Basic Engineering Common Core (BECC) 5 Practice Test (Sample)

Study Guide

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Questions

1. What is the function of strut bearings in a propulsion system?

A. To increase speed

B. To support weight of the shaft

C. To transfer power

D. To improve alignment

2. In what condition would you consider using a repair clamp?

A. For enhancing a pipe

B. For leak repairs in critical systems

C. When an immediate replacement is possible

D. When a quick fix is needed for a non-critical pipe

3. Which tanks are designated for storing drinkable water?

A. VCHT tanks

B. Holding tanks

C. Potable water tanks

D. Fuel oil tanks

4. Which component operates independently when the wildcat lever is disengaged?

A. Gear box

B. Capstan

C. Windlass

D. Anchor

5. What is required when a pipe cannot be replaced immediately and is needed for continuous operation?

A. A temporary seal

B. A departure from specifications

C. A repair clamp

D. A standard workaround

6. What type of gear features teeth arranged in a V pattern?

- **A. Spur gear**
- **B. Blade gear**
- **C. Double helical gear**
- **D. Crown gear**

7. What can increase the ship's draft?

- **A. Displacement of cargo**
- **B. Ballasting**
- **C. Reducing weight**
- **D. Emptying tanks**

8. What gear type has teeth that are cut straight across the inside rim?

- **A. External spur gear**
- **B. Internal spur gear**
- **C. Kite gear**
- **D. Bevel gear**

9. Which tank receives separated oil from the OWS for later discharge?

- **A. Oily Waste Holding Tank**
- **B. Waste Oil Tank**
- **C. Sludge Tank**
- **D. Processing Tank**

10. What is the backup system used alongside the AMCW?

- **A. Auxiliary freshwater main**
- **B. Auxiliary seawater main**
- **C. Main seawater system**
- **D. Emergency water supply**

Answers

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

Explanations

1. What is the function of strut bearings in a propulsion system?

A. To increase speed

B. To support weight of the shaft

C. To transfer power

D. To improve alignment

Strut bearings play a crucial role in a propulsion system by providing structural support to the weight of the shaft. These bearings are designed to accommodate the axial and radial loads that arise during the operation of the propulsion system. By supporting the shaft's weight, strut bearings help maintain the mechanical stability of the system, ensuring that the shaft remains properly positioned and aligned. When a shaft rotates, it experiences various forces, including those from the thrust generated during operation. Strut bearings help manage these forces by distributing the load evenly and preventing undue stress on other components. This support is essential for the overall durability and performance of the propulsion system. Without proper support from strut bearings, there could be premature wear and potential failure of the shaft or related components due to misalignment or excessive load. Other options do not correctly represent the primary function of strut bearings. For instance, increasing speed is typically achieved through design and engineering of the propulsion system rather than the function of bearings. While bearings can contribute to efficiency and performance, their primary role is not power transfer or improving alignment, though they can incidentally assist in these areas by maintaining the appropriate positioning of the shaft.

2. In what condition would you consider using a repair clamp?

A. For enhancing a pipe

B. For leak repairs in critical systems

C. When an immediate replacement is possible

D. When a quick fix is needed for a non-critical pipe

Using a repair clamp is an effective solution when there is a need for a quick fix, especially for non-critical pipes. These situations often arise when immediate repairs are necessary to prevent further damage or leaks, but the system doesn't require a complete overhaul or a permanent solution right away. Repair clamps provide a temporary solution by sealing leaks and can be installed quickly without the need for extensive tools or expertise. This can prevent disruptions in service and allow for time to plan for a more permanent fix, if needed, later on. The context of the choices helps clarify this point; for instance, enhancing a pipe typically involves more substantial modifications and might not be suitable for a clamp. Critical systems, on the other hand, necessitate more reliable and long-term repairs than what a clamp typically provides. Immediate replacements imply a more thorough approach than a quick clamp application, and thus, do not align with the purpose of a repair clamp. Therefore, the scenario where a quick fix is sought for a non-critical pipe aligns best with the utilization of a repair clamp.

3. Which tanks are designated for storing drinkable water?

A. VCHT tanks

B. Holding tanks

C. Potable water tanks

D. Fuel oil tanks

The correct choice is the one that explicitly refers to the storage of drinkable water. Potable water tanks are specifically designed for this purpose, ensuring that the water stored is safe for human consumption. These tanks are constructed using materials that do not contaminate the water, and they often adhere to health and safety regulations to maintain water quality. In contrast, the other types of tanks serve different functions. VCHT (Vacuum Collection and Holding Tank) tanks are used for storing wastewater and are not suitable for drinkable water. Holding tanks typically serve as temporary storage for various non-potable liquids, while fuel oil tanks are dedicated to storing fuel, which is clearly not intended for consumption. Thus, the designation of potable water tanks is critical for ensuring access to safe drinking water and maintaining public health.

4. Which component operates independently when the wildcat lever is disengaged?

A. Gear box

B. Capstan

C. Windlass

D. Anchor

The capstan operates independently when the wildcat lever is disengaged because it is designed to perform its function without being mechanically linked to the wildcat. A capstan typically serves as a rotating drum to handle mooring lines, and it can be operated using a separate mechanism. This allows the deck crew to control line tension and manage the mooring process without affecting the operation of the wildcat, which is specifically designed for hoisting and lowering the anchor chain. In contrast, the gearbox, windlass, and anchor have functions closely tied to mechanisms that typically engage or disengage together with the wildcat lever. The windlass, for instance, functions both to raise or lower the anchor and is often linked directly to the wildcat. Therefore, when the wildcat is disengaged, the overall operation of the windlass might also be interrupted, unlike the capstan that can continue to function independently.

