MERCHANT MARINE ACADEMY OF MACEDONIA
SCHOOL OF ENGINEERS

Course: Maritime English
Academic year: 2017 – 2018 **Name:**
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Exam paper grade:

FINAL EXAM

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

neat measurements data damp breakdown references

turbocharger injection claims deteriorating detune

exhaust over-writing near problems dynamic emissions

-- The _____ from the log books is often used for insurance _____ in case of accidents and _____ misses are discussed during safety meetings as _____ that can help in making safety plans.
-- Engineers working in the engine room must ensure that the log book is kept _____ and clean without oil smudges or _____.
-- In most cases, the practical means to reduce vibration is simply to _____ the lowest natural frequencies away from the main _____ excitation frequencies.
-- On the basis of engine noise _____ and frequency analyses, as per MAN Diesel, it can be determined that noise _____ from 2-stroke engines primarily originate from the _____ (air and gas pulsations), _____ valves and fuel oil _____ systems.
-- The aim of vibration analysis is to determine the _____ condition of equipment before it leads to a _____.

2. Complete the following text with an appropriate word. In some cases the first letter is given. (15 p.)

A basic part of the cycle of an _____ combustion engine is the supply of fresh air and the removal of exhaust gases. This is the gas exchange process. **S**_____ is the removal of exhaust gases by blowing in fresh air. **C**_____ is the filling of the engine cylinder with a supply of fresh air ready for compression. With **s**_____, a large mass of air is supplied to the cylinder by blowing it in under **p**_____. Older engines were "naturally aspirated" – taking fresh air only at _____ pressure. Modern engines make use of exhaust gas driven **t**_____ to supply pressurised fresh air. On 2-stroke engines, an electrically driven auxiliary **b**_____ is usually installed because the air provided at _____ engine speeds is not enough. This pressurised air is then cooled to increase its **d**_____.

3. Complete the sentences with the correct derivative of the word in the parenthesis. (20 p.)
-- Silicone is a highly _____ **(viscosity)** fluid.

-- High levels of noise may cause _____ **(comfort)** and _____ **(annoy)** to the crew.
-- Log books record all sludge and garbage _____ **(dispose)** operations.
-- High levels of vibration may cause _____ **(form)** or _____ **(break)** of the engine components.
-- _____ **(satisfy)** scavenging depends on efficient _____ **(evacuate)** of exhaust gases and minimum _____ **(lose)** of fresh air through the exhaust passage.
-- Insulation techniques and the _____ **(prevent)** of local resonance are used to keep the vibrations in the accommodation and at other locations within _____ **(accept)** levels.
-- Ship machinery _____ **(install)** have two principal sources of _____ **(excite)**: the main engine and the _____ **(propel)**.
-- Any prolonged _____ **(expose)** to levels of 85dB or above is likely to lead to hearing problems in the _____ **(absent)** of ear protection.
-- Log books are _____ **(office)** records. Wrong _____ **(enter)** should be crossed out and the correct ones must be written beside them along with the _____ **(sign)** of the _____ **(authority)** officer.

4. Match the following terms from physics and mechanics to their definitions. There is one extra term. (10 p.)

amplitude *frequency* *resonance* *damper* *velocity* *detune*

torsion *oscillation* *natural frequency* *vibration* *damp*

-- the speed of something in a particular direction:
-- frequency at which a system oscillates when it is not subjected to a continuous or repeated external force:
-- the greatest distance that a sound or radio wave vibrates:
-- twisting, esp. of one end of sth while the other end is held fixed:
-- the sound or other vibration produced in an object by sound or vibrations of a similar frequency from another object:
-- reduce the amplitude of a sound source:
-- change the frequency (of an oscillatory system) away from a state of resonance:
-- a continuous quick, slight shaking movement:
-- the rate at which a sound (or electromagnetic wave) vibrates:
-- movement back and forth in a regular rhythm:

5. Match the following words to their synonyms. (5 p.)

reverberate *aperture* *defect* *stiff* *align*

enhancement *replenish* *resilient* *feasible* *counteract*

-- rigid, firm:
-- able to return to an original shape after being pushed, stretched, bent, etc:
-- (of a sound) to be repeated several times:
-- refill:
-- make ineffective or neutralise the bad effects of sth by using an opposite force:
-- an opening, hole or gap:
-- arrange in a straight line:
-- able and possible to be done:
-- fault:
-- reinforcement:

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

stress crankpin torque uniflow axial inlet

reciprocating fatigue mounting horizontal torsional

vertical centrifugal hull attenuate exhaust forward

-- The shaft-generated _____ vibration can be defined as the oscillation of the shaft in _____ and aft directions, parallel to the shaft _____ line.
-- _____ vibration is a twisting phenomenon in the crankshaft which spreads from one end to the other due to uneven _____ pulses coming from different unit pistons.
-- The _____ motion of the piston in an engine cylinder creates out-of-balance forces acting along the cylinder, while the _____ force associated with the _____ rotation creates a rotating out-of-balance force.
-- Elastomer-based _____ systems are used to suppress or _____ noise and vibration in ships.
-- The vibration level must not result in _____ levels that may cause _____ damage to the engine or the connected _____ structure.
-- 2-stroke engines with an _____ valve mounted in the cylinder head are known as _____ scavenged engines.

7. Match the words to make appropriate collocations. (5 p.)

-- flexible……..	crankpin
-- piston …….....	conditions
-- working……..	order
-- firing……..	seizure
-- fatigue…….	operation
-- at any given……	inspection
-- scored……	time
-- PSC…….	on board
-- remaining……...	of machinery
-- bunkering……	coupling

8. Read the following article and answer the questions that follow. (15 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. What did initial findings reveal?
6. As per Lloyds Register, what are the main causes of such incidents?

GOOD LUCK!!!