

TABLE OF CONTENTS

COCKPIT MANAGEMENT.....	4
INSTRUMENT COCKPIT CHECK.....	5
POST-FLIGHT PROCEDURES.....	6
PROPELLER SYNCHRONIZATION.....	7
TRAFFIC PATTERN OPERATIONS.....	8
NORMAL AND CROSSWIND TAKEOFF AND CLIMB.....	9
NORMAL AND CROSSWIND APPROACH AND LANDING.....	10
MAXIMUM PERFORMANCE TAKEOFF AND CLIMB.....	11
MAXIMUM PERFORMANCE APPROACH AND LANDING.....	12
ABORTED TAKEOFF.....	13
GO-AROUND (FROM REJECTED LANDING).....	14
INSTRUMENT TAKEOFF (ITO).....	15
LANDING FROM A STRAIGHT IN OR CIRCLING APPROACH (IFR).....	16
MANEUVERING DURING SLOW FLIGHT.....	17
POWER-OFF STALLS.....	18
POWER-ON STALLS.....	19
STEEP TURNS.....	20
BASIC ATTITUDE INSTRUMENT FLYING-FOUR FUNDAMENTALS.....	21
CONSTANT AIRSPEED CLIMBS.....	22
CONSTANT AIRSPEED DESCENTS.....	23
CONSTANT RATE CLIMBS.....	24
CONSTANT RATE DESCENTS.....	25
AIRSPEED CHANGES (CHANGE OF AIRSPEED).....	26
TIMED TURNS TO MAGNETIC COMPASS HEADINGS.....	27
MAGNETIC COMPASS TURNS.....	28
PARTIAL PANEL FLIGHT.....	29
UNUSUAL FLIGHT ATTITUDES (RECOVERY FROM).....	30
VOR TRACKING.....	31
VOR INTERCEPTS.....	32
VOR TIME AND DISTANCE CHECK.....	33
NDB TRACKING.....	34

Straight & level flight
 FOI PTS 2-33
 FHB 4-2 / 12-31-58P

Airplane Hand 14-1
Private PTS 2-26

Level turns
 Flying Hand 4-2 Private PTS 2-27
 FOI PTS 2-34
 Dihedral p 12-27

NDB INTERCEPTS.....	35
NDB TIME AND DISTANCE CHECK	36
IFR DEPARTURE PROCEDURES	37
IFR ARRIVAL PROCEDURES (RADAR AND NON-RADAR)	38
HOLDING PROCEDURES.....	39
RADAR VECTORS.....	40
VOR APPROACH.....	41
NDB APPROACH	42
ILS APPROACH	43
TERMINAL APPROACH.....	44
ASR/PAR APPROACHES.....	45
APPROACH DIAGRAMS.....	46
NO-GYRO RADAR VECTORING AND APPROACH PROCEDURE	47
MISSED APPROACH PROCEDURES.....	48
CIRCLING APPROACH PROCEDURES.....	49
CLEARING TURNS	50
VMC DEMONSTRATION.....	51
DRAG DEMONSTRATION (VYSE DEMO).....	52
ENGINE FAILURE DURING TAKEOFF (BEFORE VMC)	53
ENGINE FAILURE AFTER LIFTOFF.....	54
ENGINE FAILURE ENROUTE.....	55
APPROACH AND LANDING WITH AN INOPERATIVE ENGINE	56
INSTRUMENT APPROACH - ONE ENGINE INOPERATIVE.....	57
COLLISION AVOIDANCE PRECAUTIONS	58
LOST PROCEDURES	59
DIVERSIONS.....	60
EMERGENCY DESCENTS.....	61
SHORT-FIELD TAKEOFF AND CLIMB	62
SHORT-FIELD TAKEOFF AND CLIMB (CONT.)	63
SHORT FIELD APPROACH AND LANDING	64
SHORT FIELD APPROACH AND LANDING (CONT.)	65
TURNS AROUND A POINT.....	66

ENGINE FAILURE DURING STRAIGHT AND LEVEL FLIGHT..... 67

SYSTEMS AND EQUIPMENT FAILURE..... 68

PRINCIPLES OF FLIGHT - ENGINE INOPERATIVE 69

PRINCIPLES OF FLIGHT - ENGINE INOPERATIVE (CONT.)..... 70

EMERGENCY APPROACH AND LANDING..... 71

EMERGENCY APPROACH AND LANDING (CONT.)..... 72

EMERGENCY APPROACH AND LANDING (CONT.)..... 73

EMERGENCY PROCEDURES- ENGINE FAILURE 74

EMERGENCY PROCEDURES- ENGINE FAILURE (CONT.)..... 75

PARTIAL PANEL FLIGHT 76

SOFT FIELD TAKEOFF AND CLIMB 77

SOFT FIELD APPROACH AND LANDING..... 78

FORWARD SLIPS TO A LANDING..... 79

TURNS AROUND A POINT..... 80

S-TURNS ACROSS A ROAD..... 81

RECTANGULAR COURSE..... 82

OPERATION OF SYSTEMS..... 83

EIGHTS ON PYLONS..... 84

CHANDELLE 85

LAZY EIGHT 86

PERFORMANCE AND LIMITATIONS..... 87

Straight climbs & climbing turns - FOI PTS 2-35
 Acroplane Fly Hand 4-7
 Private 2-26

