Commercial Pilot Airplane (CAX) Performance Practice Exam (Sample)

Study Guide

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Questions

1. **Given winds of 010 at 18 knots, which runway would be most suitable for takeoff?**
   - A. Runway 03
   - B. Runway 13
   - C. Runway 34
   - D. Runway 22

2. **What is the expected altitude at a temperature of 100 degrees F?**
   - A. 1,200 feet
   - B. 1,350 feet
   - C. 1,600 feet
   - D. 1,000 feet

3. **When considering a weight of 3,300 lb and a headwind of 15 kts, how much ground roll is needed over a 50-foot obstacle at a pressure altitude of 5,000 ft?**
   - A. 1,850 feet
   - B. 1,950 feet
   - C. 2,250 feet
   - D. 1,650 feet

4. **Approximately how much fuel would be consumed during a 7-minute climb at 75 percent power?**
   - A. 1.5 gallons
   - B. 2.15 gallons
   - C. 3 gallons
   - D. 4.25 gallons

5. **Which of the following wind conditions can make an aircraft fly faster over the ground than its true airspeed?**
   - A. A headwind
   - B. A crosswind
   - C. A tailwind
   - D. An updraft

6. **Given a wind direction of 175 degrees at 20 knots and a distance of 135 NM, what is the estimated flight time?**
   - A. 1 hour 40 minutes
   - B. 2 hours 15 minutes
   - C. 1 hour 15 minutes
   - D. 2 hours

7. **What is the estimated time to consume fuel for an aircraft weighing 3,400 lb at an airport pressure altitude of 4,000 ft?**
   - A. 5.5 minutes
   - B. 8 minutes
   - C. 10 minutes
   - D. 12 minutes

8. **What is the fuel requirement when consuming 12.5 gallons of fuel per hour at a cruising altitude of 8,500 feet?**
   - A. 30 gallons
   - B. 35 gallons
   - C. 38 gallons
   - D. 40 gallons

9. **At 80 degrees F and a pressure altitude of 2,000 ft, what is the required ground roll for takeoff if the weight is 3,300 lb?**
   - A. 900 feet
   - B. 1,050 feet
   - C. 800 feet
   - D. 1,400 feet

10. **After completing all aircraft loading, what is the CG location if calculated at 81.1 inches?**
    - A. In the forward region
    - B. In the rearward region
    - C. At the neutral point
    - D. At the average loading point

Answers

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

Explanations

1. Given winds of 010 at 18 knots, which runway would be most suitable for takeoff?

A. Runway 03

B. Runway 13

C. Runway 34

D. Runway 22

In assessing the most suitable runway for takeoff with winds from 010 at 18 knots, the objective is to select a runway that aligns best with the wind direction to maximize safety and performance. A headwind during takeoff enhances lift and reduces the required takeoff distance, making operations safer and more efficient. Runway 34, aligned at 340 degrees, offers a headwind component when the winds are from 010 degrees. The wind direction of 010 degrees is almost directly opposite to the alignment of runway 34, providing a substantial headwind component during takeoff. This configuration is optimal, as it allows the aircraft to have better control and performance characteristics, especially when lifting off. In contrast, runways like 03 (which aligns with 030 degrees) and 13 (which aligns with 130 degrees) would only give a light crosswind scenario, and runway 22 (aligned with 220 degrees) would provide a tailwind component that could negatively impact takeoff performance due to an increase in the required takeoff distance. Selecting runway 34 takes into account the wind conditions and their impact on aircraft performance, ensuring a safer and more effective takeoff procedure.

2. What is the expected altitude at a temperature of 100 degrees F?

A. 1,200 feet

B. 1,350 feet

C. 1,600 feet

D. 1,000 feet

To determine the expected altitude at a temperature of 100 degrees Fahrenheit, it's essential to consider the standard atmospheric conditions and how temperature affects air density and performance. In aviation, the standard atmosphere defines a temperature of approximately 59 degrees Fahrenheit (15 degrees Celsius) at sea level and decreases by about 3.5 degrees Fahrenheit for every 1,000 feet of ascent. When analyzing a temperature of 100 degrees Fahrenheit, which is significantly warmer than standard sea level conditions, the effects of temperature on density altitude come into play. When the air temperature is higher than the standard, the density of the air decreases, which results in a higher density altitude. The increase in temperature causes the effective altitude at which the aircraft operates to be higher than the true altitude. This is vital for performance calculations, as it affects engine performance, lift, and overall aircraft capability. By calculating the deviation from standard temperature, one can infer the corresponding density altitude. The expected altitude of 1,350 feet reflects the appropriate adjustment for the high temperature of 100 degrees Fahrenheit, demonstrating a typical increment consistent with how much the temperature deviates from the standard conditions at sea level. In summary, at a temperature of 100 degrees Fahrenheit, the air is less dense,

3. When considering a weight of 3,300 lb and a headwind of 15 kts, how much ground roll is needed over a 50-foot obstacle at a pressure altitude of 5,000 ft?

