Trainer Helicopter, Design Number 73 (TH-73) Systems Practice Test (Sample)

Study Guide

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Questions

1. Which ECS system provides ambient air?

A. Upper

B. Lower

C. Both

D. None

2. What is the primary purpose of the transmission?

A. Increase engine RPM

B. Reduce engine RPM, change direction of drive

C. Stabilize flight controls

D. Maximize engine power output

3. What metrics/parameters are monitored by the ADU/ADC system?

A. Baro/altitude, airspeed/VSI, OAT

B. Speed, fuel flow, engine temperature

C. Pitch, roll, yaw

D. Heading, navigation, altitude

4. How is the landing gear of the TH-73 designed?

A. Retractable type for high-speed landings

B. Skidded type for stability on various terrains

C. Wheeled type for land operations

D. Fixed type for enhanced aerodynamics

5. What type of oil system does the transmission utilize?

A. Dry sump

B. Independent pressurized system

C. Wet sump

D. Closed circuit system

6. Why is communication a crucial aspect of training with the TH-73?

A. To synchronize flight maneuvers

B. To ensure safety during operations

C. To enhance learning and instruction clarity

D. To manage aircraft systems

7. What mechanism addresses the dissymmetry of lift in the tail rotor?

A. Composite rotor system

B. Delta hinge

C. Swashplate assembly

D. Fenestron configuration

8. How many linear actuators are present in the system?

A. 3

B. 4

C. 5

D. 6

9. How does the TH-73 support realistic training environments?

A. By conducting actual rescue missions

B. By performing simulated missions including search and rescue

C. Through classroom instruction only

D. Using augmented reality technology

10. Which system is commonly utilized for backup navigation in the TH-73?

A. Visual reference systems

B. GPS

C. Traditional navigation aids

D. All of the above

Answers

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

Explanations

1. Which ECS system provides ambient air?

A. Upper

B. Lower

C. Both

D. None

The upper environmental control system (ECS) is responsible for providing ambient air in the TH-73 helicopter. This system is designed to ensure that the cockpit and cabin environments are comfortable for occupants by regulating temperature and ventilation. In the context of helicopter systems, the upper ECS typically draws in ambient air to maintain the desired air conditions, making it vital for crew comfort and operational efficiency. While the lower ECS may be involved in other environmental management functions, it does not serve the same primary role as the upper ECS concerning the provision of ambient air. Therefore, focusing on the upper ECS as the source emphasizes its importance in maintaining a suitable environment within the aircraft, particularly during various flight conditions.

2. What is the primary purpose of the transmission?

A. Increase engine RPM

B. Reduce engine RPM, change direction of drive

C. Stabilize flight controls

D. Maximize engine power output

The primary purpose of the transmission in the TH-73 helicopter is to reduce engine RPM and change the direction of drive. The transmission is a crucial component that connects the engine to the rotor system and is responsible for managing the engine's power output. In a helicopter, the engine operates at a higher RPM than what is needed for the rotor blades to turn effectively at safe operating speeds. Hence, the transmission reduces this engine RPM to a more suitable level for rotor operation, allowing for optimal performance during various flight conditions. Additionally, the transmission can change the direction of drive to facilitate the proper rotation of the main rotor and tail rotor, which is essential for controlling the helicopter's flight direction and stability. This function is vital for flight safety and efficiency, as it enables the helicopter to fly smoothly while maintaining sufficient power and control.

3. What metrics/parameters are monitored by the ADU/ADC system?

A. Baro/altitude, airspeed/VSI, OAT

B. Speed, fuel flow, engine temperature

C. Pitch, roll, yaw

D. Heading, navigation, altitude

The correct answer focuses on the essential parameters monitored by the ADU (Air Data Unit) and ADC (Air Data Computer) system in the Trainer Helicopter TH-73. This system specifically monitors barometric altitude, airspeed, vertical speed indicator (VSI), and outside air temperature (OAT). These metrics are crucial for providing real-time data necessary for safe flight operations and overall aircraft performance. By keeping track of barometric altitude, the system helps pilots maintain the correct altitude and assists in navigation and safety during flight. Monitoring airspeed and VSI is vital to understand the helicopter's performance and ascent or descent rates, which are key for maintaining control and ensuring efficient maneuvers. Additionally, knowing the OAT is important for performance calculations and engine management, especially in varying environmental conditions. In contrast, the other options, while important for different aspects of aircraft operation, do not specifically relate to the primary functions of the ADU/ADC system. Speed, fuel flow, engine temperature; pitch, roll, yaw; and heading, navigation, altitude represent different systems and parameters not directly monitored by the ADU/ADC. Hence, option A accurately represents the specific metrics and parameters associated with the ADU/ADC system.

4. How is the landing gear of the TH-73 designed?

A. Retractable type for high-speed landings

B. Skidded type for stability on various terrains

C. Wheeled type for land operations

D. Fixed type for enhanced aerodynamics

The landing gear of the TH-73 is designed as a skidded type, which enhances stability on a variety of terrains. This design is particularly advantageous for training helicopters, as it allows for effective operations in less than ideal conditions, including soft or uneven ground surfaces where a wheeled system might struggle. The skid type landing gear is lighter and allows for a lower center of gravity, which contributes to overall stability during landings and takeoffs. This feature supports the primary training mission of the TH-73 by enabling students to gain experience in a range of landing scenarios, which could include unpaved or other non-traditional landing areas. In contrast, options describing retractable gear, wheeled types, or fixed designs do not align with the operational requirements and objectives of the TH-73.

