Gleim Private Pilot Flight Maneuvers

Seventh Edition, First Printing
Updates
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NOTE: Text that should be deleted is displayed with a line through it. New text is shown with a blue background.

If you are tested on any content not represented in our materials or this update, please share this information with Gleim so we can continue to provide the most complete test preparation experience possible. You can submit feedback at www.GleimAviation.com/questions. Thank you in advance for your help!

The changes described and reproduced in this update are due to the release of the FAA's revised Private Pilot Airman Certification Standards (FAA-S-ACS-6B), effective June 2018.

To view the updated ACS, go to
www.faa.gov/training_testing/testing/acs/media/private_airplane_acs.pdf

The Task reproductions at the beginning of each Part II study unit as well as each Task element within each subunit have been updated to match the FAA ACS document above. The changes also include updating the Study Unit 16 title to "Communications, Light Signals, and Runway Lighting Systems."

Information related to weather services was updated to reflect the discontinuation of DUATS. Many instances of "cockpit" were changed to "flight deck" throughout the book to reflect current terminology.

Study Unit 3 – Pilot Qualifications

Page 25, Subunit 3.1: Add new item A.5.

5. **The applicant demonstrates understanding of Part 68 BasicMed privileges and limitations.**
    a. BasicMed allows a pilot to conduct certain operations using a U.S. driver's license instead of a medical certificate as long as the pilot
        1) Has held an FAA medical certificate at any time after July 14, 2006, the most recent of which
            a) May have been a special issuance medical certificate.
                i) A one-time special issuance medical certificate must be obtained for certain cardiovascular, neurological, and mental health conditions.
            b) May be expired.
            c) Cannot have been suspended, revoked, withdrawn, or denied.
        2) Completes an approved medical education course in the preceding 24 calendar months in accordance with 14 CFR Part 68.

3) Receives a comprehensive medical examination from a state-licensed physician in the previous 48 calendar months in accordance with 14 CFR Part 68.

a) The exam is not required to be conducted by an aviation medical examiner (AME).

b. The pilot in command of an aircraft operating under BasicMed must adhere to the following limitations:

1) The aircraft

a) May not be certificated to carry more than six occupants
b) May not have a maximum certificated takeoff weight of more than 6,000 lb.
c) May carry a maximum of five passengers on board

2) No portion of the flight may be

a) Carried out above 18,000 ft. MSL

b) Conducted outside the United States unless authorized by the country in which the flight is conducted

c) Carried out at an indicated airspeed greater than 250 kt.

3) The pilot must have available in his or her logbook (in paper or electronic format)

a) The completed medical examination checklist
b) The medical education course completion certificate

Pages 26-27, Subunit 3.2: Delete items A.2. and A.3. and renumber item A.4. as item A.2.

Study Unit 5 – Weather Information

Page 53, Subunit 5.1: Add new item A.3.b.7).

7) Mountain wave occurs when stable air crosses a mountain barrier. Air flowing up the windward side is relatively smooth, and the wind across the barrier tends to flow in layers.

a) It is called mountain wave because the barrier may set up waves in these layers.

i) The wave pattern may extend 100 mi. or more downwind from the barrier.

b) Wave crests may be marked by stationary almond- or lens-shaped clouds known as standing lenticular clouds.

c) Wave crests extend well above the highest mountain. Under each wave crest is a rotary circulation.

i) The rotor forms below the elevation of the mountain peaks. Turbulence can be violent in these rotors.

ii) Updrafts and downdrafts in the waves can also create violent turbulence.

Page 68, Subunit 5.2: Add new item A.1.c.

c. **Hazardous Weather Conditions, Including Known or Forecast Icing or Turbulence Aloft**

1) Some situations that increase risk include unforecast en route weather conditions with heavy rain, icing, turbulence, and fuel capacity concerns due to higher than forecast headwinds or deteriorating weather at your destination airport.

2) A close temperature-dew point spread indicates the probable formation of visible moisture in the form of dew, mist, fog, or clouds. The decrease in temperature (most frequently at night) can result in a close temperature-dew point spread and fast forming fog.

3) Having a suitable alternate airport on your IFR flight plan helps mitigate risk involved in flying your planned IFR flight.

4) Thinking about the whole IFR flight helps to mitigate the risk involved in your planned flight.

   a) This includes checking for weather along the whole route of flight, not just your destination airport.

   b) The pilot must always be thinking of an “escape route” if the weather becomes too hazardous to continue the flight to the planned destination airport.

