Navy Aviation Structural Mechanic (AM) Practice Test (Sample)

Study Guide

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Questions

1. What is the main purpose of drilling in aircraft repairs?

A. To make decorative patterns in the metal

B. To create holes for the insertion of various hardware

C. To cut metal sheets into smaller segments

D. To smoothen the surface of metal components

2. Which of the following is considered a disadvantage of aluminum alloys?

A. High cost of production

B. Not easy to form with added elements

C. Heavier than most metals

D. Low corrosion resistance

3. What is the primary purpose of cutting sheet material?

A. To smooth edges

B. To remove damaged areas and fabricate new parts

C. To bend sheets into shape

D. To drill holes for fasteners

4. In the context of aircraft structure, what type of bolt is known for its swaged collar?

A. Standard bolt

B. Jo-bolt

C. Hi-shear rivet

D. Hex bolt

5. What components make up a combination square?

A. A steel rule and a 90-degree angle tool

B. A steel rule with an accurately machined head

C. A steel rule and a protractor only

D. A steel rule and a level

6. What type of file would you use to enlarge round holes?

A. Half-round file

B. Flat file

C. Triangular file

D. Square file

7. In terms of applications, what is a common use for titanium alloys?

A. Aircraft components

B. Building structures

C. Automobile frames

D. Cooking utensils

8. What is one characteristic of a hand drill?

A. It is only used for large diameter holes

B. It is for drilling small holes and requires manual operation

C. It operates on battery power

D. It has a fixed speed

9. Which flight control manages the pitching motion of an aircraft along the lateral axis?

A. Ailerons

B. Rudder

C. Elevators

D. Stabilators

10. What is the primary use of a prick punch?

A. To make deep indents for drilling

B. To make a light mark for hole centers and arcs

C. To measure angles

D. To connect two points on the surface

Answers

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

Explanations

1. What is the main purpose of drilling in aircraft repairs?

A. To make decorative patterns in the metal

B. To create holes for the insertion of various hardware

C. To cut metal sheets into smaller segments

D. To smoothen the surface of metal components

The main purpose of drilling in aircraft repairs is to create holes for the insertion of various hardware. This is essential in the assembly and maintenance of aircraft, as it allows technicians to secure components together using rivets, bolts, or other fasteners, ensuring structural integrity and safety during flight. Drilling is a critical operation in aircraft maintenance because correctly placed holes enable the secure attachment of parts, facilitating repairs or modifications as needed. Without accurately drilled holes, the effectiveness of fasteners would be compromised, leading to potential failures in the aircraft's structure. While decorative patterns, cutting metal sheets, or smoothing surfaces may serve specific functions in other contexts, they do not align with the primary objective of drilling in the realm of aircraft repair.

2. Which of the following is considered a disadvantage of aluminum alloys?

A. High cost of production

B. Not easy to form with added elements

C. Heavier than most metals

D. Low corrosion resistance

The correct answer highlights that aluminum alloys can be difficult to form when certain alloying elements are added. This is primarily due to the modification of the physical properties of aluminum during the alloying process. While aluminum in its pure form is relatively malleable and easy to work with, the introduction of different elements can alter its ductility and workability. For instance, when certain elements are added to improve strength, it can result in increased brittleness or reduced malleability, making the forming processes more challenging. The context of this characteristic is crucial in aerospace applications, where structural integrity and ease of fabrication are essential. Understanding the forming limitations of aluminum alloys helps in selecting the appropriate alloy for specific applications, ensuring that engineers and mechanics can work effectively within the constraints of material properties. The other options do not accurately capture the disadvantages of aluminum alloys in the same context. For example, while the cost of production may vary but is often less significant compared to other metals like titanium, aluminum is still generally considered cost-effective for many applications. Similarly, while aluminum is lighter than many metals, making it an attractive option for reducing overall weight in aviation, low corrosion resistance is often mitigated through various treatments and coatings. Thus, the intricacies of alloy compositions and

3. What is the primary purpose of cutting sheet material?

A. To smooth edges

B. To remove damaged areas and fabricate new parts

C. To bend sheets into shape

D. To drill holes for fasteners

The primary purpose of cutting sheet material is to remove damaged areas and fabricate new parts. In aviation and other manufacturing contexts, cutting is a crucial process that not only addresses any damage in the sheet material but also allows for the precise creation of components that fit specific requirements. By cutting sheets to the correct dimensions, technicians can ensure that new parts are formed accurately, which is vital for maintaining the integrity and functionality of aviation structures. This process can include cutting out sections of damaged or worn material, which is essential for repairs, as well as shaping new components needed for assembly or replacement. While smoothing edges, bending sheets, and drilling holes are important processes in the overall fabrication and repair of materials, they serve secondary roles or are results of cutting rather than its primary objective. Cutting effectively lays the foundation for further operations by enabling the creation of parts that fit the operational needs and safety standards in aviation.

4. In the context of aircraft structure, what type of bolt is known for its swaged collar?

A. Standard bolt

B. Jo-bolt

C. Hi-shear rivet

D. Hex bolt

The correct answer is a Hi-shear rivet. A Hi-shear rivet features a swaged collar that is designed to enhance its shear strength, making it particularly well-suited for applications in aircraft structures where high strength and reliability are critical. The swaged collar acts as a secondary locking mechanism once the rivet is installed, creating a mechanical bond that can handle significant loads. This design is crucial in aviation, where components are often subjected to extreme operational stresses. The other options, such as standard bolts, jo-bolts, and hex bolts, do not incorporate this swaged collar feature and serve different applications in structural assembly. For example, standard bolts and hex bolts are commonly used for general fastening but do not offer the same shear resistance as Hi-shear rivets. Jo-bolts are typically used in specific connections but lack the unique properties of the Hi-shear rivet. Understanding these distinctions is important for selecting the appropriate fastener for aerospace applications.