Straight descents & descending turns - Private 2-27
 Acroplane Hand 4-9

Turns to heading - - - - Private 2-27
 FOI 2-48
 AFH 9-5

Emergency equip & survival - FOI 2-55
 Com PTS 2-32
 AFH 12-8
 Private 2-32
 3

Operation of system
 FOI PTS 2-56
 Com PTS 2-4
 AFH 11-1
 Private 2-4

Performance & limitations
 Com PTS 2-4
 FOI PTS 2-56
 Private 2-3

COCKPIT MANAGEMENT

DESCRIPTION: A systematic method for organizing materials and equipment so they are readily available and adequate for insuring crew coordination and briefing of passengers.

OBJECTIVE: To develop the student's ability to efficiently organize and manage the cockpit environment both prior to and during flight.

PROCEDURES:

1. Arriving at the aircraft, verify that all equipment and materials needed for the flight are accounted for.
2. Verify airworthiness inspections, MEL and IFR requirements (if applicable) are current.
3. Organize and carefully secure all items, making sure they are readily available.
4. Brief all occupants on seat adjustment, seat belt use, aircraft exits, emergency equipment, and air vents.
5. Insure that all occupants are properly seated and doors closed properly.
6. Carefully adjust your seat and belts so as to allow easy access to all controls and equipment.
7. If appropriate determine who will be PIC and what, if any, duties you expect the pilot not flying to perform.
8. During the flight, remain well organized and alert to the needs of the passengers.

COMPLETION

STANDARDS: The lesson is complete when the student has learned a systematic method for organizing materials and equipment so they are readily available and adequate for insuring crew coordination and briefing of passengers.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook, FAA-H-8083-3

INSTRUMENT COCKPIT CHECK

DESCRIPTION: The Instrument Cockpit Check starts prior to taxi with a systematic check of all radios and navigation equipment. The magnetic compass and gyro instrument are checked while taxiing to the active runway (no conflicting traffic).

OBJECTIVE: To ensure proper operation of all instruments, avionics equipment, and navigation equipment prior to takeoff.

PROCEDURES:

1. Turn the avionics switch on.
2. Test the marker beacon lights and check the audio panel.
3. Check both communication radios (transmit and receive).
4. Set a nearby navaid frequency into the #1 nav to check for identifier and needle deflection.
5. Repeat step 4 with #2 nav.
6. Turn on the DME and tune to a nearby navaid frequency to check for identifier and proper indications.
7. Turn the transponder on and depress the test button to ensure proper operation.
8. Return to standby.
9. Set a frequency in the ADF receiver and check for the identifier, proper needle indication and proper test function.
10. Check that the compass card on the Heading Indicator or HSI agrees with the magnetic compass.
11. Clock-check operating and set to the correct time.
12. Airspeed indicator-check on zero.
13. Altimeter-set to current altimeter setting, maximum error +/- 75 feet.
14. Vertical Speed Indicator-should indicate zero, any deviation noted.
15. Circuit Breakers-check all in
16. Alternate Static Source-normal position

NOTE: THE FOLLOWING PART OF THE INSTRUMENT CHECK WILL BE ACCOMPLISHED AFTER LEAVING THE RAMP AND CLEAR OF ALL TAXI TRAFFIC.

17. Magnetic Compass-bowl full of fluid, card moves freely, check against a known heading, deviation card intact.
18. While making turns to the left and right check the gyro instruments:
 - Attitude Indicator-no more than 5 degrees of precession.
 - Turn and slip indicator-needle operating properly, ball moves freely in the race and the race is filled with fluid.
 - Heading Indicator or HSI-heading warning flag not visible, heading checked against the magnetic compass, and operating properly.

REFERENCES: FAA Instrument Rating Practical Test Standards, Instrument Flying Handbook, FAA-H-8083-15

POST-FLIGHT PROCEDURES

DESCRIPTION: A complete and systematic conclusion to any flight, which insures the safety of passengers, pilots, ground personnel, and the aircraft.

