SSI Science Of Diving Practice Exam (Sample)

Study Guide

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Questions

1. Which of the following will typically void a dive equipment warranty?

A. Equipment being taken apart

B. Parts replaced by a self-trained technician

C. Using a dive professional for repairs

D. Modifying the equipment

2. What is the significance of equalizing pressure while descending?

A. To prevent buoyancy control issues

B. To avoid discomfort and potential injury to the eardrums

C. To increase dive duration

D. To assist in achieving deeper depths

3. What is the significance of having redundant systems in scuba gear?

A. They improve buoyancy control

B. They provide backup in case of primary system failure

C. They reduce the weight of the gear

D. They enhance the aesthetic of the equipment

4. Sponges are recognized by the presence of which feature indicating water circulation?

A. Leaves

B. Bumps

C. Holes

D. Branches

5. At what absolute pressure does a depth of 132 feet in saltwater exist?

A. 5.000 ata

B. 4.852 ata

C. 4.084 ata

D. 5.012 ata

6. Which of the following is NOT typically included in a dive plan?

- **A. Dive site and objective**
- **B. Depth and duration**
- **C. Emergency procedures**
- **D. Personal equipment preferences**

7. In case of decompression sickness, what should you never do?

- **A. Provide oxygen first aid and watch vital signs**
- **B. Transport the diver to a treatment facility even if it involves considerable delay**
- **C. Provide water to drink**
- **D. Recompress the diver underwater**

8. What should be the correct order of events during a scuba dive?

- **A. Entry, underwater exploration, ascent, post-dive debriefing, pre-dive briefing**
- **B. Pre-dive briefing, entry, descent, underwater exploration, ascent, post-dive debriefing**
- **C. Ascent, entry, pre-dive briefing, underwater exploration, post-dive debriefing, descent**
- **D. Descent, pre-dive briefing, entry, post-dive debriefing, underwater exploration, ascent**

9. The SSI Equipment Service Program is intended to maintain the components of a Total Diving System to what standard?

- **A. Stored at the dive center**
- **B. All of the answers are correct**
- **C. Clean and usable**
- **D. Performing reliably and to the best of their potential**

10. What is the surface air consumption rate (SAC) of a diver using a 3000 psi-rated, 80-cubic foot cylinder, using 650 psi in 10 minutes at a depth of 33 feet?

A. 34 psi/minute

B. 28.5 psi/minute

C. 30 psi/minute

D. 32.5 psi/minute

Answers

1. A
2. B
3. B
4. C
5. A
6. D
7. D
8. B
9. D
10. D

Explanations

1. Which of the following will typically void a dive equipment warranty?

A. Equipment being taken apart

B. Parts replaced by a self-trained technician

C. Using a dive professional for repairs

D. Modifying the equipment

The action that typically voids a dive equipment warranty is taking the equipment apart. When a manufacturer provides a warranty, it usually covers defects in materials and workmanship under the condition that the equipment is used and maintained according to their guidelines. Taking the equipment apart can lead to issues such as improper reassembly, loss of parts, or damage that would not have occurred had the equipment remained intact. Manufacturers often specify that any unauthorized disassembly will result in the warranty being voided, as it compromises their ability to uphold product integrity and safety. In contrast, using a dive professional for repairs is generally supported by manufacturers, as these individuals are trained to work on the equipment according to manufacturer specifications. Parts replaced by a self-trained technician can also void the warranty due to the risk of incorrect installation, but the act of disassembling the equipment itself is a more direct breach of warranty terms. Modifying the equipment can similarly void the warranty, but the core issue lies in taking equipment apart, which often results in irreversible changes or damage.

2. What is the significance of equalizing pressure while descending?

A. To prevent buoyancy control issues

B. To avoid discomfort and potential injury to the eardrums

C. To increase dive duration

D. To assist in achieving deeper depths

Equalizing pressure while descending is crucial for preventing discomfort and potential injury to the eardrums. As a diver descends, the pressure surrounding them increases, which also affects the air-filled spaces in their body, particularly the ears. The Eustachian tubes, which connect the middle ear to the back of the throat, need to be equalized to ensure that the pressure inside the ear matches the pressure outside. If divers fail to equalize their ears adequately, they can experience pain, discomfort, and in severe cases, barotrauma, where the eardrum may become damaged due to the pressure differential. This emphasizes the importance of equalization as a safety measure and a necessary practice for comfortable diving. Ensuring pressure equalization contributes to the overall health and safety of divers, allowing them to focus on their dive experience without discomfort stemming from pressure-related issues.

