

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

**Course: Maritime English**

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**FINAL EXAM**

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

*balancing   attenuate   heat   hull   tailshaft   absorbing   bracing   oscillation   axial  
evolved   crankshaft   erratic   out-of-balance   torque   mounting   hydraulic   torsional*

- Engine struts or \_\_\_\_\_ are stud-like structures usually incorporated with \_\_\_\_\_ or mechanical systems to transfer engine vibration to the \_\_\_\_\_ of the ship.
- Elastomer-based \_\_\_\_\_ systems are used to suppress or \_\_\_\_\_ noise and vibration in ships.
- \_\_\_\_\_ vibration is a twisting phenomenon in the \_\_\_\_\_ which spreads from one end to the other due to uneven \_\_\_\_\_ pulses coming from different unit pistons.
- An engineer on board can identify something \_\_\_\_\_ in the equipment by feeling the \_\_\_\_\_, or by listening to the noise, or by watching the status of the device.
- \_\_\_\_\_ is a way of controlling vibrations by arranging that the overall summation of the \_\_\_\_\_ forces cancels out, or is reduced to a more acceptable amount.
- Dampers are used to damp or reduce the frequency of \_\_\_\_\_ of the vibrating components of the machine by \_\_\_\_\_ a part of the energy \_\_\_\_\_ during vibration.

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

..... is the process of removing ..... gases from the cylinder after c....., and replenishing the cylinder with fresh ..... Efficient scavenging is necessary for the good combustion of ..... inside the engine cylinder. Scavenging is important, because it affects the overall e..... of the engine, the power output and the fuel c..... Incomplete scavenging results in poor combustion, ..... oil contamination, piston rings w....., as well as high mean t..... in the cylinder.

**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.
- \_\_\_\_\_ (**detune**) are used to alter the frequency of the vibrating machinery reducing the vibration of the engine.
- When vibrations occur in big-sized machines, operating under heavy loads, the \_\_\_\_\_ (**intensify**) of vibration magnifies because of large mass rotation and \_\_\_\_\_ (**combustion**) gases forced inside the machinery.
- The information recorded in the log book is used as a future \_\_\_\_\_ (**refer**).
- Any prolonged \_\_\_\_\_ (**expose**) to levels of 85dB or above is likely to lead to hearing problem in the \_\_\_\_\_ (**absent**) of ear protection.
- Log books are \_\_\_\_\_ (**office**) records. Wrong \_\_\_\_\_ (**read**) should be crossed out and the correct ones must be written beside them along with the \_\_\_\_\_ (**sign**) of the \_\_\_\_\_ (**authority**) officer.
- In a 2-stroke marine \_\_\_\_\_ (**propel**) engine, vibrations may cause wear of internal components.

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

*amplitude      frequency      resonance      damp      velocity      detune*  
*torsion      oscillation      natural frequency      vibration      damper*

- 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:
- a device for reducing mechanical vibration:
- 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      tidy      enhancement      replenish      resilient*  
*feasible      appropriate*

- rigid, firm:
- flexible:
- (of a sound) to be repeated several times:
- refill:
- suitable:
- an opening, hole or gap:
- neat:
- 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.)**

*resonance changes generated excitation isolation range energy track  
accommodation steaming misses axial insulation malfunctions assist sailing  
highlighted*

- Ship machinery installations have two principal sources of \_\_\_\_\_: the main engines and the propellers.
- The engine room log book is a \_\_\_\_\_ record of all the ship machinery parameters, performance, maintenance, and \_\_\_\_\_.
- Unusual \_\_\_\_\_ in the performance of any particular machinery, sudden increase or decrease in parameters, accidents, near \_\_\_\_\_, or breakdown of any equipment should be noted down and \_\_\_\_\_ in the log book.
- The extremely slow \_\_\_\_\_ of ships has become the mainstream as a result of the recent \_\_\_\_\_-saving trend.
- \_\_\_\_\_ techniques and the prevention of local \_\_\_\_\_ are used to keep the vibrations in the \_\_\_\_\_ and at other locations within acceptable levels.
- The \_\_\_\_\_ damper is fitted on the crankshaft of the engine to dampen the shaft-\_\_\_\_\_ vibration.
- Mitsubishi Heavy Industries Marine Machinery has developed an electric- \_\_\_\_\_ system for large turbochargers for marine diesel engines and verified high energy saving advantages in the low-load operating \_\_\_\_\_ of the engine.

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

- |                      |              |
|----------------------|--------------|
| -- flexible.....     | crankpin     |
| -- for future.....   | conditions   |
| -- working.....      | claims       |
| -- insurance.....    | reference    |
| -- fatigue.....      | operation    |
| -- at any given..... | inspection   |
| -- scored.....       | time         |
| -- PSC.....          | on board     |
| -- remaining.....    | of machinery |
| -- bunkering.....    | coupling     |

**8. Choose either A or B. (15 p.)**

**A. Read the following article and answer the questions that follow.**

**Azipod saved over 700,000 tonnes of fuel, says ABB**

by Paul Fanning

As part of its Azipod 25<sup>th</sup> anniversary celebrations, ABB has announced that the total fuel savings of the entire installed Azipod fleet is estimated to be more than 700,000 tonnes. Assuming the average family car uses one tonne of fuel annually, this saving corresponds to the annual fuel consumption of 700,000 cars.

The gearless, steerable propulsion system reduces fuel consumption by up to 20 per cent and achieves decimeter accurate manoeuvrability without the aid of tugboats. It is installed on an extremely wide range of vessels, including the world's largest cruise ship (6,600 passengers), the most advanced icebreaker, one of the largest crane vessels in Asia, a 105m luxury super yacht, and most recently, an innovative cargo transfer vessel. According to Clarkson's Research, the leading shipbroker and research firm, the number of vessels with electric propulsion is growing at a pace of 12 per cent per year, three times faster than the world's fleet.

A pioneering technology leader, ABB is celebrating Azipod propulsion's 25th anniversary this year. The electrical propulsion system – where the electric motor with propeller is mounted inside a streamlined pod capable of 360 degrees movement beneath the ship – has evolved to become the industry standard for the marine industry. The system can drive and steer the ship at the same time.

The entire installed Azipod propulsion unit base has accumulated 12 million operating hours in merchant, offshore and special vessel segments. "Our engineers continue to innovate, like they did 25 years ago, to ensure Azipod propulsion meets the demands from a diverse range of ship owners. Much has changed in the shipping sector since we introduced the first Azipod but the desire for efficiency, manoeuvrability and reliability remains the same. The fact that Azipod propulsion remains the dominant force in podded electric propulsion shows our commitment to meet our customer's needs," said Juha Koskela, the managing director of ABB's Marine and Ports business.

(Retrieved: 26 August, 2016 from [www.mpropulsion.com](http://www.mpropulsion.com))

1. What do the total fuel savings of the entire installed Azipod fleet correspond to?
2. What are the advantages of Azipod regarding fuel consumption and manoeuvrability?
3. What types of vessels can Azipod be installed on?
4. When was the first Azipod propulsion system introduced in the shipping sector?

**B. Write a short text on the following topic: Discuss the problem of vibration. Causes, preventive measures, and ways to reduce its consequences. (Approximate length 100 words).**

*GOOD LUCK!!!*