

Question Bank

«Flaw detection and non-destructive methods of control of aircraft and aircraft engine»

Topic: Technical Diagnostics and Control of Aircraft

1. Give the definition of the term "technical control".
2. Give a definition of the term "non-destructive testing".
3. Give the definition of the term "technical diagnostics".
4. State the difference between technical control and technical diagnostics.
5. Give the definition of the term "defectoscopy".
6. What is the main subject of technical diagnostics?
7. Explain the purposes and tasks of technical diagnostics.

Topic: Non-destructive testing in aircraft inspection

1. What is Non-Destructive Testing (NDT) in aircraft inspection?
2. Why is NDT important in aircraft inspection?
3. What are the common NDT methods used in aircraft inspection?
4. Is NDT required by aviation regulations?
5. Can NDT be performed on all aircraft components?
6. How often should NDT inspections be conducted on aircraft?
7. Can NDT techniques detect hidden corrosion in aircraft structures?
8. How does NDT help extend the lifespan of aircraft?

Topic: Types of Aviation Maintenance Checks

1. What are the different types of aviation maintenance checks, and what is the purpose of each?
2. Explain the key differences between daily checks (A-checks) and line maintenance checks (B-checks)?
3. What is the typical interval for base maintenance checks (C-checks), and what activities are involved in this type of check?
4. Describe the scope and level of detail associated with heavy maintenance checks (D-checks).
5. How does regulatory compliance influence the scheduling and execution of different types of maintenance checks?
6. What are some common tasks involved in daily checks, and why are they essential for ensuring flight safety?
7. How do maintenance personnel prioritize tasks during a base maintenance check to ensure efficient use of time and resources?
8. Can you provide examples of specialized tools or equipment required for conducting specific types of maintenance checks?
9. What role does documentation play in the process of conducting maintenance checks, and why is accurate record-keeping crucial?
10. How do maintenance checks contribute to overall aircraft safety, reliability, and compliance with aviation regulations?
11. What are some of the risk factors associated with different types of maintenance checks, and how are these risks managed?
12. How do advancements in technology and aircraft systems impact the procedures and requirements for different types of maintenance checks?
13. In what ways do maintenance checks contribute to the overall lifecycle management of an aircraft?
14. How do aviation maintenance professionals stay updated with the latest industry standards and best practices related to maintenance checks?
15. Can you provide examples of scenarios where an aircraft might require an unscheduled maintenance check, and how would this be handled?

Topic: Classification of defects

1. What are some common non-destructive testing methods used to assess defects in aircraft?
2. How does defect classification relate to emergency response procedures in aviation?
3. What steps should be taken if a critical defect is identified just before or during a flight?
4. What are the key categories of defects commonly encountered in aircraft maintenance?
5. What are some specific regulations or guidelines that pertain to defect classification in aviation?
6. Give an example of a defect and explain its potential impact on the safety and airworthiness of an aircraft.
7. How does the classification of defects play a role in an aircraft's scheduled maintenance program?
8. How does technician decide whether a defect requires repair, replacement, or further evaluation?
9. What are some best practices for ensuring continuous improvement in defect classification procedures?
10. How can an organization use data from defect classification to improve their maintenance processes and prevent future defects?

Topic: Visual Inspection of Aircraft

1. What are the advantages and disadvantages of "rigid" and "flexible" borescopes?
2. The subjectivity in general visual inspections of aircraft. what are the risks?
3. What is the planned sequence for conducting the visual inspection?
4. What are the primary tools used in visual optical inspections of aircraft?
5. What is the purpose of conducting a visual optical inspection on an aircraft?
6. What are some specific areas of an aircraft that often require magnified inspection?
7. What types of surface irregularities or damages can be identified through visual optical inspection?
8. How often should visual optical inspections be conducted on an aircraft?
9. What are some common challenges faced during visual optical inspections, and how are they mitigated?
10. What are the typical costs associated with obtaining and maintaining optical inspection equipment for aircraft inspections?

Topic: Liquid Penetrant Testing

1. What is the purpose of conducting Liquid Penetrant Testing on aircraft components?
2. Explain the basic principles behind Liquid Penetrant Testing and how it works in detecting surface defects.
3. What are some common materials used in penetrant testing for aircraft components, and why are they chosen?
4. Describe the importance of proper surface preparation before conducting a liquid penetrant test on an aircraft component.
5. What safety precautions should be taken when performing Liquid Penetrant Testing on aircraft?
6. What are the steps involved in removing excess penetrant from an aircraft component after the dwell time?
7. Why is it important to apply the developer evenly and consistently during the liquid penetrant testing process?
8. How to distinguish a true reading from a false one when performing a penetrance test?
9. Explain the process of documenting and reporting the results of a liquid penetrant test on an aircraft component.
10. What industry codes, standards, or specifications govern the liquid penetrant testing of aircraft components?
11. What measures can be taken to ensure that the results of a liquid penetrant test are reliable and consistent?
12. Explain the role of quality control and assurance in the liquid penetrant testing of aircraft components.