3. What is the significance of having redundant systems in scuba gear?

A. They improve buoyancy control

B. They provide backup in case of primary system failure

C. They reduce the weight of the gear

D. They enhance the aesthetic of the equipment

Having redundant systems in scuba gear is crucial for safety during dives. Redundant systems are designed to provide a backup option in the event that the primary system fails. For instance, if a diver's main air supply becomes compromised, having a secondary air source allows the diver to manage the situation without panic and safely ascend to the surface. This redundancy ensures that divers can continue their dive and are better equipped to handle emergencies. It provides peace of mind and enhances overall dive safety, allowing divers to focus on their environment and the experience rather than worrying about potential failures in their equipment. Other choices may seem relevant but do not relate directly to the primary function of redundancy in safety. Improvements in buoyancy control or reducing gear weight, while important, do not capture the emergency preparedness aspect that redundancy is designed to address. Similarly, aesthetic considerations do not have any impact on the functional reliability of scuba equipment in critical situations.

4. Sponges are recognized by the presence of which feature indicating water circulation?

A. Leaves

B. Bumps

C. Holes

D. Branches

Sponges are unique organisms characterized by their ability to filter water through their bodies, and this process is facilitated by the presence of numerous small openings known as pores or holes. These holes are crucial for water circulation as they allow water to enter the sponge, where it is filtered for nutrients. As water flows through the sponge's body, it exits through a larger opening called the osculum. This system of holes effectively enables sponges to maintain a constant flow of water, which is essential for their feeding, respiration, and waste removal. The other features mentioned, such as leaves, bumps, or branches, do not play a role in water circulation within sponges. Leaves are associated with plants, while bumps and branches are not representative of sponge morphology. Thus, the presence of holes is a defining characteristic of sponges and is fundamental to their functioning as filter feeders in aquatic environments.

5. At what absolute pressure does a depth of 132 feet in saltwater exist?

A. 5.000 ata

B. 4.852 ata

C. 4.084 ata

D. 5.012 ata

To determine the absolute pressure at a depth of 132 feet in saltwater, it's important to understand how pressure increases with depth in water. The pressure at sea level is approximately 1 atmosphere (ata), which is equal to 14.7 psi. For every 33 feet of water depth in saltwater, the pressure increases by approximately 1 ata due to the weight of the water above. At a depth of 132 feet, the calculation for pressure involves the increase in pressure due to the depth of the water: 1. Start with the pressure at the surface, which is 1 ata. 2. Determine how many 33-foot increments fit into 132 feet: \[132 \, \text{feet} \div 33 \, \text{feet/ata} = 4 \, \text{ata} \] 3. Add this to the surface pressure: \[1 \, \text{ata} + 4 \, \text{ata} = 5 \, \text{ata} \] Thus, the absolute pressure at 132 feet in saltwater is 5 ata, which makes the answer correct. This understanding

6. Which of the following is NOT typically included in a dive plan?

A. Dive site and objective

B. Depth and duration

C. Emergency procedures

D. Personal equipment preferences

In the context of a dive plan, personal equipment preferences are typically not included because dive plans focus on standardized and crucial information that ensures the safety and success of the dive. A dive plan serves to prepare divers for the dive environment and circumstances they will face, emphasizing critical details such as the dive site and objective, which lay out where the dive will take place and what the divers aim to achieve. Additionally, the depth and duration of the dive are included to establish limits on water depth and how long the dive will last, which are essential for safety and planning, especially to avoid issues like decompression sickness. Emergency procedures are vital as they provide guidance for what to do in case something goes wrong, ensuring that all divers are prepared and know how to react in emergencies. In contrast, personal equipment preferences can vary greatly among divers and do not constitute critical information for the overall dive. While divers should ensure that their equipment is appropriate for the dive, the specifics of personal preferences are secondary to the shared objectives and safety protocols that a dive plan outlines.