5) The best way to mitigate risks encompassing known or forecast icing conditions or turbulence is by knowing what weather products and resources are available to you as you plan and execute your IFR flight.

   a) After reviewing all the available information on icing conditions and turbulence for your flight, you can make a go/no-go decision.

   b) Freezing-level graphics are used to assess the lowest freezing-level heights and their values relative to flight paths.

   c) AIRMETs will state the forecast areas of expected icing and turbulence.

      i) AIRMET ZULU describes moderate icing and freezing-level heights.
      ii) AIRMET TANGO describes areas of moderate turbulence.

   d) The low-level significant weather prog will depict the forecast freezing levels and areas of turbulence.

   e) G-AIRMET snapshots are graphical forecasts of en route weather hazards, including areas of moderate airframe icing, freezing levels, and moderate turbulence.

   f) The CIP/FIP product suite can assist in determining the probability for icing, the intensity of icing, and the threat for SLD.

   g) When mitigating the risks involved with icing conditions and turbulence, the pilot can also use any available PIREPs for up-to-date information.

Pages 71-72, Subunit 5.3: Move the content from item A.3. to item A.1. as items d.-v. and edit as follows. Delete item A.3.

~~a.~~ d. Every planned flight requires a go/no-go decision. To be able to make a decision based on weather conditions, you must first understand the overall weather situation and the dangers associated with the flight environment.

~~b.~~ e. The best way to ensure a safe decision is made every time is to create personal minimums.

~~c.~~ f. To use personal minimums as part of the weather-related decision-making process, compare the current and forecast weather to the personal minimums you have set.

1) If the weather is better than your minimums, you are a “go.”
2) If the weather is below your minimums, you are a “no-go” for weather reasons.

~~d.~~ g. Your evaluator will want to see how you make the go/no-go decision.

1) You may be given a specific scenario that will require you to make that decision.
2) Coming into the practical test with a set of personal minimums will show the evaluator that you are prepared and safety conscious.

~~e.~~ h. Competent go/no-go decisions are made by the correct interpretation of the most up-to-date weather data from reliable weather sources.

~~f.~~ i. A good weather briefing begins with developing a total awareness of the overall big picture before obtaining a detailed or standard briefing.

~~g.~~ j. Many pilots start by monitoring weather patterns through commercial television, such as The Weather Channel, several days before the flight.

~~h.~~ k. The day or evening before the flight, pilots may wish to obtain an outlook briefing from FSS or electronically from ~~a Direct User Access Terminal System (DUATS)~~ an official weather source such as www.1800wxbrief.com. You may choose to download weather and forecast charts from the Internet.

~~1) Use official weather sources such as www.duats.com or www.1800wxbrief.com.~~

~~i.~~ l. When using ~~DUATS or any other weather~~ Internet weather sources, contact FSS to clarify any information you do not fully understand.

~~j.~~ m. As close to departure time as possible, call FSS ~~or log on to DUATS~~ for a standard briefing.

~~k.~~ n. When using weather products on the Internet or via other sources, first make sure that the menu of products is suitable for aviation use and the products are current.

~~l.~~ o. If you obtain a standard briefing several hours before the flight or when the weather is questionable, it is a good practice to call an FSS for an abbreviated briefing just before takeoff.

~~m.~~ p. If you are already in flight and need to obtain a standard briefing or update a previous briefing ~~in flight~~, contact FSS on 122.2 MHz. Advise the specialist of the type of briefing you require (standard, abbreviated, etc.) and provide appropriate background information. The specialist will then provide information as specified in the type of briefing you requested. PIREPs are a valuable source of in-flight weather information to help provide you with real-time weather information from other pilots.

~~n.~~ q. Advanced avionics ~~cockpit~~ flight deck weather systems are designed to enhance safety–not to extend the limits of flight operations. The pilot must be able to evaluate weather conditions from the data presented during the flight. The pilot must consider all of the details of a display, especially refresh rates and delays from data acquisition to presentation, to make en route weather decisions.

~~o.~~ r. HIWAS, SIGMETs, and Center Weather Advisories (CWAs) combined with automated ~~cockpit~~ flight deck weather can help you make in-flight diversion decisions.

~~p.~~ s. Destination/terminal area arrival weather can be obtained via radio and/or datalink from FSS, UNICOM, ATIS, AWOS/ASOS, and terminal area datalink and can be used to help make diversion decisions in a timely manner.

~~q.~~ t. On-board data is never an adequate substitute for a timely and thorough en route weather briefing from an FSS, but it can aid you in seeing the “big picture” of where VFR conditions exist to maintain awareness of potential landing sites in the event that a diversion is necessary.

~~r.~~ u. With the availability of weather information ~~in~~ on the ~~cockpit~~ flight deck, a common pitfall is that the pilot can be tempted to skip the preflight weather briefing. Do not use advanced avionics weather data systems as a substitute for a pre-flight weather briefing. Always contact FSS at 1-800-WX-BRIEF for a standard weather briefing before departure to aid in your go/no-go decision.