5. What type of oil system does the transmission utilize?

A. Dry sump

B. Independent pressurized system

C. Wet sump

D. Closed circuit system

The transmission of the Trainer Helicopter, Design Number 73 (TH-73), utilizes a wet sump oil system. In a wet sump system, the oil resides in the bottom of the transmission case, where it is gathered and cycled through the system. This design allows for efficient lubrication, cooling, and noise reduction owing to the oil's presence, which helps to dampen vibrations and provide a consistent level of lubrication to the gears and bearings. The wet sump configuration enables the oil to be constantly available for the transmission components without needing an external reservoir or complex piping that would be required in alternative systems. This simplifies the design and maintenance of the transmission while providing effective lubrication under various operating conditions. Moreover, the design contributes to the overall reliability of the helicopter's transmission system, ensuring that it can handle the operational demands placed on it during flight.

6. Why is communication a crucial aspect of training with the TH-73?

A. To synchronize flight maneuvers

B. To ensure safety during operations

C. To enhance learning and instruction clarity

D. To manage aircraft systems

Communication plays a vital role in enhancing learning and instruction clarity, particularly in a training environment like that of the TH-73 helicopter. Effective communication allows instructors to convey complex concepts and operational procedures in a manner that is easily understood by students. This ensures that trainees grasp the fundamental skills necessary for piloting and managing the aircraft, including navigation, emergency procedures, and system operations. Moreover, clear communication fosters an environment where trainees can ask questions, seek clarification, and express any uncertainties they might have. This interaction not only solidifies their understanding but also encourages active participation, which is critical in practical training scenarios. When trainees are well-informed and comfortable in asking for clarification, their proficiency and confidence in operating the TH-73 are significantly enhanced. While synchronization of flight maneuvers, ensuring safety, and managing aircraft systems are all important aspects of TH-73 operations, the foundation for successfully executing these tasks lies in the strength of communication. Without effective communication, the ability to learn, execute, and adapt in a dynamic training context would be severely hampered.

7. What mechanism addresses the dissymmetry of lift in the tail rotor?

A. Composite rotor system

B. Delta hinge

C. Swashplate assembly

D. Fenestron configuration

The delta hinge is a mechanical feature that effectively manages the dissymmetry of lift in the tail rotor of the helicopter. Dissymmetry of lift occurs due to the varying angles of attack on a rotor blade when it is in a forward flight, which can lead to imbalanced forces and potential control issues. The delta hinge allows for the tail rotor blades to flap independently, which helps to equalize lift forces on each side of the rotor system during flight maneuvers. By enabling controlled movement of the rotor blades, the delta hinge can accommodate variations in airflow and rotational velocity, thus reducing stress and enhancing stability. This is crucial for maintaining directional control while flying, especially during maneuvers that could otherwise result in unwanted pitch or yaw. While other mechanisms such as composite rotor systems, swashplate assemblies, and fenestron configurations each play roles in rotor dynamics or blade design, they do not specifically focus on addressing the dissymmetry of lift in the tail rotor, making the delta hinge the most relevant mechanism for this particular function.

8. How many linear actuators are present in the system?

A. 3

B. 4

C. 5

D. 6

The correct answer indicates that there are five linear actuators within the TH-73 system. Linear actuators are critical components that convert rotational motion into linear displacement, providing the necessary control for various systems within the aircraft. In the case of the TH-73, these actuators play vital roles in controlling flight surfaces, landing gear, and other mechanisms essential for the operation of the helicopter. Understanding the specific number of linear actuators helps in comprehending the complexity and capabilities of the TH-73's systems. Each actuator is designed to meet specific performance criteria, like speed, accuracy, and operational load, which are integral to ensuring reliable operation under various flying conditions. Therefore, the presence of five actuators suggests a carefully engineered balance between redundancy, efficiency, and performance in the design of the helicopter's control and movement systems.

9. How does the TH-73 support realistic training environments?

A. By conducting actual rescue missions

B. By performing simulated missions including search and rescue

C. Through classroom instruction only

D. Using augmented reality technology

The TH-73 supports realistic training environments by performing simulated missions, including search and rescue. This capability allows trainees to engage in scenarios that closely mimic real-world operations without the risks associated with actual missions. Simulated training provides opportunities for pilots to develop and refine their skills in various environments and situations they may encounter in real life. While conducting actual rescue missions would provide valuable experience, it is not feasible or safe for training purposes. Classroom instruction alone does not provide the hands-on experience needed to develop practical flying skills. Augmented reality technology can enhance training but isn't the primary method for simulating complex missions. By utilizing simulations, the TH-73 ensures that learners can practice critical decision-making and operational procedures in a controlled, safe environment.

10. Which system is commonly utilized for backup navigation in the TH-73?

A. Visual reference systems

B. GPS

C. Traditional navigation aids

D. All of the above

The system commonly utilized for backup navigation in the TH-73 includes a combination of several methods, making "all of the above" the most appropriate answer. Visual reference systems offer pilots the ability to navigate using landmarks and other visual cues, providing a backup option when electronic systems may be unavailable or compromised. GPS is a primary navigation tool equipped in many modern aircraft, serving as a reliable source for precise location data; however, it is important to have backup systems available. Traditional navigation aids, such as VOR or NDB, serve as additional layers of navigation that pilots can rely on should GPS signals be lost. Utilizing all of these options effectively creates a comprehensive approach to navigation in the TH-73, ensuring pilots have multiple methods to determine their position and navigate safely. Therefore, the correct answer recognizes the integration of various systems as a best practice for backup navigation.