5. What components make up a combination square?

A. A steel rule and a 90-degree angle tool

B. A steel rule with an accurately machined head

C. A steel rule and a protractor only

D. A steel rule and a level

A combination square is an essential tool used in various measurement and layout tasks, especially in the fields of woodworking and metalworking. The core components of a combination square include a steel rule and an accurately machined head. The head is typically adjustable and can have multiple features, such as a right-angle or 45-degree angle, as well as a level and sometimes a protractor. The accuracy of the machined head is critical, as it allows for the precise alignment and measurement when creating square corners or measuring angles. This combination of features enables the user to make accurate measurements and check angles efficiently in various applications. Therefore, identifying the accurate machined head paired with a steel rule clarifies the functionality and versatility of the combination square in practical use.

6. What type of file would you use to enlarge round holes?

A. Half-round file

B. Flat file

C. Triangular file

D. Square file

Using a half-round file is the most suitable choice for enlarging round holes because of its unique shape, which features one flat side and one rounded side. The rounded side can particularly be effective in working within circular openings, allowing the user to smoothly remove material from the edges of the hole. This is essential for achieving a desired diameter or shape without damaging the surrounding material. The flat side of a half-round file can also be used to dress the flat surfaces, giving versatility in the same tool for both shaping and smoothing tasks. Its design allows for controlled removal of material while retaining the integrity of the hole's rounded shape. In contrast, flat, triangular, and square files have specific functionalities suited for other tasks and shapes. A flat file is best for surfaces; triangular files are effective for corners and grooves, and square files are used for right angles. They may not be able to conform to the curvature needed in enlarging round holes as effectively as a half-round file does.

7. In terms of applications, what is a common use for titanium alloys?

A. Aircraft components

B. Building structures

C. Automobile frames

D. Cooking utensils

Titanium alloys are widely used in aircraft components due to their unique properties, which make them highly suitable for aviation applications. These alloys are known for their high strength-to-weight ratio, excellent corrosion resistance, and ability to withstand extreme temperatures. This combination of characteristics allows for the production of lightweight yet durable components that can perform efficiently in the challenging environments found in aviation. In aircraft construction, titanium alloys are often utilized in critical components such as airframes, engine parts, landing gear, and fasteners. Their strength helps to improve overall aircraft performance by reducing weight while maintaining structural integrity, which is vital for flight safety and fuel efficiency. While titanium alloys have uses in other areas, such as medical devices and some industrial applications, their predominant role in aircraft components is a result of the specialized requirements for performance and safety in the aerospace sector.

8. What is one characteristic of a hand drill?

A. It is only used for large diameter holes

B. It is for drilling small holes and requires manual operation

C. It operates on battery power

D. It has a fixed speed

A hand drill is specifically designed for drilling small holes and typically requires manual operation, making it distinct in functionality. While it can indeed perform tasks involving small diameter holes, it gives the user control over the drilling process, allowing for precision work that is often necessary in tasks such as woodworking, metalworking, or other detailed applications. Unlike powered drills, a hand drill does not rely on electricity or battery power, emphasizing its manual nature. This characteristic is essential because it allows for operation in areas where power sources may be unavailable, as well as providing the ability to manage the drill's speed and pressure, depending on the material being drilled. The other choices, while potentially describing certain tools or devices, do not accurately capture the primary characteristic of a hand drill. For instance, hand drills are not limited to large diameter holes or defined by fixed speed, and they do not operate on battery power since they are manually operated tools. These factors further highlight the unique utility of a hand drill in various tasks requiring small and precise holes.

9. Which flight control manages the pitching motion of an aircraft along the lateral axis?

A. Ailerons

B. Rudder

C. Elevators

D. Stabilators

The correct answer is elevators, as they are specifically designed to control the pitching motion of an aircraft along its lateral axis. The lateral axis runs from wingtip to wingtip, and pitching refers to the up-and-down movement of the aircraft's nose. Elevators are situated on the horizontal stabilizer at the tail of the aircraft and work by changing the airflow over the stabilizer, which causes the aircraft to climb or descend. When the pilot pulls back on the control yoke, the elevators move upward, increasing lift at the tail and causing the nose of the aircraft to rise. Conversely, pushing the yoke forward causes the elevators to move downward, decreasing lift at the tail and enabling the aircraft to descend. Thus, elevators play a crucial role in managing the pitch attitude of the aircraft. In contrast, ailerons control the roll motion around the longitudinal axis, while the rudder is responsible for controlling yaw around the vertical axis. Stabilators combine the functions of elevators and horizontal stabilizers but are a different mechanism than standard elevators. These roles clarify why elevators are the key components for managing the pitching motion of an aircraft.

10. What is the primary use of a prick punch?

A. To make deep indents for drilling

B. To make a light mark for hole centers and arcs

C. To measure angles

D. To connect two points on the surface

The primary use of a prick punch is to make a light mark for hole centers and arcs. This tool is specifically designed to create small indentations on surfaces, which serve as reference points for precision work, such as drilling holes accurately. The light markings help guide the drill bit to the exact spot where the hole is to be made, reducing the risk of misalignment and ensuring a clean and accurate hole. Using a prick punch is advantageous because it is less likely to damage the workpiece compared to deeper punches. It allows for careful marking without significantly altering the material surface. This is particularly important in aviation maintenance and structural work where precision is crucial for safety and performance. The other options focus on different uses that do not align with the prick punch's intended function. For instance, making deep indents is more typical of a center punch, measuring angles might involve a protractor or other measuring tools, and connecting points on a surface is often done with a straightedge or chalk line. Therefore, the practicality and precision of the prick punch in marking light references solidify its primary role in prep work before drilling or cutting processes.