OBJECTIVE: To develop the student's ability to safely and efficiently conclude a flight.

PROCEDURES:

1. Select and taxi to an appropriate parking spot, considering wind conditions, obstructions, people, and aircraft servicing requirements.
2. Insure that no deplaning occurs until the aircraft is safely shutdown and the parking brake is set.
3. Supervise the deplaning of all passengers, giving special attention to anyone not familiar with ramp hazards.
4. Secure the airplane properly with tie downs, wheel chocks and control gust locks as appropriate.
5. Perform a post-flight visual inspection.
6. Personally verify that any aircraft discrepancies have been noted on the discrepancy board.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook, FAA-H-8083-3

PROPELLER SYNCHRONIZATION

DESCRIPTION: During flight the propeller controls are adjusted to achieve synchronization at power settings within the governor range. Throttles are adjusted when power settings are out of governor range.

OBJECTIVE: To develop the students ability to synchronize the propellers in multi-engine airplanes.

PROCEDURES:

1. Use the throttles to set both engines to the same manifold pressure.
2. Use the propeller controls to set both propellers to the same RPM setting.
3. Select either propeller control and adjust RPM until synchronization occurs.
4. If the RPM settings differ more than 50 RPMs, set 1/2 the difference below the desired setting on one propeller and 1/2 the difference above the desired setting on the other propeller. If necessary, make a further adjustment on either propeller to achieve final synchronization.
5. At power settings below the governor range, use the throttles instead of propeller controls as described above.

REFERENCES: Advanced Pilots Flight Manual, Kershner

TRAFFIC PATTERN OPERATIONS

DESCRIPTION: The traffic pattern is used to establish an orderly flow of traffic for aircraft arriving, departing and operating in the vicinity of airports. The pattern consists arrival to and departure from airports while executing proper cockpit duties.

OBJECTIVE: To help the student gain skill and proficiency necessary for conducting airport arrival and departure procedures.

ENTRY PROCEDURES:

1. Determine the active runway by the appropriate method.
2. Establish the aircraft on a 45-degree ground track toward the midpoint of the downwind leg unless otherwise directed by the control tower. Establish 100 KIAS (approx. 18" MP and 2300 RPM) and traffic pattern altitude 2 miles prior to reaching the downwind entry point.
3. Maintain strict vigilance for other traffic in the pattern or in the vicinity of the airport
4. Initiate the "**Approach checklist**".
5. Turn the aircraft onto the downwind leg approximately 1/2 mile to 1 mile from the runway; Maintain traffic pattern altitude and 100 KIAS unless traffic separating is required or ATC instructions dictate otherwise.
6. When abeam the point of intended landing, Perform the "**Gear down before landing checklist**".
7. Turn base leg at an appropriate point. Adjust the power to maintain 90 KIAS approach attitude to maintain the desired approach angle.
8. Complete the **GUMP check (GAS-UNDERCARRIAGE-MIXTURE-PROPS)** on the final leg before descending below 1000' AGL.
9. Visually clear the final approach path and turn onto the final approach with the aircraft aligned with the runway above 400' AGL, announce "**Gear down and stabilized**"!
10. Make coordinated pitch attitude and power setting adjustments to maintain the desired approach angle and normal final approach airspeed of 88 KIAS. Adjust the final approach airspeed by adding 1/2 the gust factor if appropriate
11. Execute the appropriate landing procedure.

DEPARTURE PROCEDURES:

1. After lift off, maintain runway alignment and appropriate climb airspeed.
2. Upon reaching a safe altitude (not less than 500' AGL) and clear of obstacles, set cruise climb power and accelerate to cruise climb airspeed
3. Upon reaching traffic pattern altitude and a point beyond the departure end of the runway, exit the pattern on a 45°-ground track in the direction of the traffic pattern.
4. Continue the appropriate altitude and proceed on course when clear of the airport and traffic.
5. **CLOSED PATTERN OPERATION:** Begin the turn to the crosswind leg at an altitude not less than 300' below traffic pattern altitude.
6. Upon reaching traffic pattern altitude, perform the after "**Takeoff checklist**" accelerate to 100 KIAS and set the power to (approx. 18" MP and 2500 RPM).
7. Initiate the "**Gear down, before landing checklist**" abeam the approach end.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, PA-44 Normal Checklist, Airplane Flying Handbook FAA-H-8083-3, Aeronautical Information Manual

P2-24 FOI PTS



Airplane Flying Handbook 3-5 / Comm PTS 1-12 / Multi-Phase PTS 2-11
NORMAL AND CROSSWIND TAKEOFF AND CLIMB

DESCRIPTION: The aircraft is aligned with the runway centerline and the ailerons are held into the wind. Takeoff power is applied and the aircraft is accelerated to rotation speed at which time the pitch attitude is increased to establish a positive lift-off and a V_y airspeed. Once airborne, a crab is established to maintain a ground track aligned with the runway centerline.