~~s.~~ v. Another common pitfall ~~is if,~~ while flying en route~~,~~ is that the pilot does not clarify hazardous or adverse conditions from FSS and uses weather information that is not as current as that provided from FSS in weather decision making.

Study Unit 6 – Cross-Country Flight Planning

Page 74, Subunit 6.1: Add new item A.1.f.

f. When planning a route of flight, you must consider what navigational facilities will be available along the route. NOTAMs should be reviewed during the planning process to check for VORs that are out of service, areas where GPS will not be available, etc.

Study Unit 7 – National Airspace System

Page 100, Subunit 7.3: Add new item A.3. and move items A.1.b.- A.1.c. to be items A.3.a.- A.3.b.

3. **The applicant demonstrates the ability to explain the requirements for operating in SUA or within a TFR and to explain SATR and SFRA operations, if applicable.**

~~b.~~ a. Use your knowledge to apply pertinent operations and requirements to account for SUA, SFRAs, SATRs, and TFRs.

~~c.~~ b. Explain to your evaluator how you determine these airspace areas and how you would remain clear of them or obtain permission to enter.

Study Unit 9 – Operation of Systems

Page 112, Subunit 9.1: Add new NOTE under item A.1.

NOTE: If this element is selected for testing, the evaluator must assess the applicant’s knowledge of at least three of the following sub-elements.

Study Unit 10 – Human Factors

Page 124, Subunit 10.1: Add new NOTE under item A.1.

NOTE: If this element is selected for testing, the evaluator must assess the applicant’s knowledge of at least three of the following sub-elements.

Page 126, Subunit 10.1: Revise item A.1.f.

f. **Carbon monoxide poisoning** causes **hypemic hypoxia**, which occurs because of a reduced ability of the blood to carry oxygen.

1) Even though there is an adequate supply of oxygen to breathe, the blood's capacity to carry oxygen to the cells is impaired.

2) Anemia, hemorrhage, hemoglobin abnormalities, sulfa drugs, and nitrites can also result in hypemic hypoxia.

3) Carbon monoxide is a colorless, odorless, and tasteless gas contained in exhaust fumes and tobacco smoke. ~~1)~~ When inhaled even in minute quantities over a period of time, it can significantly reduce the ability of the blood to carry oxygen.

a) Consequently, the effects of hypoxia occur.

~~2)~~ 4) Most heaters in light aircraft work by air flowing over the exhaust manifold.

[. . .]

Study Unit 14 – Taxiing

Pages 180-181, Subunit 14.1: Revise item A.6.b.

b. ~~Taxiing is the controlled movement of the airplane under its own power while on the ground.~~ **Radio Communications Procedures**

~~1) Taxiway centerline and edge markings are yellow.~~

~~a) When yellow taxiing centerline stripes are provided, they should be observed unless necessary to clear obstructions or airplanes.~~

~~2) Markings for runways are white.~~

~~a) Maintain runway alignment by following the white runway centerline markings.~~

~~3) Usually when operating on a soft or muddy field, you must maintain the taxi speed or power slightly above that required under normal field operations; otherwise, the airplane may come to a stop.~~

~~a)~~ 1) Special Considerations for Tower-Controlled Airports

~~i)~~ a) Acknowledge and read back all ATC instructions/clearances.

~~ii)~~ b) Write down ATC taxi instructions and make use of airport diagrams to visualize your taxi route, especially at complex and/or busy airports.

~~iii)~~ c) Hold short of all runways unless explicitly cleared by ATC to cross them.

~~iv)~~ d) Always stop and query ATC if you have questions or doubts regarding your clearance.

~~v)~~ e) Request progressive taxi instructions from ATC when unsure of the taxi route.

~~b)~~ 2) Special Considerations for Nontowered Airports

~~i)~~ a) Visually confirm the area around the aircraft is clear before moving.

~~ii)~~ b) Pay attention to local radio transmissions while taxiing to determine what other aircraft are operating in the area.

~~iii)~~ c) Transmit your intentions to let others know of your movement on the ground.

~~iv)~~ d) Do not develop the mentality that taxiing at a nontowered airport requires less mental focus than when operating at a tower-controlled airport.