7. In case of decompression sickness, what should you never do?

A. Provide oxygen first aid and watch vital signs

B. Transport the diver to a treatment facility even if it involves considerable delay

C. Provide water to drink

D. Recompress the diver underwater

In the case of decompression sickness, recompressing the diver underwater is extremely dangerous and should never be done. This situation is a medical emergency that requires specific treatment protocols, primarily performed in hyperbaric chambers. Recompressing the diver underwater can exacerbate their condition and lead to severe complications, including further injury or even death. The proper response to decompression sickness involves administering oxygen first aid and transporting the diver to a medical facility where they can receive the appropriate hyperbaric treatment. Other potential responses to decompression sickness, such as monitoring vital signs or providing hydration, may have specific contexts where they could be relevant, but none replace the necessity for professional medical intervention and hyperbaric oxygen therapy. Transporting the diver should be done as quickly as possible, but not underwater.

8. What should be the correct order of events during a scuba dive?

A. Entry, underwater exploration, ascent, post-dive debriefing, pre-dive briefing

B. Pre-dive briefing, entry, descent, underwater exploration, ascent, post-dive debriefing

C. Ascent, entry, pre-dive briefing, underwater exploration, post-dive debriefing, descent

D. Descent, pre-dive briefing, entry, post-dive debriefing, underwater exploration, ascent

The correct order of events during a scuba dive is crucial for ensuring safety and enjoyment. The sequence involves careful planning and execution, beginning with a pre-dive briefing. This step is essential as it allows divers to discuss dive objectives, review safety protocols, check equipment, and ensure everyone is aware of the dive plan. Following the briefing, the divers move to the entry phase, where they prepare to enter the water. Upon entry, divers will often perform a descent to reach their desired depth. Once at the planned depth, underwater exploration can commence. This portion of the dive involves observing marine life, navigating the dive site, and adhering to the dive plan. As the dive comes to an end, ascending to the surface follows. Proper ascent procedures, including safety stops if necessary, help to reduce the risk of decompression sickness. Finally, after surfacing, divers participate in a post-dive debriefing. This is an important step where divers can discuss their experiences, evaluate what went well, what could be improved, and ensure all gear is accounted for. The order presented in the correct choice is rational and reflects the standard procedures that enhance safety and the overall diving experience.

9. The SSI Equipment Service Program is intended to maintain the components of a Total Diving System to what standard?

A. Stored at the dive center

B. All of the answers are correct

C. Clean and usable

D. Performing reliably and to the best of their potential

The SSI Equipment Service Program is designed to ensure that all components of a Total Diving System are performing reliably and to the best of their potential. This involves regular maintenance and servicing of diving equipment to prevent malfunctions and enhance safety during dives. By focusing on the dependable functioning of the equipment, divers can have confidence that their gear will operate effectively, thus optimizing their diving experiences and minimizing risks associated with equipment failure. The emphasis on reliability and optimal performance is crucial, as any compromise in this area can have serious implications for diver safety and diving efficiency. Equipment needs to be in peak condition to respond appropriately in various underwater situations, ensuring that all safety protocols are adhered to. Maintaining equipment that is simply clean and usable does not account for the intricacies of thorough servicing and testing that is essential for ensuring that gear meets the required performance standards. Therefore, while cleanliness and usability are important, they are not sufficient on their own without the focus on reliability and peak performance that the Equipment Service Program promotes.

10. What is the surface air consumption rate (SAC) of a diver using a 3000 psi-rated, 80-cubic foot cylinder, using 650 psi in 10 minutes at a depth of 33 feet?

A. 34 psi/minute

B. 28.5 psi/minute

C. 30 psi/minute

D. 32.5 psi/minute

To determine the surface air consumption rate (SAC) for the diver, it's essential to calculate how much air is consumed per minute and then adjust that for the effective pressure at a depth of 33 feet. First, calculate the total amount of air consumed during the dive. The diver started with 3000 psi and ended using 650 psi, which means they used: 3000 psi - 650 psi = 2350 psi Next, since the diver was underwater at a depth of 33 feet, it's important to understand that this depth corresponds to a pressure of approximately 2.1 atmospheres (1 atmosphere for the surface and about 1.1 atmospheres for the additional water pressure at this depth). To convert the consumed psi at the depth of 33 feet into a surface equivalent, divide the used pressure by the total pressure at that depth. Therefore, the effective surface consumption can be calculated as follows: 2350 psi / 2.1 atm ≈ 1119.05 psi (surface equivalent) Now, since this amount of air was consumed over a timeframe of 10 minutes, we can find the SAC rate: 1119.05 psi / 10 minutes ≈ 111.9 psi/minute