OBJECTIVE: To develop the student's ability to safely accomplish a takeoff and departure in normal and crosswind conditions.

PROCEDURES:

1. Set the flaps to the takeoff position.
2. Align the aircraft with the runway centerline and apply full aileron into the wind with the elevator in the neutral position.
3. Smoothly advance the throttles to the maximum power position. Check the power engine instruments for the proper indications.
4. As the aircraft accelerates, adjust the ailerons as necessary to control drift and maintain runway alignment with the rudder.

NOTE: DIFFERENTIAL POWER MAY BE USED TO AID IN DIRECTIONAL CONTROL IN STRONG CROSSWINDS DURING INITIAL ACCELERATION AND THE TAKEOFF ROLL. THE POWER SHOULD BE EQUALIZED AS SOON AS RUDDER EFFECTIVENESS IS ACHIEVED.

5. If a significant crosswind exists, the aircraft should be kept on the ground slightly longer than normal and a firm and definite liftoff accomplished.
6. At 75 KIAS apply back pressure to liftoff and adjust the pitch attitude to establish a V_y climb.
7. As the aircraft leaves the runway, aileron deflection may result in the downwind with and main gear lifting off first. Immediately level the wings and then establish a crab angle into the wind.
8. During the climb, maintain a ground track aligned with the runway centerline.
9. Upon achieving a positive rate of climb and a point where a landing can no longer be accomplished, apply brake pressure and retract the landing gear.
10. After the landing gear is fully retracted, retract the flaps (if extended).
11. Maintain V_y until a safe altitude (normally 500' AGL) is reached, and then accelerate to cruise climb speed of 100 KIAS and set climb power of 24" MAP and 2500 RPM.
12. Upon reaching 1000' AGL perform the "After Takeoff checklist".

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards
Airplane Flying Handbook FAA-H-8083-3

FOI PTS 2-28
COM PTS 2-~~13~~14
Airplane F hand 7-11
Private PTS 2-12



NORMAL AND CROSSWIND APPROACH AND LANDING

DESCRIPTION: After entering a traffic pattern, the aircraft is aligned with the runway centerline on final approach. The landing flap setting is made and a crab angle is established if necessary. A stabilized power on final approach is established. At an appropriate altitude a transition to the landing pitch attitude is begun in a manner that will allow the aircraft to touch down in the proper pitch attitude. After touchdown the aircraft is slowed to a normal taxi speed on the runway centerline and then taxied clear of the runway. Appropriate crosswind control is maintained throughout the final approach, landing and rollout.

OBJECTIVE: To develop the student's ability to safely and accurately execute an approach, landing, and rollout in normal and crosswind conditions.

PROCEDURES:

1. Complete the "**Approach checklist**".
2. Complete the "**Gear down before landing checklist**".
3. Complete the GUMP check (GAS-UNDERCARRIAGE-MIXTURE-PROPS) on the base leg before descending below 1000' AGL.
4. Achieve a stabilized, power on approach and announce "**Gear down - stabilized**" prior to descending below 400' AGL. Adjust heading to achieve a proper crab angle if necessary. Normal approach airspeed is 88 KIAS (full flaps) plus 1/2 the wind gust factor if appropriate.
5. Make coordinated changes in pitch attitude (glide angle) and power setting (airspeed) so that a touchdown can be made at the appropriate point on the runway.
6. Prior to beginning the round out and flare, correct for crosswind drift by using the wing-low method. Use aileron to correct for the drift and rudder to keep the aircraft's longitudinal axis aligned with the runway.

NOTE: IN STRONG CROSSWIND CONDITIONS, DIFFERENTIAL POWER MAY BE USED TO HELP ACHIEVE PROPER CROSSWIND CORRECTION.

6. At the appropriate flare altitude, increase the pitch attitude and reduce power at a rate that will allow a slow decrease in rate of descent and airspeed so that touchdown occurs just as the power reaches idle and the pitch attitude reaches the proper touchdown attitude. Use of proper crosswind technique will result in touchdown on the upwind main gear first followed by the downwind main gear and then the nose gear.
7. Gusty wind conditions may require a touchdown at a slightly higher speed than normal (5-10 KIAS) and a slightly lower than normal pitch attitude.

NOTE: USE CARE IN DETERMINING RUNWAY LENGTH NEEDED WHEN TOUCHING DOWN AT HIGHER THAN NORMAL SPEED DUE TO AN INCREASED LANDING ROLL REQUIREMENT.