Topic: Magnetic Particle Testing

1. What is Magnetic Particle Testing (MT) and what types of materials is it typically used for?
2. What are the key principles behind the MT process and how does it detect surface defects?
3. What are the advantages and limitations of MT compared to other non-destructive testing methods?
4. What are the necessary steps for proper surface preparation before conducting an MT inspection?
5. What safety precautions should be taken when performing MT, especially concerning electrical hazards and personal protective equipment (PPE)?
6. What are the key elements that need to be documented in an MT inspection report?
7. What type of magnetic particles will be used (e.g., dry, wet, fluorescent, non-fluorescent)?

Topic: Ultrasonic Testing

1. What are the basic principles of ultrasonic testing and how do they apply to aircraft inspection?
2. Explain the difference between longitudinal waves and shear waves in ultrasonic testing? When should each type be employed in aircraft inspection?
3. How to calibrate an ultrasonic flaw detector for a specific aircraft inspection task? What parameters need to be taken into account?
4. Why Ultrasonic Testing is considered a crucial non-destructive testing method in the aerospace industry?
5. What are the key advantages of using Ultrasonic Testing over other non-destructive testing techniques for aircraft inspection?
6. What are the specific challenges and considerations when applying Ultrasonic Testing to composite materials commonly used in modern aircraft?
7. How does the choice of transducer type and frequency impact the accuracy and effectiveness of Ultrasonic Testing in different aircraft components?

Topic: Eddy Current Testing of Aircraft

1. What is the principle behind eddy current testing, and how does it work in the context of inspecting aircraft components?
2. What are the key advantages of using eddy current testing for inspecting critical aerospace components compared to other non-destructive testing methods?
3. How is the choice of probe or coil influenced by the specific characteristics of the aircraft component being tested, such as material type, geometry, and the type of defect being targeted?
4. What are some common aerospace applications where eddy current testing is particularly valuable, and what are the typical defects it is used to detect?
5. How does the frequency of the eddy current signal affect the depth of penetration and sensitivity to different types of defects in aircraft materials?
6. What are some best practices for setting up and calibrating eddy current testing equipment for inspecting aircraft components?
7. How can eddy current testing be employed to evaluate the integrity of critical areas on an aircraft, such as wing structures, landing gear components, and engine parts?
8. What are the limitations and challenges associated with eddy current testing in the aerospace industry, and how can they be addressed?
9. How does eddy current testing contribute to the overall safety and reliability of aircraft, and what role does it play in maintenance, repair, and overhaul (MRO) activities?
10. What are the regulatory and industry standards that govern the use of eddy current testing in the aerospace sector, and how do these standards ensure the quality and integrity of inspected components?

Topic: Radiography Testing

1. How does RT contribute to the prevention of catastrophic failures in critical aircraft components, and what specific defects or irregularities can it detect within these parts?
2. What safety measures and regulations are imperative to follow during RT inspections to ensure both personnel and environmental safety from radiation exposure?
3. How does RT complement and integrate with other non-destructive testing methods to form a comprehensive inspection strategy for aircraft maintenance?
4. In what ways does RT facilitate the balance between meticulous inspection accuracy and the need to minimize downtime or disruption to aircraft operation?
5. What specialized training and expertise are required for technicians conducting RT on aircraft, particularly in terms of interpreting radiographic images and identifying critical defects?
6. What advancements or innovations in RT technology are shaping the future of aircraft inspection and maintenance, and how do these advancements enhance the efficacy of inspections?
7. How does RT documentation and reporting contribute to informed decision-making regarding aircraft maintenance, repairs, or component replacements?
8. Considering the evolving nature of aviation materials and designs, how does RT continuously adapt and improve to meet the inspection needs of modern and future aircraft models?

Topic: Infrared Thermography Testing

1. What are the fundamental principles governing infrared thermography and how do they apply to aviation maintenance?
2. Explain the concept of emissivity and its significance in infrared thermography testing for aircraft components.
3. Describe the specific types of infrared cameras used in aviation thermography. How do these differ from standard infrared cameras used in other industries?
4. What are the key factors to consider when selecting an infrared camera for aircraft inspection purposes?
5. What are the critical areas within an aircraft that benefit the most from infrared thermography inspections?
6. Explain the importance of regular thermographic inspections for aircraft engines and how these inspections contribute to overall safety and maintenance.
7. What are some challenges or limitations associated with performing infrared thermography testing on aircraft, and how can these challenges be mitigated?
8. How do environmental factors (e.g., temperature, weather conditions) affect the accuracy of infrared thermography in aviation?

Topic: Diagnostics of Aircraft Engine

1. What are the primary methods used for diagnosing the health and performance of aircraft engines?
2. How do aircraft engineers monitor engine parameters during flight to detect potential issues?
3. Can you explain the role of predictive maintenance in aircraft engine diagnostics?
4. What are some common indicators of engine degradation or malfunction, and how are they identified?
5. How do advancements in sensor technology contribute to more accurate engine diagnostics?
6. What role does data analysis play in diagnosing engine health, and how is this data collected and processed?
7. Can you discuss the importance of regular engine inspections and how they contribute to early detection of issues?
8. What are some challenges associated with diagnosing engine problems, and how are they overcome?
9. How do environmental factors, such as temperature and altitude, affect engine diagnostics?
10. What advancements or trends do you foresee in aircraft engine diagnostics in the future?