material which prevents rise in temperature.
- By using oil mist detector in the crankcase with proper ***vision / visual*** and audible alarm. Oil mist detectors raise an alarm if the ***concentration / condensation*** of oil mist rises above the permissible limit.
- Pressure ***regulating / relief*** valves should be fixed on the crankcase for the instant release of pressure. They should be periodically ***temperature / pressure*** tested.
- Crankcase doors should be made of strong and durable material. Vent ***pipes / ports*** shouldn't be too large and should be checked for any choke up.
- In the event of an explosion, the crankcase doors should never be opened until the system has totally ***calmed / cooled*** down.
- Fire extinguishing medium should be kept standby. In many systems, ***exhaust / inert*** gas flooding system is directly connected to the crankcase.

3. Fill in the gaps using the words below. (15 p.)

cavitation drain running detector flames principle vent solution

blade explosion fresh crankcase relief warning pressure

-- In freezing weather, you must carefully _____ all passages and pockets in the engine that contain _____ water and are subject to freezing, unless an antifreeze _____ has been added to the water.
-- _____ is the formation and bursting of vapour bubbles in water near a moving propeller _____ in regions of low pressure due to Bernoulli's _____.
-- The oil mist _____ does not reduce or prevent the formation of mist, but it only gives _____ in case the concentration rises above the level at which an _____ can take place.
-- When engines are stopped, you must _____ all starting-air lines because serious accidents may occur if _____ is left on.
-- Pressure _____ valves should be provided with wire mesh to prevent the release of _____ inside the engine room.
-- Oil mist is created in the _____ when the lubricating oil is splashed by the _____ components of the engine.

4. Complete the sentences with the appropriate form of the words in parentheses. (20 p.)

-- The main shaft is supported and held in _____ **(align)** by bearings.
-- When the temperature of steam reduces, _____ **(condense)** takes place.
-- _____ **(prevent)** measures should always be taken during bunkering.
-- When the fuel reaches the _____ **(inject)** system, it should be _____ **(absolute)** free of water and foreign matter.
-- International regulations try to reduce the _____ **(emit)** of ships' fuels.
-- The _____ **(sensitive)** of the oil mist detector should be checked on a regular basis.

-- The screw-type propeller is the _____ **(propel)** device used in almost all ships.
-- In _____ **(control)** pitch propellers, the pitch can be adjusted by a hydraulic mechanism which allows the blades to turn on their own axis.
-- Depending on the _____ **(long)** of the shaft, there can be two or more shafts coupled by bolting _____ **(arrange)**.
-- The authorities used _____ **(disperse)** to break up the oil spill in the Gulf of Mexico some years ago.
-- The lubricating oil used in _____ **(corrode)** conditions such as lubrication of cylinder liners is mixed with certain _____ **(add)** to make it alkaline.
-- Cavitation can waste power, generate _____ **(consider)** noise, create _____ **(vibrate)** and wear, and cause damage to the propeller.
-- _____ **(regular)** running of the engine may be an _____ **(indicate)** of the governor's _____ **(function)**.
-- Materials which offer low _____ **(resist)** to electric current are called conductors.

5. Match the words to their synonyms/definitions. There is one extra word. (15 p.)

condense dependable attempt momentum stationary defect build up

choke disperse ductwork impact durable chock range rupture limited

standing still; not moving _____
clog _____
accumulate _____
fault _____
able to last, long-lasting _____
effort _____
vary between limits _____
cause to break or burst _____
(of a gas) become liquid, esp by becoming cooler _____
restricted _____
the quantity of movement in a body _____
the total of all pipes or tubes _____
reliable _____
scatter or spread in different directions _____
having a powerful influence on sth/smb _____

6. Write the opposites of the following words. (10 p.)

-- ingress
-- efficient
-- manned
-- reasonable
-- equal
-- equality
-- obey
-- balance
-- formation
-- reduce

7. Read the following article and answer the questions that follow. (10 p.)

You think crankcase explosions don't happen much anymore! Think again!

At 6 a.m. on November 8, 2010, the second day of a voyage from Long Beach, CA to the Mexican Riviera, the 952-foot cruise ship Carnival Splendor experienced a fire in her engine room, knocking out all electrical power on the ship. Carnival reported shortly after the incident that a "crankcase split" had caused the fire, apparently the result of a crankcase explosion in one of the diesel engines.

The fire was extinguished by that afternoon and luckily none of the nearly 4,500 passengers and crew members on board at the time was injured. The crew could not restore power to any of the engines and the ship had to be towed to San Diego over the next three days. Because of the power outage, the ship lacked food service, so passengers were fed rations delivered by U.S. Navy helicopters from the aircraft carrier USS Ronald Reagan. Carnival Splendor arrived in San Diego under tow around sunrise on November 11.

The Panamanian-flagged vessel was built by Fincantieri and entered service in 2008. Since the incident was in international waters, the flag state, Panama, initially led the casualty probe, with the U.S. Coast Guard assisting. Subsequently, for unknown reasons, the Panama Maritime Authority asked the U.S. to take over the investigation. The National Transportation Safety Board (NTSB) assigned staff to conduct the investigation, while Carnival's own engineers and representatives from both the shipyard and the engine manufacturer also investigated the incident. No definitive conclusions have yet been provided, although the focus remains on one of the diesel generators. Initial findings revealed that diesel engine number five in the aft engine room suffered a split of the crankcase and caught fire, damaging the engine control room and the electric cabling.

Carnival estimated that the cost of repairs, transport, refunds, free cruises given to displaced passengers, and the lost revenue from cancelled sailings would total $65 million.

In a time when modern automation systems are supposed to prevent the above types of incidents from happening, these events are not rare. According to an eleven-year analysis of its classed fleet starting from 1990, Lloyds Register recorded 143 incidents of crankcase explosions, caused by bearing failures, piston failures, and other types of failures. (Retrieved: 02 September, 2017 from macsea.com)

1. What was the cause of the fire and what damage did it cause?
2. How many casualties were there?
3. How long did it take the cruise ship to arrive in San Diego? And how did she arrive there?
4. Who conducted the investigation in the first place and why?
5. As per Lloyds Register, what are the main causes of such incidents?

GOOD LUCK!