8. After touchdown, lower the nose gently to the runway and gradually increase aileron deflection into the wind as the aircraft slows down.
9. Slow the aircraft to normal taxi speed before taxiing clear of the runway.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook FAA-H-8083-3

MAXIMUM PERFORMANCE TAKEOFF AND CLIMB

DESCRIPTION: The aircraft is aligned with the runway centerline and the ailerons are held into the wind. Takeoff power is applied and the aircraft is accelerated to rotation speed at which time the pitch attitude is increased to establish a positive lift-off in the shortest distance possible and established in a maximum angle climb until all obstacles are cleared.

OBJECTIVE: To develop the students ability to safely obtain maximum performance from the aircraft while executing a short field takeoff and safely clearing all obstacles in the departure path.

PROCEDURES:

1. Set the flaps to the takeoff position.
2. Align the aircraft with the runway centerline at the end of the runway so that maximum runway length is available and apply full aileron into the wind with the elevator in the neutral position.
3. Hold the brakes and smoothly advance the throttles to the maximum power position
4. Check the power and engine instruments for the proper indications, and then release the brakes.
5. As the aircraft accelerates, adjust the ailerons as necessary to control drift and maintain runway alignment with the rudder.
6. Accelerate to liftoff speed (70 KIAS) and establish a pitch attitude that produces the appropriate "Barrier / Obstacle Clearance speed" (75 KIAS)
7. As the aircraft leaves the runway, aileron deflection may result in the downwind wing and main gear lifting off first. Immediately level the wings and then establish a crab angle into the wind.
8. During the climb, maintain a ground track aligned with the runway centerline.
9. Upon achieving a positive rate of climb and a point where a landing can no longer be accomplished, apply brake pressure and retract the landing gear.
10. Upon crossing the 50' barrier accelerate to V_x if obstacle clearance is necessary, or V_y if obstacles are not present.
11. Maintain V_x/V_y until a safe altitude is reached, then accelerate to cruise climb speed of 100 KIAS.
12. Perform the "After takeoff checklist" out of 1000' AGL.

NOTE 1: YOU ARE EXPECTED TO COMPUTE TAKEOFF AND LANDING DATA PRIOR TO ALL FLIGHTS THAT INCLUDE MAXIMUM PERFORMANCE TAKEOFFS AND LANDINGS. SPECIAL EMPHASIS SHOULD BE PLACED ON DETERMINING ADEQUATE RUNWAY LENGTHS.

NOTE 2: 0° FLAP TAKEOFF IS REQUIRED, SINCE THIS PROVIDES A BETTER MARGIN OF AIRSPEED IN CASE OF AN ENGINE FAILURE. FOR TRAINING PURPOSES USE MAX. WT. SPEEDS (LIFTOFF 70 KIAS, BARRIER SPEED 75 KIAS) FOR A BETTER SAFETY MARGIN.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook FAA-H-8083-3

MAXIMUM PERFORMANCE APPROACH AND LANDING

DESCRIPTION: An approach and landing is accomplished at an airport with a restricted length runway due to obstacles on the approach path, minimum length runway, unfavorable runway gradient, required downwind landing, high-density altitude, or a combination of these factors. The approach is stabilized no lower than 400' AGL. The round out and flare is accomplished in a manner that allows the aircraft to reach the power off stall attitude as the main landing gear touches the runway with the power reaching idle at the same time. The rollout is minimized by proper use of brakes and elevator backpressure.

OBJECTIVE: To develop the students ability to safely and accurately execute an approach, landing, and rollout in maximum performance approaches and landings.

PROCEDURES:

1. Complete the appropriate "**Approach checklist**".
2. Complete the "**Gear down before landing checklist**".
3. Announce, "**Blue line – GUMP**" (**GAS-UNDERCARRIAGE-MIXTURES-PROPS**) before descending below 1000' AGL.
4. Achieve a stabilized, power on approach and the final flap setting prior to descending below 400' AGL. Adjust heading to achieve a proper crab angle if necessary. Max. Perf. approach airspeed is 75 KIAS (flaps 40) add 1/2 the wind gust factor if appropriate.
5. Make coordinated changes in pitch attitude (glide angle) and power setting (airspeed) so that a touchdown can be made at the appropriate point on the runway.
6. Prior to beginning the round out and flare, correct for crosswind drift by using the wing-low method. Use aileron to correct for the drift and rudder to keep the aircraft's longitudinal axis aligned with the runway.
7. At the appropriate flare altitude, increase the pitch attitude and reduce power at a rate that will allow a slow decrease in rate of descent and airspeed so that touchdown occurs just as the power reaches idle and the pitch attitude reaches the proper touchdown attitude. Use of proper crosswind technique will result in touchdown on the upwind main gear first followed by the downwind main gear and then the nose gear.
8. Gusty wind conditions may require a touchdown at a slightly higher speed than normal (5-10 KIAS) and a slightly lower than normal pitch attitude.