~~c) Use a standard clearing procedure before initiating movement on the surface.~~

~~i) Look to your left, scan the area for other traffic, and announce "clear left" if it is in fact clear.~~

~~ii) Repeat this same procedure for both the front and right of the aircraft.~~

~~iii) Check for traffic before crossing any runway hold line and before entering a taxi.~~

~~d) Make use of airport diagrams for unfamiliar airports.~~

~~i) Know your intended taxi route, but also be aware of other ramp areas, common entry/exit points from ground vehicles, and points where you can safely stop the aircraft so as not to inconvenience other traffic.~~

~~e) Review NOTAMs for information on runway/taxiway closures and construction areas.~~

~~f) Turn on aircraft lights and the rotating beacon or strobe lights while taxiing.~~

Page 184, Subunit 14.2: Add new item A.3.

3. **The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing a taxi route or departure runway change.**

a. A change in taxi route or departure runway can create the opportunity for pilot deviations or runway incursions.

1) Acknowledge and read back all ATC instructions/clearances.
2) Stop and write down ATC instructions. Do not attempt to write while taxiing.
3) Always verify with ATC if you are unsure of the new taxi route.
4) Review an airport diagram to familiarize yourself with the new route before you resume taxiing.

Pages 185-189, Subunit 14.3: Reorder to match the FAA's revised ACS. No content needs to be added or deleted.

Study Unit 15 – Before Takeoff Check

Page 198, Subunit 15.3: Revise items A.2.d.1)d) and A.3.a.

d) Abort point: Establish an abort point prior to takeoff~~. Abort if you haven't achieved 70% takeoff speed by the runway midpoint~~ based on the required ground roll distances from the appropriate performance charts.

e) After liftoff: Once the information above is determined, brief your plan for an engine failure during and after takeoff.

3. **The applicant demonstrates the ability to properly position the airplane while considering other aircraft, vessels, and wind.**

a. As you ~~taxi to the active runway~~ arrive at the area to perform your pretakeoff check, turn your airplane somewhat diagonal to the runway so you will not prop blast any aircraft behind you.

Study Unit 16 – Communications, ~~and~~ Light Signals, and Runway Lighting Systems

Page 210, Subunit 16.1: Add new item A.9.

9. **The applicant demonstrates understanding of runway status lighting systems.**
   a. The Runway Status Lights (RWSL) System is designed to provide a direct indication, using warning lights on runways and taxiways, that it is unsafe to enter a runway, cross a runway, or take off from or land on a runway when the system is activated.
      1) Runway status lights are red in color and indicate runway status only.
      2) They do not indicate clearance to enter a runway or clearance to take off.

Section IV: Takeoffs, Landings, and Go-Arounds

Page 251: Revise item O.2.

2. Prior to takeoff, determine and mark your takeoff abort point–exactly where you will cut power if not airborne–based on the required ground roll distances from the appropriate performance charts.
   ~~a. Seventy-five percent of V_R by the halfway point on the runway is a general rule.~~

Page 254: Revise item T.9.b.

b. Determine and mark your takeoff abort point–exactly where you will cut power if not airborne–based on the required ground roll distances from the appropriate performance charts.
   ~~1) Seventy-five percent of V_R by the halfway point on the runway is a general rule.~~

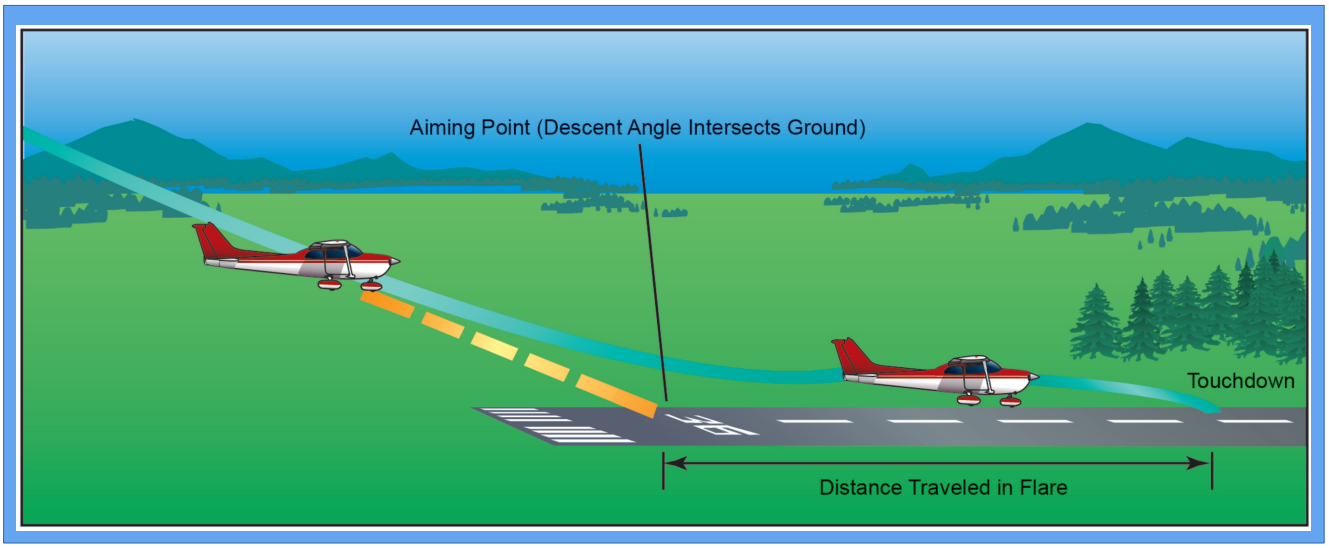
Study Unit 19 – Normal Approach and Landing

Page 279, Subunit 19.3: Replace the content of item A.5.

