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**Summary of Maneuvers**  
**Private Pilot Airman Certification Standards (ASEL)**

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***Traffic Patterns***

- (1) Exhibit knowledge of the elements related to traffic patterns at controlled and uncontrolled fields.
- (2) Comply with proper traffic pattern procedures and maintain adequate spacing.
- (3) Correct for wind drift to maintain proper ground track.
- (4) Maintain Traffic Pattern Altitude +/- 100 feet.
- (5) Maintain Appropriate Airspeed +/- 10 knots.

***Normal and Crosswind Takeoffs and Climbs***

- (1) Position controls for existing wind conditions.
- (2) Maintain directional control and proper wind drift correction.
- (3) Lift off at recommended airspeed and accelerate to  $V_y$ .
- (4) Establish pitch attitude to maintain airspeed at  $V_y +10/-5$  knots.
- (5) Retract flaps (and landing gear) after an appropriate positive rate of climb has been established.
- (6) Maintain  $V_y +10/-5$  knots until reaching a safe maneuvering altitude.

***Normal and Crosswind Approach and Landing***

- (1) Establish the recommended approach and landing configuration and airspeed, adjusting pitch and power as necessary.
- (2) Maintain a stabilized approach at the recommended airspeed  $+10/-5$  knots with wind gust factor applied.
- (3) Touch down smoothly at the approximate stalling speed.
- (4) Touch down at or within 400 feet beyond a specified touchdown point, without drift along the runway centerline.
- (5) Maintain directional control and crosswind correction.
- (6) Complete after landing checklist.

## ***Soft Field Takeoff and Climb***

- (1) Position controls for existing wind conditions and maximum lift (setting flaps as recommended).
- (2) Maintain directional control and proper wind drift correction.
- (3) Clear the area and taxi into the takeoff position without stopping.
- (4) Smoothly advance the throttle (in a tricycle gear airplane, raising the nosewheel from the surface).
- (5) Establish and maintain a pitch attitude that will transfer weight from the wheels to the wings as quickly as possible.
- (6) Lift off at the slowest speed possible and remain in ground effect until reaching either  $V_x$  or  $V_y$  as appropriate.
- (7) Climb out at  $V_x$  or  $V_y +10/-5$  knots as appropriate.
- (8) Retract flaps (and landing gear) after clearing any obstacles or as recommended.
- (9) Maintain  $V_y +10/-5$  knots until reaching a safe maneuvering altitude.

## ***Soft Field Approach and Landing***

- (1) Establish the recommended approach and landing configuration and airspeed, adjusting pitch and power as necessary.
- (2) Maintain a stabilized approach at the recommended airspeed  $+10/-5$  knots with wind gust factor applied.
- (3) Touch down softly without drift along the runway centerline.
- (4) Maintain directional control and crosswind correction.
- (5) Complete after landing checklist.

## ***Short Field Takeoff and Maximum Performance Climb***

- (1) Position controls for existing wind conditions and maximum lift (setting flaps as recommended).
- (2) Clear the area and taxi into position using all available takeoff area.
- (3) Apply brakes while advancing throttle smoothly to takeoff power. (Release brakes and begin takeoff roll after maximum power has been achieved.)
- (4) Lift off at recommended airspeed and climb out at recommended obstacle clearance airspeed or  $V_x$ .
- (5) Establish a pitch attitude that will maintain  $V_x +10/-5$  knots until the obstacle is cleared.
- (6) After clearing the obstacle, accelerate to  $V_y$  and maintain  $V_y +10/-5$  knots during the climb to a safe maneuvering altitude.
- (7) Retract flaps (and landing gear) after clearing any obstacles or as recommended.

## ***Short Field Approach and Landing***

- (1) Consider the wind conditions, landing surface, and obstructions to select the most suitable touchdown point.
- (2) Establish the recommended approach and landing configuration and airspeed, adjusting pitch and power as necessary.
- (3) Maintain a stabilized approach at the recommended airspeed  $+10/-5$  knots with wind gust factor applied.
- (4) Touch down smoothly on the centerline at minimum control airspeed at or within 200 feet beyond the selected touchdown point, maintaining directional control and crosswind correction.
- (5) Apply brakes to stop in the shortest distance consistent with safety.
- (6) Complete after landing checklist.