5. What is required when a pipe cannot be replaced immediately and is needed for continuous operation?

A. A temporary seal

B. A departure from specifications

C. A repair clamp

D. A standard workaround

In situations where a pipe needs to remain in operation but cannot be replaced immediately, a repair clamp is an essential solution. This tool is designed specifically to provide a temporary fix by encasing the damaged area of the pipe, effectively sealing it to prevent leaks and maintain the integrity of the system. While a temporary seal might suggest a quick fix, it may not offer the durability and reliability required for continuous operation under pressure. A departure from specifications typically implies modifications to established standards, which can introduce risks and is not advisable without appropriate assessment and approval. A standard workaround may help in some scenarios but does not directly address the integrity of the pipe itself and may not be suitable depending on the damage severity. By utilizing a repair clamp, the pipe can continue to operate safely while planning for a replacement, ensuring minimal disruption to the system's functionality.

6. What type of gear features teeth arranged in a V pattern?

A. Spur gear

B. Blade gear

C. Double helical gear

D. Crown gear

Double helical gears, often recognized for their unique tooth arrangement, are characterized by teeth that are set in a V pattern. This design features two sets of teeth that spiral in opposite directions on the same gear, forming a "V" shape when viewed from the side. The double helix configuration significantly improves load distribution across the teeth because it engages more than one tooth pair at a time. This reduces the tendency for the gear to slip and diminishes axial thrust, which is a common issue in other gear types such as spur gears or single helical gears. The benefits of this design include smoother operation, quieter performance, and a greater ability to handle higher loads. In contrast, spur gears have straight teeth aligned parallel to the axis, while crown gears have teeth that are oriented perpendicular to the gear axis, and blade gears do not have a standardized definition in gear terminology. Thus, the unique V pattern of teeth in double helical gears sets them apart, making them the correct choice for this question.

7. What can increase the ship's draft?

A. Displacement of cargo

B. Ballasting

C. Reducing weight

D. Emptying tanks

Ballasting a ship involves taking on water or other materials to increase its weight, which in turn increases the ship's draft, or the distance from the waterline to the bottom of the hull. This process is crucial, especially during operations like loading cargo or navigating through certain conditions, as it enhances stability and helps the vessel maintain an optimal position in the water. When a ship is ballasted, the added weight contributes to a deeper immersion in the water, allowing better handling and control. The design of vessels often necessitates certain drafts to ensure they operate efficiently and safely, particularly in terms of stability and buoyancy. In contrast, options that involve displacing cargo, reducing weight, or emptying tanks result in a decrease in the ship's draft. Displacing cargo means that removing items from the ship lightens it, causing it to sit higher in the water. Reducing weight and emptying tanks further lower the overall weight of the ship, which similarly results in a decreased draft.

8. What gear type has teeth that are cut straight across the inside rim?

A. External spur gear

B. Internal spur gear

C. Kite gear

D. Bevel gear

The correct answer is the internal spur gear. Internal spur gears are characterized by their teeth that are cut straight across the inside rim, allowing them to mesh with external spur gears or another internal spur gear effectively. This design creates a compact arrangement that can transmit torque and rotational motion efficiently within a confined space. This type of gear is often used in gearboxes and mechanisms requiring a reduction in size or when a unique layout is needed due to spatial constraints. Its ability to efficiently transfer motion while maintaining a simplified design is a key advantage, especially in applications where weight and size are critical factors. In contrast, external spur gears, while also having straight teeth, are cut on the outer rim and mesh with other external gears. Kite gears and bevel gears each have distinct configurations and are designed for specific applications involving different orientations of shaft connections or unique motion requirements.

9. Which tank receives separated oil from the OWS for later discharge?

A. Oily Waste Holding Tank

B. Waste Oil Tank

C. Sludge Tank

D. Processing Tank

The Waste Oil Tank is designed specifically to hold and store oil that has been separated from wastewater through processes such as those in an Oil-Water Separator (OWS). When oil and water are mixed, the OWS effectively separates the oil due to differences in density. The oil that rises to the top is collected and stored in the Waste Oil Tank for later discharge or processing, ensuring that it can be handled appropriately and safely. The function of the Waste Oil Tank is critical because it helps manage the oily waste by providing a dedicated storage space for the separated oil, preventing potential environmental hazards that could arise from improper disposal. It also emphasizes the importance of keeping separated oil separate from other waste streams, allowing for appropriate disposal or recycling of oil. Other tanks mentioned, like Oily Waste Holding Tanks or Sludge Tanks, serve different purposes within waste management. An Oily Waste Holding Tank may collect oily waste in general without the specific function of storing separated oil for discharge, while a Sludge Tank typically holds solids or sludge that arises from the treatment processes. A Processing Tank, on the other hand, would be involved in further treatment or processing of materials rather than simply storing separated oil. Thus, the Waste Oil Tank is the designated choice for storing separated oil from

10. What is the backup system used alongside the AMCW?

A. Auxiliary freshwater main

B. Auxiliary seawater main

C. Main seawater system

D. Emergency water supply

The correct choice identifies the auxiliary seawater main as the backup system used alongside the AMCW (Auxiliary Machinery Cooling Water) system. This auxiliary seawater main is essential for providing an alternative cooling water source when the primary AMCW system is unavailable or requires maintenance. Using seawater as a backup is particularly advantageous because it is readily accessible in marine environments. The auxiliary seawater main can be designed to take over the cooling functions and ensure that equipment remains at operational temperatures, thus preventing overheating and potential damage. This redundancy is a critical aspect of marine engineering and systems design, as it enhances the reliability and safety of the cooling systems on board vessels. The other options, while relevant to water systems on a ship, do not specifically serve as backups for the AMCW; for example, freshwater systems typically handle different operational requirements and are not a direct substitute for seawater cooling methods.