

ASA Landing Gear Practice Test (Sample)

Study Guide



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SAMPLE

Questions

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- 1. What is the primary purpose of landing gear in an aircraft?**
 - A. To improve aerodynamic performance**
 - B. To support the aircraft during takeoff, landing, and while on the ground**
 - C. To enhance fuel efficiency**
 - D. To control the aircraft's altitude**
- 2. Explain how an oleo strut works.**
 - A. It uses a spring mechanism to absorb shock**
 - B. It employs a fluid system to maintain pressure**
 - C. It uses compressed air and fluid to absorb shock**
 - D. It absorbs vibrations through rubber materials**
- 3. Which type of landing gear is typically designed for rough terrain landings?**
 - A. Tricycle gear**
 - B. Tailwheel gear**
 - C. Fixed gear**
 - D. Retractable gear**
- 4. If the extended longitudinal axis of the main landing gear wheel assemblies intersects aft of the aircraft, how are the wheels described?**
 - A. Toe-in**
 - B. Toe-out**
 - C. Neutral alignment**
 - D. Cambered alignment**
- 5. A hydraulic hose identified as MIL-H-8794 is marked with a yellow stripe. What does this stripe indicate?**
 - A. It denotes the pressure rating of the hose**
 - B. It is a warning for high-temperature applications**
 - C. It ensures that the hose is installed without excessive twisting**
 - D. It is an indication of the hose's material composition**

- 6. How can pilot error affect landing gear operations?**
- A. It may cause gear to be too heavy**
 - B. It may lead to incorrect gear retraction or extension**
 - C. It causes a delay in landing**
 - D. It affects the tire wear**
- 7. What type of landing gear offers better performance on rough terrain?**
- A. Tricycle landing gear**
 - B. Conventional landing gear**
 - C. Single-point gear**
 - D. Fixed gear**
- 8. If a pilot reports that a brake is spongy, what is the most likely cause?**
- A. Low brake fluid**
 - B. Faulty brake pads**
 - C. Air in the hydraulic system**
 - D. Worn out brake lines**
- 9. What is the primary function of brake components in conjunction with landing gear?**
- A. To stabilize the aircraft during flight**
 - B. To slow down or stop the aircraft during ground operations**
 - C. To monitor weight distribution**
 - D. To prevent gear malfunctions**
- 10. What is the role of a sequence valve in a hydraulic retractable landing gear system?**
- A. To control the speed of the hydraulic fluid**
 - B. To prevent fluid leakage during landing**
 - C. To ensure operation of the landing gear and gear doors in the proper order**
 - D. To activate the emergency landing gear system**

Answers

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

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Explanations

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1. What is the primary purpose of landing gear in an aircraft?

- A. To improve aerodynamic performance
- B. To support the aircraft during takeoff, landing, and while on the ground**
- C. To enhance fuel efficiency
- D. To control the aircraft's altitude

The primary purpose of landing gear in an aircraft is to support the aircraft during takeoff, landing, and while on the ground. This functional requirement is critical as landing gear must be designed to withstand the significant loads encountered during these phases of flight, ensuring the aircraft remains stable and safely supports its weight when not airborne. Landing gear also provides the necessary interface with the runway or ground surface, allowing for safe ground operations such as taxiing and parking. Its design takes into account the need for shock absorption during landing, as well as the capability to facilitate smooth transitions onto and off of the runway. This makes it an essential component of an aircraft's structure and operational integrity, as it allows the aircraft to efficiently interact with its environment once it leaves the airspace. In contrast, while aerodynamic performance, fuel efficiency, and altitude control are important considerations in aircraft design and operation, they are not the primary functions of the landing gear itself. These aspects are addressed by other systems and components within the aircraft.

2. Explain how an oleo strut works.

- A. It uses a spring mechanism to absorb shock
- B. It employs a fluid system to maintain pressure
- C. It uses compressed air and fluid to absorb shock**
- D. It absorbs vibrations through rubber materials

The oleo strut is a key component in aircraft landing gear that utilizes a combination of compressed air and hydraulic fluid to absorb shock during landing and takeoff. When the aircraft lands, the impact compresses the air in the strut while simultaneously forcing hydraulic fluid through orifices within the strut. This process converts the kinetic energy from the landing into thermal energy within the fluid, effectively damping the shock loads experienced by the airframe. The design of the oleo strut allows for adjustable damping characteristics due to the interplay of pressure from the compressed air and the hydraulic fluid. This system not only absorbs the initial impact force but also controls the rate at which the strut rebounds, helping maintain stability and control during landing operations. Other choices present mechanisms that are not typical for oleo struts. One option suggests the use of solely a spring mechanism, which doesn't account for the fluid dynamics involved in effective shock absorption within oleo struts. Another choice points to a fluid system maintaining pressure, but it lacks the additional context of combined air and fluid for shock absorption, which is critical for the oleo design. Lastly, the use of rubber materials for vibration absorption does not apply to oleo struts, as these components are specifically designed to