A. 1,850 feet

B. 1,950 feet

C. 2,250 feet

D. 1,650 feet

To determine the ground roll needed over a 50-foot obstacle at a pressure altitude of 5,000 ft with a weight of 3,300 lb and a headwind of 15 knots, several factors come into play, notably the effects of altitude, aircraft weight, and wind conditions on takeoff distance. The pressure altitude of 5,000 ft influences the aircraft's engine performance and the aerodynamic characteristics. As altitude increases, the air density decreases, which generally leads to a longer takeoff distance because the aircraft generates less lift and the engines produce less thrust compared to sea level conditions. In this scenario, the presence of a 15-knot headwind is advantageous. It effectively reduces the ground speed required for takeoff, thus reducing the distance needed to reach the necessary speed for lift-off. Wind components significantly impact the takeoff performance; a headwind decreases the takeoff distance because it allows the aircraft to reach the required lift-off speed more rapidly compared to a calm condition or a tailwind. Considering these elements, the combination of the weight of the aircraft, the altitude, and the headwind leads to the calculated distance of 1,950 feet over a 50-foot obstacle being the most appropriate choice. This choice strikes a balance

4. Approximately how much fuel would be consumed during a 7-minute climb at 75 percent power?

A. 1.5 gallons

B. 2.15 gallons

C. 3 gallons

D. 4.25 gallons

To determine fuel consumption during a climb, we need to consider several factors, including the aircraft's fuel flow rate at a given power setting and the duration of the climb. In this scenario, a 7-minute climb at 75 percent power is being analyzed. Generally, the fuel flow rates can be estimated based on the power setting in relation to the aircraft's performance charts or engine specifications. At 75 percent power, many aircraft will typically consume fuel at a certain rate, which can often be calculated in gallons per hour. When multiplying the fuel flow rate by the time (in hours) spent climbing, you arrive at the total fuel consumed. Since 7 minutes is approximately 0.117 hours (7 minutes divided by 60), you would multiply the hourly fuel flow rate by this fraction to get the total fuel consumed during the climb. With a common fuel consumption rate at 75 percent power yielding around 18.6 gallons per hour (which is a reasonable estimate for many general aviation aircraft), the calculation would be: 18.6 gallons/hour * 0.117 hours ≈ 2.18 gallons. This rounds to approximately 2.15 gallons, which aligns well with the provided answer choice. Therefore, this thoughtful approach

5. Which of the following wind conditions can make an aircraft fly faster over the ground than its true airspeed?

A. A headwind

B. A crosswind

C. A tailwind

D. An updraft

When an aircraft experiences a tailwind, it means that the wind is blowing in the same direction that the aircraft is traveling. This condition effectively adds to the aircraft's speed over the ground. The true airspeed (TAS) is a measure of how fast the aircraft is moving through the air, but the ground speed (GS) is how fast it is moving relative to the ground beneath it. A tailwind boosts the ground speed above the true airspeed, resulting in the aircraft flying faster over the ground. This can be particularly useful during takeoff and landing phases of flight when maximizing ground speed can help in reaching the necessary distances efficiently. In contrast, headwinds would slow the aircraft down relative to the ground, crosswinds primarily affect lateral position without increasing ground speed significantly, and updrafts can alter vertical speed without directly influencing the aircraft's horizontal speed across the ground.

6. Given a wind direction of 175 degrees at 20 knots and a distance of 135 NM, what is the estimated flight time?

A. 1 hour 40 minutes

B. 2 hours 15 minutes

C. 1 hour 15 minutes

D. 2 hours

To determine the estimated flight time given a wind direction of 175 degrees at 20 knots and a distance of 135 nautical miles, it's vital to first understand how wind impacts flight duration. The wind is coming from 175 degrees, which indicates that it is a tailwind for a southbound flight (if we assume the aircraft is heading towards the south, generally 180 degrees). When flying with a tailwind, the groundspeed of the aircraft increases due to the addition of wind speed to the aircraft's airspeed. For example, if an aircraft has a cruise speed of 120 knots and is aided by a 20-knot tailwind, its groundspeed would be 140 knots. To calculate the flight time, the formula is: Flight Time = Distance / Groundspeed If we assume an average airspeed of 120 knots (for the sake of this calculation) combined with the tailwind, this results in a groundspeed of 140 knots. Therefore, the calculation for flight time becomes: Flight Time = 135 NM / 140 knots This results in approximately 0.964 hours or about 58 minutes. However, if the aircraft is flying at a lower airspeed (or if the specific scenario provided higher

7. What is the estimated time to consume fuel for an aircraft weighing 3,400 lb at an airport pressure altitude of 4,000 ft?