5. **The applicant demonstrates the ability to consider the wind conditions, landing surface, and obstructions, and to select a suitable touchdown point ~~(ASES, AMES)~~.**
   a. ~~This is a seaplane task item, and it is not covered in this text.~~ You must know the wind conditions and the effect they will have on your airplane's approach and landing performance.
      1) A headwind will decrease the landing distance, while a tailwind will greatly increase the landing distance.
   b. The landing surface conditions or runway surface type will affect the total landing distance.
      1) A surface other than a paved one, such as turf, gravel, or grass, will not provide as much traction as a hard-surface runway.
      2) The effects of a soft or wet runway can make an otherwise routine crosswind landing hazardous when one main wheel touches down before the other main wheel.
   c. During your approach, look for any hazards or obstructions and then evaluate how they may affect your approach and selection of a suitable touchdown point.

d. After considering the conditions and environment, select the most suitable touchdown point.

1) With the touchdown point chosen, select your aim point. The aim point will be the point at the end of your selected glide path, not your touchdown point. Thus, your aim point will be short of your touchdown point. It is the point where your flare begins.



Page 288, Subunit 19.3: Revise item A.10.

10. **The applicant demonstrates the ability to touch down ~~at the speed recommended by the manufacturer~~ at a proper pitch attitude, within 400 ft. beyond or on the specified point, with no side drift, and with the airplane's longitudinal axis aligned with and over the runway center/landing path.**

a. ~~At the point of touchdown, the airplane should be at a speed that is no longer capable of generating aerodynamic lift.~~ The touchdown is the gentle settling of the airplane onto the landing surface.

b. ~~Touch down smoothly at the approximate stalling speed in the landing configuration.~~ The touchdown should be made within 400 ft. of the intended landing point.

1) ~~However, due to ground effect and the operating weight of the airplane, the speed at touchdown may actually be slightly lower than the stall speed marked on the airspeed indicator.~~ This is accomplished by properly selecting an aiming point and adjusting the descent rate throughout the approach.

2) ~~You may hear the stall warning horn before touchdown, which is normal as the airplane is flying at a high angle of attack~~. The floating characteristics of each airplane type will be different, so it is important to be familiar with your aircraft when planning where to land.

c. It is extremely important that the touchdown occur with the airplane's longitudinal axis exactly parallel to the direction in which the airplane is moving along the runway.

1) Failure to accomplish this imposes severe side loads on the landing gear.

2) To avoid these side stresses, do not allow the airplane to touch down while turned into the wind or drifting.

3) Make adjustments with the rudder and ailerons to keep the nose centered down the runway.

Study Unit 20 – Soft-Field Takeoff and Climb

Page 308, Subunit 20.3: Add new item A.6.b. and redesignate subsequent items accordingly.

b. While taxiing onto the runway, the flight controls should be held in the proper position.

1) Full back pressure should be applied to the yoke. This will allow support of the airplane's weight to transfer from the wheels to the wings as the takeoff roll proceeds.

2) Flaps should be lowered according to the manufacturer's recommendations.

Study Unit 23 – Short-Field Approach and Landing

Page 342, Subunit 23.3: Delete item A.10. and redesignate subsequent items accordingly.

Study Unit 24 – Forward Slip to a Landing

Page 352, Subunit 24.2: Add new items A.8. and A.9.

8. **The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing surface contact with the airplane's longitudinal axis misaligned.**

a. It is extremely important that the touchdown occur with the airplane's longitudinal axis exactly parallel to the direction in which the airplane is moving along the runway.

1) Failure to accomplish this imposes severe side loads on the landing gear.

2) To avoid these side stresses, do not allow the airplane to touch down while turned into the wind or drifting.

3) Make adjustments with the rudder and ailerons to keep the nose centered down the runway.

9. **The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing an unstable approach.**

a. For information on stabilized approach, see Section IV Introduction, item D., beginning on page 239.

Page 354, Subunit 24.3: Add new item A.9.