3. Which type of landing gear is typically designed for rough terrain landings?

- A. Tricycle gear**
- B. Tailwheel gear**
- C. Fixed gear**
- D. Retractable gear**

Tailwheel gear, often known as conventional landing gear, is well-suited for rough terrain landings due to its design characteristics. The configuration consists of two main wheels located at the front of the aircraft and a smaller wheel, or tailwheel, at the back. This design helps the aircraft to have a better angle of approach when landing, allowing it to handle uneven surfaces more effectively. When aircraft with tailwheel configurations land on rough terrain, they are less likely to damage the nose of the aircraft, which is elevated above the ground in this setup. The tailwheel allows for better maneuverability and stability on such surfaces as it positions the center of gravity more towards the rear, which can help in recognizing and correcting for potential rough ground handling. In contrast, tricycle gear, although popular for general aviation and commercial aircraft, can be less effective on rough terrain because the nose gear can be more vulnerable to impacts and obstructions. Fixed gear and retractable gear configurations also typically do not provide the same level of ruggedness as tailwheel gear, making them less suitable for operations in environments with significant surface irregularities.

4. If the extended longitudinal axis of the main landing gear wheel assemblies intersects aft of the aircraft, how are the wheels described?

- A. Toe-in**
- B. Toe-out**
- C. Neutral alignment**
- D. Cambered alignment**

When the extended longitudinal axis of the main landing gear wheel assemblies intersects aft of the aircraft, the wheels are described as "toe-in." This condition occurs when the front of the wheels points slightly inward relative to the centerline of the aircraft. Toe-in can be advantageous for directional stability during takeoff and landing. Having the wheels angled this way can help maintain better contact with the runway surface and improve handling characteristics, especially on uneven ground. It ensures that the wheels are positioned to follow the aircraft's intended trajectory more effectively, helping to facilitate a straighter path during operation and reducing the tendency for the aircraft to wander off course while on the ground. In contrast, other alignment options like toe-out would mean the wheels are angled outward, which can lead to instability. Neutral alignment indicates that the wheels are parallel to the centerline, while cambered alignment refers to the vertical tilt of the wheels. Each of these conditions has distinct effects on the aircraft's handling and stability, but in the case of the described scenario, toe-in is clearly the correct characterization.

5. A hydraulic hose identified as MIL-H-8794 is marked with a yellow stripe. What does this stripe indicate?

- A. It denotes the pressure rating of the hose**
- B. It is a warning for high-temperature applications**
- C. It ensures that the hose is installed without excessive twisting**
- D. It is an indication of the hose's material composition**

The presence of a yellow stripe on a hydraulic hose marked as MIL-H-8794 signifies that the hose is designed to be installed with certain considerations to prevent excessive twisting during installation. This marking helps technicians and maintenance personnel recognize the importance of following specific handling procedures to ensure the hose maintains its integrity and functionality. In hydraulic systems, excessive twisting can lead to damage, kinking, or improper flow of fluids, which could compromise system performance. Therefore, the yellow stripe serves as a helpful reminder during installation to avoid such configurations and ensure optimal operation of the hydraulic system. Other options relate to different potential markings or features common in hydraulic hoses, such as pressure ratings or material differences, but they do not apply specifically to the designation denoted by the yellow stripe in this context.

6. How can pilot error affect landing gear operations?

- A. It may cause gear to be too heavy**
- B. It may lead to incorrect gear retraction or extension**
- C. It causes a delay in landing**
- D. It affects the tire wear**

Pilot error can significantly impact landing gear operations, particularly through incorrect gear retraction or extension. This can occur during critical phases of flight such as takeoff and landing, where timing and sequence of gear operations are crucial for safety. If a pilot inadvertently retracts the landing gear before the aircraft is airborne, or fails to extend it before landing, it can lead to catastrophic consequences, including gear collapse upon touchdown or unsafe landings. The correct response reflects the importance of adhering to standard operating procedures and checklists, where the pilot must ensure that the landing gear is in the correct position at various stages of flight. This aspect highlights the need for proper training and awareness among pilots regarding the mechanics and protocols for landing gear operation, as errors can compromise not only the aircraft's functionality but also the safety of the flight and its occupants. While other factors like gear weight, landing delays, or tire wear may relate to aircraft operation, they do not directly involve the immediate mechanical actions executed by the pilot concerning the landing gear during crucial flight phases. Thus, the pivotal nature of accurately extending and retracting the landing gear underscores why this choice is the most relevant.