## ***Forward Slip to a Landing***

- (1) Select a suitable touchdown point.
- (2) Establish a slip attitude at a point from which a landing can be made using the recommended approach and landing configuration and airspeed.
- (3) Maintain a ground track along the runway centerline.
- (4) Touch down smoothly (aligned with the runway centerline) at the approximate stalling speed at or within 400 feet beyond the specified touchdown point, maintaining directional control and crosswind correction.
- (5) Complete after landing checklist.

## ***Go Around/Rejected Landing***

- (1) Make a timely decision to discontinue the approach.
- (2) Apply takeoff power immediately and transition to a climb pitch attitude for  $V_y$ , maintaining  $V_y +10/-5$  knots.
- (3) Retract landing gear and flaps as appropriate.
- (4) Maneuver to the side of the runway, parallel to the centerline for traffic avoidance.
- (5) Maintain  $V_y +10/-5$  knots until reaching a safe maneuvering altitude.

## ***Steep Turns***

- (1) Establish the recommended airspeed or a safe airspeed not to exceed  $V_a$ .
- (2) Roll into a coordinated 360° turn maintaining 45° of bank.
- (3) Divide attention between control, orientation, (and traffic avoidance).
- (4) Maintain the entry altitude  $\pm 100$  feet, airspeed  $\pm 10$  knots, and bank angle  $\pm 5^\circ$ .
- (5) Roll out on the entry heading  $\pm 10^\circ$ .

## ***Ground Reference Maneuvers***

- (1) Enter the maneuver on the downwind (i.e. with the wind at your back).
- (2) Begin the maneuver at an altitude between 600 and 1000 feet above ground level.
- (3) Apply adequate wind drift correction to maintain ground track during the maneuver.
- (4) Divide attention between aircraft control, ground track, (and traffic avoidance) while maintaining coordinated flight.
- (5) Maintain altitude  $\pm 100$  feet and airspeed  $\pm 10$  knots.

## ***Maneuvering During Slow Flight***

- (1) Select an altitude that will allow the task to be completed no lower than 1,500 feet AGL.
- (2) Establish and maintain an airspeed at which any change in angle of attack, increase in load factor, or reduction of power will result in an immediate stall warning.
- (3) Accomplish coordinated straight and level flight, climbs and descents, and turns with any flap configurations.
- (4) Divide attention between airplane control and orientation.
- (5) Maintain the specified altitude  $\pm 100$  feet, specified heading  $\pm 10^\circ$ , airspeed  $\pm 10/-0$  knots and specified angle of bank  $\pm 10^\circ$ .

## ***Power-Off Stalls***

- (1) Select an altitude that will allow the task to be completed no lower than 1,500 feet AGL.
- (2) Establish a stabilized descent in the approach and landing configuration.
- (3) Transition smoothly to a pitch attitude that will induce a stall.
- (4) In straight and level flight, maintain heading  $\pm 10^\circ$  and bank angle not to exceed  $20^\circ$  while inducing the stall.
- (5) In turning flight, maintain a bank angle not to exceed  $10^\circ$  while inducing the stall.
- (6) Recover promptly by lowering the nose to reduce angle of attack, increasing power to the maximum allowable power setting, and return to straight and level flight with a minimum loss of altitude.
- (7) Retract flaps (and landing gear) after a positive rate of climb has been established.
- (8) Accelerate to  $V_x$  or  $V_y$  before final flap reduction.

## ***Power-On Stalls***

- (1) Select an altitude that will allow the task to be completed no lower than 1,500 feet AGL.
- (2) Establish takeoff or departure configuration with power set to no less than 65% of available power.
- (3) Transition smoothly from the departure attitude to the pitch attitude that will induce a stall.
- (4) In straight and level flight, maintain heading  $\pm 10^\circ$  and bank angle not to exceed  $20^\circ$  while inducing the stall.
- (5) In turning flight, maintain a bank angle not to exceed  $10^\circ$  while inducing the stall.
- (6) Recover promptly by lowering the nose to reduce angle of attack, increasing power to the maximum allowable power setting, and return to straight and level flight with a minimum loss of altitude.
- (7) If flaps (and landing gear) are extended, retract them after a positive rate of climb has been established.
- (8) Accelerate to  $V_x$  or  $V_y$ .