NOTE: USE CARE IN DETERMINING RUNWAY LENGTH NEEDED WHEN TOUCHING DOWN AT HIGHER THAN NORMAL SPEED DUE TO AN INCREASED LANDING ROLL REQUIREMENT.

9. After touchdown, lower the nose gently to the runway and gradually increase aileron deflection into the wind as the aircraft slows down while applying maximum braking (without skidding the tires) while holding full back elevator pressure.

NOTE: FULL BACK ELEVATOR PRESSURE MUST BE APPLIED IN A MANNER THAT DOES NOT ALLOW THE NOSE WHEEL TO LIFT OFF THE GROUND.

10. Slow the aircraft to normal taxi speed before taxiing clear of the runway.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook FAA-H-8083-3

ABORTED TAKEOFF

DESCRIPTION: A discontinued takeoff roll during which the aircraft is brought to a stop on the runway while maintaining full control of the aircraft.

OBJECTIVE: To develop the students ability to safely execute an aborted takeoff.

PROCEDURES:

1. Reduce power to idle.
2. Brakes as necessary for runway length and conditions. As brakes are applied, maintain backpressure on the elevator to reduce pressure on the nose wheel and to provide maximum aerodynamic braking.
3. Maintain directional control with the rudder and apply appropriate aileron control for crosswind conditions.
4. Stop the aircraft as soon as practicable.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook FAA-H-8083-3

GO-AROUND (FROM REJECTED LANDING)

DESCRIPTION: The landing approach is discontinued and the aircraft is transitioned to a climb.

OBJECTIVE: To develop the student's ability to safely perform a rejected landing/go-around procedure.

PROCEDURES:

1. Verify mixture full rich and the propeller to full RPM.
2. Apply full power and adjust the pitch attitude to stop the descent.

NOTE: IN A SINGLE-ENGINE APPROACH, APPLYING FULL POWER TO THE OPERATING ENGINE MAY NOT STOP THE DESCENT AT A SAFE AIRSPEED OR ALLOW A CLIMB. AN APPROPRIATE SAFE AIRSPEED MUST BE MAINTAINED AT ALL TIMES IN ORDER TO MAINTAIN AIRCRAFT CONTROL.

3. Retract the flaps slowly to 0 degrees.
4. After achieving a positive rate of climb, retract the landing gear.
5. Establish V_x or V_y as appropriate and retract the flaps.
6. Adjust the cowl flaps as necessary,
7. Radio intentions as appropriate.

CAUTION: AFTER COMPLETING THE GO-AROUND PROCEDURE, CONDITIONS PERMITTING, ESTABLISH A NORMAL TRAFFIC PATTERN SO THAT ALL PRE-LANDING ITEMS, INCLUDING THE LANDING GEAR DOWN, ARE ACCOMPLISHED.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook FAA-H-8083-3

COM PTS 2-21
PTS FOI 2-29
Airplane Flying 7-8
Private PTS 2-11

INSTRUMENT TAKEOFF (ITO)

DESCRIPTION: A takeoff accomplished by using instrument references only.

OBJECTIVE: To help the student develop the skills necessary for performing takeoffs using flight instruments as the sole reference.

PROCEDURES:

1. Align the aircraft with the runway centerline and hold the brakes.
2. Set the attitude indicator.
3. Set the heading indicator to the 5-degree mark nearest to the published runway heading.
4. Apply partial power (2000 RPM) for rudder effectiveness and check all engine gages for proper indications.
5. Release the brakes and smoothly increase power to the takeoff power setting.
6. Maintain precise heading control using the rudders.
7. At a safe rotation speed (75 KIAS), establish the V_y pitch attitude by reference to the attitude indicator (approximately 10 degrees pitch).
8. After establishing a positive rate of climb (cross check the altimeter and vertical speed indicator) and a safe altitude (at least 100' AGL) retract the landing gear.
9. Retract the flaps (if extended).
10. Trim as necessary.
11. As the aircraft climbs through 500' AGL, accelerate to climb airspeed (100 KTS) and set climb power.

REFERENCES: Instrument Flying Handbook, FAA-H-8083-15

LANDING FROM A STRAIGHT IN OR CIRCLING APPROACH (IFR)

DESCRIPTION: The transition from instrument to visual flight reference that must occur in order to allow a safe approach and landing after accomplishing an instrument approach.

OBJECTIVE: To help the student develop the ability and skill to safely and accurately maneuver and land immediately following an instrument approach flown in simulated or actual instrument meteorological conditions.