7. What type of landing gear offers better performance on rough terrain?

- A. Tricycle landing gear**
- B. Conventional landing gear**
- C. Single-point gear**
- D. Fixed gear**

Conventional landing gear, often known as tailwheel gear, is designed with the main wheels positioned forward of the center of gravity, and the tailwheel at the rear. This configuration provides several advantages in performance on rough terrain. One key benefit is the way the aircraft is positioned when landing or taking off; the tailwheel configuration often allows for greater pitch control and stability on uneven surfaces. The geometry of conventional gear often allows for better clearance from rocks, ruts, and other obstacles typical in rough terrain, helping to prevent damage to the aircraft's belly and propeller. Additionally, conventional gear can provide better visibility for the pilot during ground handling, especially in environments where terrain varies significantly. Pilots flying aircraft equipped with this type of landing gear often find that they can maneuver more effectively on grass or unpaved surfaces, which can include agricultural fields or remote airstrips. The other types of landing gear, such as tricycle landing gear or fixed gear, may not provide the same level of performance advantages in rough conditions due to their different design characteristics.

8. If a pilot reports that a brake is spongy, what is the most likely cause?

- A. Low brake fluid**
- B. Faulty brake pads**
- C. Air in the hydraulic system**
- D. Worn out brake lines**

When a pilot describes a brake as spongy, the most likely cause is air in the hydraulic system. This condition occurs because hydraulic systems rely on incompressible fluids to transmit force from the brake pedal to the braking mechanism. When air enters the system, it compresses under pressure, leading to a soft or spongy feel when the brake pedal is applied. In practical terms, this phenomenon is a result of the hydraulic system's inability to effectively transmit the force needed to engage the brakes firmly. This can happen if there's a leak in the system or improper bleeding of the brakes, allowing air to infiltrate the hydraulic lines. While low brake fluid can contribute to issues with braking performance, it typically results in a firmer pedal during use rather than a spongy feel. Faulty brake pads mainly affect the friction and engagement of the brakes but do not directly cause a spongy pedal sensation. Worn-out brake lines can lead to other issues such as brake fluid leaks or reduced structural integrity but are not primarily responsible for the spongy sensation experienced in the pedal. Thus, the presence of air in the hydraulic system is the most common and direct cause of a spongy brake feel that a pilot would report.

9. What is the primary function of brake components in conjunction with landing gear?

- A. To stabilize the aircraft during flight**
- B. To slow down or stop the aircraft during ground operations**
- C. To monitor weight distribution**
- D. To prevent gear malfunctions**

The primary function of brake components in conjunction with landing gear is to slow down or stop the aircraft during ground operations. This is crucial for the safe landing and taxiing of the aircraft. When an aircraft lands, its momentum must be reduced to bring it safely to a halt; this is achieved through the activation of the braking system, which applies friction to the wheels. During ground operations, effective braking is essential for controlling the aircraft's speed as it taxis to and from runways, and it plays a vital role in preventing runway overruns during landing. The effectiveness of the brakes directly affects the overall safety and handling characteristics of the aircraft on the ground. While stabilizing the aircraft during flight and monitoring weight distribution are important aspects of aircraft operation, they do not directly relate to the function of brake components. Similarly, while preventing gear malfunctions is crucial for safety, it is not the primary purpose of the brake system. Therefore, understanding the role of brakes in conjunction with landing gear highlights their essential function for ground operations.

10. What is the role of a sequence valve in a hydraulic retractable landing gear system?

- A. To control the speed of the hydraulic fluid**
- B. To prevent fluid leakage during landing**
- C. To ensure operation of the landing gear and gear doors in the proper order**
- D. To activate the emergency landing gear system**

In a hydraulic retractable landing gear system, the sequence valve plays a crucial role in controlling the order of operations for deploying and retracting the landing gear and its associated gear doors. This ensures that the landing gear and the gear doors function in a coordinated manner. For instance, when the landing gear is retracted, the gear doors must close first before the gear itself starts to retract, preventing any potential damage or malfunction. Conversely, during deployment, the gear must extend before the doors open, ensuring that the gear is properly positioned before the doors facilitate a smooth transition. This ordered sequence is vital for safe and effective landing gear operation. If the sequence were not controlled properly, it could lead to malfunctions, such as the gear not fully extending or the doors obstructing the gear's movement. Therefore, the sequence valve is essential in maintaining the integrity and reliability of the landing gear system, making option C the correct answer.