9. **The applicant demonstrates the ability to maintain a ground track aligned with the runway center/landing path.**

a. For information on maintaining a ground track aligned with the runway center/landing path, see item 8. above.

Study Unit 25 – Go-Around/Rejected Landing

Page 362, Subunit 25.3: Revise item A.4.b.

b. ~~You should~~ Level the wings and simultaneously ~~release the~~ increase right rudder pressure while ~~re~~adjusting the pitch attitude to the normal ~~glide~~ climb attitude. ~~If the pressure on the rudder is released abruptly, the nose will swing too quickly into line and the airplane will tend to acquire excess speed.~~

Page 363, Subunit 25.3: Move items a.-b. from item A.6. to item A.5. as items b.-c. Remove item A.6. and renumber subsequent items accordingly.

Study Unit 26 – Steep Turns

Pages 372-373, Subunit 26.1: Revise and combine items A.2.d. and A.2.f. Delete item A.3.

d. **Load Factor and Accelerated Stalls**

1) At the same gross weight, airplane configuration, CG location, power setting, and environmental conditions, a given airplane consistently stalls at the same indicated airspeed provided the airplane is at +1G (i.e., steady-state unaccelerated flight).

a) However, the airplane can also stall at a higher indicated airspeed (accelerated stall) when the airplane is subject to an acceleration greater than +1G, such as when performing a steep turn.

b) An accelerated stall can occur inadvertently during an improperly executed steep turn.

c) As the bank angle increases in level flight, the margin between stalling speed and maneuvering speed decreases.

i) This is due to an increase in load factor. As load factor increases, so does the stalling speed.

ii) Stalling speed increases at the square root of the load factor.

d) In a level altitude, 45° banked turn, the resulting load factor is 1.4; in a level altitude, 60° banked turn, the resulting load factor is 2.0.

i) With a load factor of 2.0, the effective weight of the aircraft will double.
ii) Load factors increase dramatically beyond 60° of bank.

~~c)~~ e) Because of the higher load factors during a steep turn, they should be performed at an airspeed that does not exceed the airplane's design maneuvering speed (V_A) or the manufacturer's recommended speed.

i) As the load factor increases, remember that so does the stalling speed.

- For example, if an airplane stalls in level flight at 50 knots, it will stall at 60 knots in a level altitude, 45° banked turn, and at 70 knots in a level altitude, 60° banked turn.
- As the bank angle increases in level flight, the margin between stalling speed and maneuvering speed decreases.

~~d)~~ f) During steep turns, it is not uncommon for a pilot to allow the nose to get excessively low, resulting in a significant loss in altitude in a very short period of time.

i) The recovery sequence requires that the pilot first reduce the angle of bank with coordinated use of opposite aileron and rudder and then increase the pitch attitude by increasing elevator back pressure.

ii) If recovery from an excessively nose-low, steep bank condition is attempted by use of the elevator only, it only causes a steepening of the bank and unnecessary stress on the airplane.

iii) The increased back elevator pressure increases the AOA, which increases the lift and thus the G load, which may lead to an accelerated stall.

~~e)~~ g) Take recovery action at the first indication of a stall by applying forward elevator pressure as required to reduce the AOA and to eliminate the stall warning, level the wings using ailerons, coordinate with the rudder, and adjust power as necessary.

e. **Rate and Radius of Turn**

1) The rate of turn at any given true airspeed depends on the horizontal lift component. The horizontal lift component varies in proportion to the amount of bank. Therefore, the rate of turn at a given true airspeed increases as the angle of bank is increased.

a) A steeper bank angle will result in a higher rate of turn.
b) The rate of turn will decrease if the bank angle decreases.

2) When a turn is made at a higher true airspeed at a given bank angle, the inertia is greater and the horizontal ~~life~~ lift component required for the turn is greater, causing the turning rate to become slower. Therefore, at a given angle of bank, a higher true airspeed will make the radius of turn larger because the airplane will be turning at a slower rate.

~~f. **Effect of Bank Angle on Stalls**~~

~~1) As the bank angle increases in level flight, the margin between stalling speed and maneuvering speed decreases.~~

~~a) This is due to an increase in load factor. As load factor increases, so does the stalling speed.~~

~~b) Stalling speed increases at the square root of the load factor.~~

~~2) In a level altitude, 45° banked turn, the resulting load factor is 1.4; in a level altitude, 60° banked turn, the resulting load factor is 2.0.~~

~~a) With a load factor of 2.0, the effective weight of the aircraft will double.~~
~~b) Load factors increase dramatically beyond 60°.~~

Study Unit 27 – Ground Reference Maneuvers

Page 386, Subunit 27.3: Add new NOTE under item A.3.