PROCEDURES:

1. Identify the landing environment and comply with the requirements listed in FAR 91.17 upon reaching the DH, MDA, or circling minimums.
2. **PRECISION APPROACH-** upon reaching the DH, slow to final approach speed. (add gust factor if appropriate) and extend landing flaps while maintaining a descent on the glide slope to the proper flare altitude. At 400' AGL recheck landing gear and announce, "**Gear down, stabilized**".
3. **NON-PRECISION** - upon reaching the MDA or circling minimums, determine the best time and position to begin the descent for landing. Then, slow to final approach speed (add gust factor if appropriate), extend landing flaps and descend to land. At 400' AGL recheck landing gear and announce, "**Gear down, stabilized**".
4. **CIRCLING APPROACH** – ATP requires 88 to 100 KIAS approach speed with flaps at 0 degrees. Select flaps to 25 degrees when leaving the MDA reducing the speed to blue line and arriving at 400' AGL and announcing, "**Gear down, stabilized**".

NOTE: ATP PROHIBITS ENGINE OUT (ACTUAL OR SIMULATED) CIRCLE TO LAND APPROACHES IN THE TRAINING ENVIRONMENT.

NOTE: THE GEAR IS NORMALLY EXTENDED AT GLIDE SLOPE INTERCEPT ON AN ILS, AT THE FINAL APPROACH FIX INBOUND ON A NON-PRECISION APPROACH OR UPON FINAL APPROACH COURSE INTERCEPT INBOUND ON TERMINAL TYPE APPROACH.

4. Continue to monitor the flight instruments to ensure a safe descent for landing and the ability to execute a missed approach if visual references are lost.
5. Comply with ATC instructions and be alert for other aircraft if VFR operations are in effect.
6. Adhere to all ATC advisories such as NOTAMS, wind shear; wake turbulence, runway surface, braking conditions, and other operational considerations.
7. Execute a landing appropriate to airport and weather conditions.

REFERENCES: Instrument Flying Handbook, FAA-H-8083-15, Federal Aviation Regulations, Aeronautical Information Manual

MANEUVERING DURING SLOW FLIGHT

DESCRIPTION: After clearing turns are completed the aircraft is maneuvered at various airspeeds and configurations while maintaining positive aircraft control.

OBJECTIVE: To teach the student to recognize changes in aircraft flight characteristic and control effectiveness at critically slow airspeeds in various configurations while maintaining positive aircraft control at all times.

PROCEDURES:

1. Select an altitude that will allow the task to be completed no lower than 3000' AGL
2. Perform Clearing Turns.
3. Power to 15" MP.
4. Below 120 Kts perform the "**Gear Down before landing checklist**".
5. Fuel selectors on.
6. Below 111 Kts Flaps 40 Degrees (If specified by instructor/examiner).
7. Mixtures full forward.
8. Props full forward.
9. Electric fuel pumps on.
10. Cowl Flaps Open.
11. Trim Aircraft as necessary.
12. Maintain Specified Altitude, Heading or Bank angle.
13. Maintain 1.2 Vs1 +/-5 knots (70 KIAS @ Flaps 40°).
14. Adjust pitch to maintain airspeed, adjust power to maintain altitude.

SLOW FLIGHT RECOVERY

1. Maintain altitude
2. Apply Full Power Slowly and Smoothly
3. Retract Flaps slowly to 0 degrees.
4. At V_x Gear up.
5. Trim Aircraft as necessary.
6. Level Off
7. Recover with the "**Cruise Checklist**".

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, PA-44 Supplement

POWER-OFF STALLS

DESCRIPTION: The aircraft is maneuvered to approach airspeed in straight or turning flight in approach and landing configuration. The angle of attack is then increased until he/she recognizes and announces the onset of the stall by identifying the first sign of aerodynamic buffeting or decay of control effectiveness. Recover as stall occurs by reducing the pitch attitude, adding power and reducing drag. Allow the airplane to accelerate to climb speed, return to altitude, heading and airspeed specified by the instructor/examiner.

OBJECTIVE: To develop the student's ability to recognize the indications leading to stalls in approach and landing situations, and to make prompt and effective recoveries with a minimum loss of altitude.

