
Q534 - Engineering Safety & Environmental Protection

1. Bilges may be pumped _____.

- on the outgoing tide
- overboard after dark
- **overboard through an oily water separator**
- anytime in an emergency, i.e. main engine lube oil failure

Note:
Bilges containing oil or oily mixtures must be discharged overboard only through an approved oily water separator to comply with MARPOL Annex I and 33 CFR Subchapter O, which prohibit direct discharge and impose strict limits (typically 15 ppm). Timing or convenience do not supersede pollution regulations, and emergency exceptions apply only to safety-of-ship or damage situations, not routine machinery failures.

---

2. In order to prevent the unnecessary release of hydrocarbons to atmosphere, when taking on departure ballast, one method used is to _____.

- **allow entering ballast to displace the inert gas to a tank where cargo is currently being discharged**
- manually open the pressure/vacuum device
- completely open the mast riser valve
- use blowers to purge the inert gas from tanks

Note:
Displacing inert gas with ballast into a tank undergoing discharge maintains a closed system, preventing hydrocarbon release to the atmosphere.

---

3. On U.S. inspected ships, oily water separating equipment, bilge alarms, and bilge monitors must be approved under _____.

- 33 CFR 151
- 18 CFR 201
- 46 CFR 41
- **46 CFR 162**

Note:
Oily water separators, bilge alarms, and bilge monitors on U.S. inspected vessels require type approval as engineering equipment under 46 CFR 162.

---

4. A new ocean going ship of 2000 gross tons having an inoperative oily water separator may dispose of its bilge slops by _____.

- pumping them into a settling tank for separation before pumping the oily water residue overboard
- **holding its slops onboard until they can be discharged to a shore side reception facility**
- circulating them through the lube oil purifier to remove water and debris
- holding its slops onboard until they can be pumped into the city sewer system

Note:
With an inoperative oily water separator, bilge slops must be retained onboard and discharged to a shore reception facility.

---

5. Static water pressure on the hull of a ship is greatest at the _____.

- boot topping
- stern
- bow
- **keel**

Note:
Static water pressure increases with depth; therefore, the keel, being the deepest point on the hull, experiences the greatest pressure.

---

6. Which of the following describes a vessel which is subjected to "hogging"?

- **It has its main deck plating under tensile stress.**
- It has its bottom plating under shearing stress.
- It has its main deck plating under compressive stress.
- It has its bottom plating under ductile stress.

Note:
Hogging occurs when a vessel bends upward in the middle, resulting in tensile stress on the main deck plating and compressive stress on the bottom plating. Therefore, the correct answer is that the vessel has its main deck plating under tensile stress.

---

7. In a compartment that has been completely flooded with water, the greatest pressure will be exerted _____.

- at a point that is one-third from the bottom of the bulkhead
- at the vertical center of the bulkhead
- **along the bottom of any bulkhead**
- along the top of the bulkhead

Note:
Hydrostatic pressure increases with depth; therefore, the greatest pressure in a flooded compartment is exerted along the bottom of any bulkhead.

---

8. Pressure-vacuum relief valves on tank vessel cargo tanks should be kept in good working order to prevent _____.

- entry of burning substances
- escape of explosive vapors
- **damage to tank boundaries**
- oil spillage on deck

Note:
Pressure-vacuum relief valves prevent damage to tank boundaries by maintaining safe internal pressure and vacuum levels, protecting the tank structure from deformation or collapse.

---

9. Which of the following pressures represents the normal pressure setting of a pressure-vacuum relief valve as normally found on tank vessels?

- 22.7 psia - 14.7 psia
- 20.7 psia - 14.6 psia
- 18.7 psia - 14.4 psia
- **16.7 psia - 14.2 psia**

Note:
Pressure-vacuum relief valves on tank vessels typically open at approximately +2.0 psi above and -0.5 psi below atmospheric pressure, which corresponds to 16.7 psia and 14.2 psia, respectively.

---

10. Pressure-vacuum relief valves, as used on tank vessels, are usually set to operate at two points, _____.

- **14.2 psia; 2 psig**
- any two points below atmospheric pressure
- 26 inches of vacuum; 5 psig
- any two points above atmospheric pressure

Note:
Pressure-vacuum relief valves on tank vessels operate at 14.2 psia to relieve vacuum and 2 psig to relieve overpressure, ensuring protection against both excessive vacuum and overpressure.