NOTE: The evaluator must select at least one maneuver for the applicant to demonstrate.

Study Unit 29 – Navigation Systems and Radar Services

Page 431, Subunit 29.2: Add new item A.4.

4. **The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing loss of a navigation signal.**

a. Normally, GPS signal is expected to be available continuously worldwide.

1) However, when there are fewer than 24 operational satellites, GPS navigational capability may not be available at certain geographic locations.

2) Loss of signal may also occur in valleys surrounded by high terrain and any time the aircraft's GPS antenna is blocked by the aircraft's structure.

b. It is important to check the status of the GPS signal periodically.

1) The GPS receiver verifies the integrity (usability) of the satellite signals received through RAIM to determine if a satellite is providing correct information.

2) RAIM needs a minimum of five satellites in view or four satellites and a barometric altimeter.

a) Without RAIM capability, the pilot has no assurance of the accuracy of the GPS position.

b) A notification should be displayed on your GPS if RAIM is lost, but each unit is different and you should be familiar with how your GPS operates.

Study Unit 33 – Power-Off Stalls

Page 478, Subunit 33.3: Revise items A.9. and A.10.

9. **The applicant demonstrates the ability to ~~retract the flaps to the recommended setting and retract the landing gear, if retractable, after a positive rate of climb is established~~ configure the airplane as recommended by the manufacturer and accelerate to V_X or V_Y.**

   a. Flaps should be partially retracted to reduce drag during recovery from the stall.

      1) Follow the procedures in your POH/AFM.

   b. Landing gear (if retractable) should be retracted after a positive rate of climb has been established on the vertical speed indicator.

   c. Allow your airplane to accelerate to V_Y before you make the final flap retraction.

10. **The applicant demonstrates the ability to ~~accelerate to V_X or V_Y speed before the final flap retraction and~~ return to the altitude, heading, and airspeed specified by the evaluator.**

    ~~a. Allow your airplane to accelerate to V_Y before you make the final flap retraction.~~
    ~~b.~~ a. Return to the altitude, heading, and airspeed, as specified by your evaluator.

Study Unit 34 – Power-On Stalls

Pages 487-488, Subunit 34.3: Revise items A.9. and A.10.

9. **The applicant demonstrates the ability to ~~retract the flaps to the recommended setting, if applicable, and retract the landing gear, if retractable, after a positive rate of climb is established~~ configure the airplane as recommended by the manufacturer and accelerate to V_X or V_Y.**

   a. The ~~wing~~ flaps normally will be set to simulate a stall during a short-field takeoff or retracted to simulate a stall during a normal takeoff and/or climb.

      1) If flaps are extended, retract them to the setting recommended by your POH/AFM.

         a) Do not extend the flaps if they are retracted.

   b. A power-on stall is normally performed with the landing gear retracted (if retractable).

      1) If you have the gear down, it should be retracted only after you have established a positive rate of climb on the vertical speed indicator.

   c. Make the final flap retraction only after your airplane has accelerated to V_X or V_Y (whichever is appropriate).

10. **The applicant demonstrates the ability to ~~accelerate to V_X or V_Y speed before the final flap retraction and~~ return to the altitude, heading, and airspeed specified by the evaluator.**

    ~~a. Make the final flap retraction only after your airplane has accelerated to V_X or V_Y (whichever is appropriate).~~
    ~~b.~~ a. Promptly return to the altitude, heading, and airspeed as specified by the evaluator.

Study Unit 42 – Emergency Descent

Page 572, Subunit 42.3: Add new item A.5. and renumber the subsequent item accordingly.

5. **The applicant demonstrates the ability to maintain appropriate airspeed, +0/–10 knots, and level off at a specified altitude, ±100 feet.**

   a. The appropriate airspeed as defined in Section 3, Emergency Procedures, of your POH/AFM should be maintained throughout the descent.

      1) You should not allow airspeed to pass the never-exceed speed (V_{NE}). You should not exceed any other limitations depending on your airplane's configuration (e.g., V_{LE}, V_{FE}, etc.).