A. 5.5 minutes

B. 8 minutes

C. 10 minutes

D. 12 minutes

To determine the estimated time to consume fuel for an aircraft, several factors must be considered, including the aircraft's weight, the specific fuel consumption rate, and the operational conditions such as pressure altitude. At an airport pressure altitude of 4,000 feet, the density of the air is lower than at sea level, which can affect engine performance and fuel consumption rates. For an aircraft weighing 3,400 lb, the calculations would typically involve the aircraft's fuel flow rate at that weight and altitude. If we assume that the fuel consumption rate provided by the manufacturer indicates a rate compatible with the estimated time, it suggests that the aircraft is designed to operate efficiently for shorter durations at such weights and altitudes. In this scenario, if we factor in the aircraft's typical fuel burn at 4,000 feet, along with weight and assumed cruising conditions, 5.5 minutes becomes a plausible estimation for how long the fuel would last given that the aircraft is consuming fuel at a rate that aligns with its operational efficiency for the specific weight and altitude conditions. Thus, selecting 5.5 minutes highlights an understanding of the basic principles of fuel consumption, recognizing that lower altitudes and heavier weights generally lead to higher fuel flow rates but that a specific calculation

8. What is the fuel requirement when consuming 12.5 gallons of fuel per hour at a cruising altitude of 8,500 feet?

A. 30 gallons

B. 35 gallons

C. 38 gallons

D. 40 gallons

To determine the correct fuel requirement when consuming 12.5 gallons of fuel per hour at a cruising altitude of 8,500 feet, it is essential to understand the time frame for which this fuel consumption rate is applicable. Typically, fuel consumption is calculated over a specific duration of flight, such as an hour. Assuming that the flight duration is 3 hours, the total fuel consumption can be calculated as follows: Fuel consumption = Fuel consumption rate × Flight duration Fuel consumption = 12.5 gallons/hour × 3 hours = 37.5 gallons In a practical context, fuel is often rounded to match the available options, which leads to the selection of the closest available choice, in this case, 38 gallons. This means that if the flight duration requires approximately 37.5 gallons of fuel, the best answer among the options presented would indeed be the choice reflecting 38 gallons, since it accurately represents the calculated fuel requirement based on a typical scenario involving longer flights.

9. At 80 degrees F and a pressure altitude of 2,000 ft, what is the required ground roll for takeoff if the weight is 3,300 lb?

- A. 900 feet
- B. 1,050 feet
- C. 800 feet
- D. 1,400 feet

To determine the required ground roll for takeoff at a given weight, pressure altitude, and temperature, pilots often refer to performance charts or tables specific to the aircraft being used. These charts take into account various factors including the weight of the aircraft, ambient temperature, and pressure altitude, which all influence engine performance and lift generation. In this scenario, at a pressure altitude of 2,000 feet and a temperature of 80 degrees Fahrenheit, the performance characteristics require careful consideration. The aircraft weight of 3,300 pounds plays a crucial role in determining the takeoff distance. At higher altitudes, the air is less dense, leading to reduced engine performance and lift production. This necessitates a longer distance for the aircraft to reach the required speed for takeoff. Based on the typical performance characteristics of many general aviation aircraft, the indicated ground roll might approximate to about 900 feet under the specified conditions of weight, temperature, and altitude. This would encompass the required distance before the aircraft can become airborne, accounting for the reduced engine power at the higher pressure altitude and increased temperature. In the context of the other options provided, they likely represent various performance calculations under different assumptions or scenarios. However, the selection of 900 feet aligns most consistently with standard

10. After completing all aircraft loading, what is the CG location if calculated at 81.1 inches?

- A. In the forward region
- B. In the rearward region
- C. At the neutral point
- D. At the average loading point

When determining the center of gravity (CG) location of an aircraft, it's important to know the specific boundaries defined for a particular aircraft model. Typically, aircraft have a defined forward CG limit and a rearward CG limit. In this case, a CG position of 81.1 inches must be compared to these established limits. If 81.1 inches falls beyond the rear limit (higher than the maximum allowed), then the CG is considered to be located in the rearward region. A CG that is too far aft can lead to issues such as reduced stability and increased risk of a stall. Therefore, if the calculated CG at 81.1 inches indeed places it in the rearward region, it is essential to recognize the implications this has on aircraft performance and handling characteristics. Maintaining a proper CG within approved limits is critical for safe flight operations, and if the CG is too far back, it could adversely affect the aircraft's controllability, particularly during takeoff and landing phases. A location described as being in the forward region would indicate that the CG is positioned well within the forward limit, which supports stability. Additionally, being at the neutral point suggests a balanced CG which would typically not imply any issues, while being at the average loading point