Study Unit 43 – Emergency Approach and Landing (Simulated)

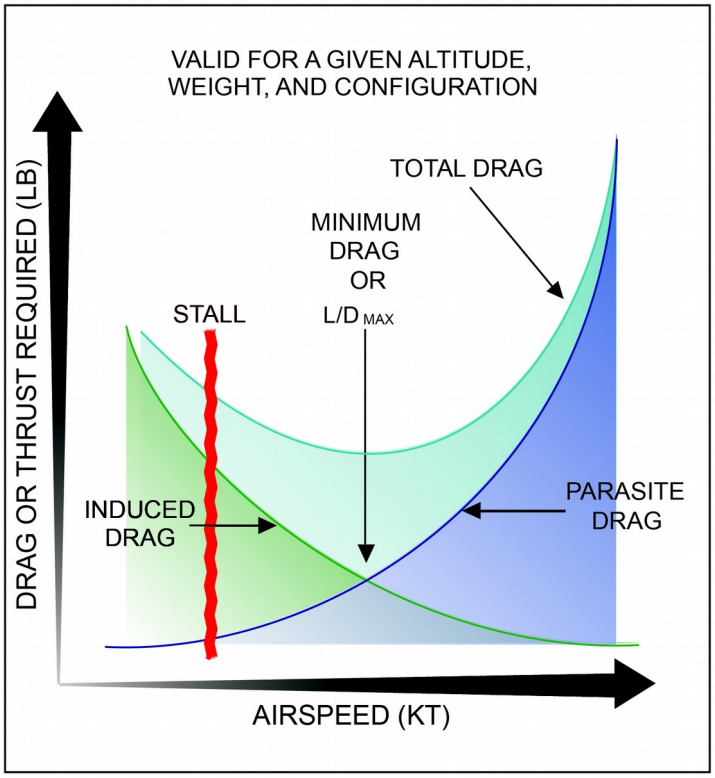
Pages 576-579, Subunit 43.1: Add new item A.2., move most of the content from item A.1. to the new item A.2., and renumber subsequent items accordingly.

1. **The applicant demonstrates understanding of immediate action items and emergency procedures~~, including (a) airspeed, including the importance of best glide speed and its relationship to distance, and (b) the difference between best glide speed and minimum sink speed~~.**

   a. For information on emergency procedures, see Section IV Introduction, item W., beginning on page 258.

2. **The applicant demonstrates understanding of airspeed, including (a) the importance of best glide speed and its relationship to distance, (b) the difference between best glide speed and minimum sink speed, and (c) the effects of wind on glide distance.**

   ~~b.~~ a. **Best glide airspeed (V_{GLIDE})** is the airspeed that provides the best lift/drag (i.e., L/D_{MAX}) ratio angle of attack in a power-off glide. It will allow the airplane to glide the farthest.



~~c.~~ b. The airspeed at which minimum drag occurs is the same airspeed at which the maximum lift/drag ratio (L/D_{MAX}) takes place.

1) At this point, the least amount of thrust is required for level flight.
2) Many important items of airplane performance are obtained in flight at L/D_{MAX}, including
    a) Maximum range.
    b) Maximum power-off glide range. Thus, the airspeed for L/D_{MAX} is the airplane's best glide airspeed.
3) Flight below L/D_{MAX} produces more drag and requires more thrust to maintain level flight.

~~d.~~ c. Best glide speed is the speed at which the airplane will travel the greatest forward distance for a given loss of altitude in still air. This speed corresponds to an angle of attack resulting in the least drag on the airplane and giving the best lift-to-drag ratio (L/D_{MAX}).

1) Any speed other than the best glide speed results in more drag and will result in a proportionate change in glide ratio.

~~e.~~ d. To glide and stay in the air as long as possible (to either fix a problem or to communicate intentions and prepare for a forced landing), the minimum sink speed (the airspeed at which the airplane loses altitude at the lowest rate) is what you need to maintain.

1) Minimum sink speed is rarely found in a POH/AFM, but it will be a little slower than maximum glide range speed.
2) To identify minimum sink speed (with an instructor), start at V_Y (or the manufacturer's recommended best glide speed) with power off and note speed vs. sink rate as you adjust pitch to reduce airspeed.
    a) The highest speed forward that gives you the lowest rate of descent is the minimum sink speed (at that particular weight).
3) The decision to fly at best glide speed or minimum sink rate depends on what you are trying to do: go the farthest distance or stay in the air the longest.

e. Wind affects the gliding distance and will require corrections to reach the intended point of landing.

1) An airplane has a higher groundspeed and glides farther with a tailwind.
2) An airplane has a lower groundspeed and glides a shorter distance with a headwind.
3) Due to the lower groundspeed and stopping distance required, a forced landing should be made into a headwind if possible.

Study Unit 47 – After Landing, Parking, and Securing

Page 627, Subunit 47.2: Add new item A.4.

4. **The applicant demonstrates the ability to identify, assess, and mitigate risks encompassing disembarking passengers.**

a. Before any passengers disembark from the airplane, you should brief them on how to safely walk from the plane to the FBO.

1) If necessary, help passengers step out of the airplane to avoid injury.
2) Walk with your passengers to the FBO.
3) Keep an eye out for any suspicious activity and ensure your passengers comply with your instructions.

Page 628, Subunit 47.3: Delete item A.4. and renumber subsequent items accordingly.