PROCEDURES:

1. Select an entry altitude (@ least 3500' AGL) that allows the task to be completed no lower than 3000' AGL.
2. Perform a clearing turn.
3. Complete the **"Gear down before landing checklist"**.
4. Extend flaps to 40 degrees.
5. On "final" establish 15" MP (commercial requires the aircraft be placed in a stabilized descent) and adjust approach attitude so as to induce a stall (Straight flight or in turn (bank) as specified by instructor/examiner).
6. Announce the onset of the stall at the first aerodynamic buffeting or decay in control effectiveness.
7. Promptly recover as the stall occurs by reducing pitch attitude and simultaneously applying full power.
8. Reduce drag as necessary (Flaps slowly to 0°), with minimum loss of altitude.
9. Retract landing gear after a positive rate of climb (V_x) is established.
10. Accelerate to V_y .
11. Return to altitude, heading and airspeed specified by instructor/examiner.
12. Perform **"Cruise Checklists"**.

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards Airplane Flying Handbook FAA-H-8083-3

AFIT 5-6

FOT PTS 2-44

Private PTS 2-24, 25

Com PTS 2-26

POWER-ON STALLS

DESCRIPTION: The aircraft is maneuvered to lift-off airspeed in straight or turning flight in takeoff or departure configuration. The angle of attack is then increased until he/she recognizes and announces the onset of the stall by identifying the first sign of aerodynamic buffeting or decay of control effectiveness. Recover as stall occurs by reducing the pitch attitude, adding power and reducing drag. Allow the airplane to accelerate to climb speed and resumes the climb to specified heading, altitude and airspeed specified by instructor/examiner.

OBJECTIVE: To develop the student's ability to recognize the indications leading to stalls in takeoff and departure situations, and to make prompt and effective recoveries with a minimum loss of altitude.

PROCEDURES:

1. Select an entry altitude that allows the task to be completed no lower than 3000' AGL.
2. Perform a clearing turn.
3. Complete the "**Configuration Flow**".
4. Set 15" MP, lower landing gear (below 120 Kts).
5. At blue line, props forward, cowl flaps as required.
6. Slow the aircraft to 80 KIAS.
7. At 80 KIAS, set 18" MP and establish climb attitude (10 to 12 degrees so as to induce a stall).
8. Announce the onset of the stall at the first aerodynamic buffeting or decay in control effectiveness.
9. Promptly recover as the stall occurs by reducing pitch attitude and simultaneously applying max power.
10. Establish a V_y Climb.
11. Return to altitude, heading and airspeed specified by instructor/examiner.
12. Perform "**Cruise Checklists**".

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook FAA-H-8083-3

Private PTS 2-25
FOI 2-43
AFH 5-7
COM PTS 2-27

STEEP TURNS

DESCRIPTION: 360-degree turns are performed in both directions using a steep bank angle while maintaining a constant altitude and airspeed.

OBJECTIVE: To develop the student's ability to execute high performance turns with smoothness, coordination, orientation, division of attention, and proper control techniques.

PROCEDURES:

1. Perform Clearing Turns
2. Cruise Power Set 20-22"MP and 120 Kts (or lower if Va below 120 Kts)
3. Roll Into 50 Degree Bank Turn
4. One full Turn of Up Trim
5. Maintain Altitude
6. Maintain Airspeed
7. Rollout - Lead Heading by 20 Degrees
8. Roll Into 50 Degree Bank Turn In Opposite Direction
9. Maintain Altitude
10. Maintain Airspeed
11. One full turn of Down Trim
12. Rollout - Lead Heading By 20 Degrees
13. Level Off Cruise 22"MP/2300 RPM
14. Perform the "Cruise Checklist".

REFERENCES: FAA Private and Commercial Pilot Practical Test Standards, Airplane Flying Handbook FAA-H-8083-3

FOF PTS 2-37
COM PTS 2-22
Private PTS 2-19
Airplane Hand 6-14

BASIC ATTITUDE INSTRUMENT FLYING-FOUR FUNDAMENTALS

DESCRIPTION: Straight and level flight, climbs, descents, and turns are accomplished, by establishing and maintaining appropriate control inputs by reference to the control instruments and crosschecking the aircrafts performance by reference to the performance instruments.

OBJECTIVE: To develop the student's ability to maintain aircraft control solely by reference to instruments.

PROCEDURES:

1. Properly crosscheck the instruments.
 - Consider control, performance, primary, and supporting instruments when crosschecking.
 - Include engine and navigation instruments.
 - Avoid fixation, omission, and emphasis.
2. Properly interpret the instruments that were crosschecked.
 - Interpret instrument indications/trends/rates
 - Recognize malfunctioning instruments.
 - Understand the instrument limitations and errors.
3. Effectively control the aircraft.
 - Set the control instruments using pitch, bank, power, and trim.
 - Monitor the performance instruments.
 - Make corrections/modifications as necessary by reference to the control instruments.

REFERENCES: FAA Instrument Rating Practical Test Standards, Instrument Flying Handbook FAA-H-8083-15

AFH 9-2
Private PTS 2-26
FOIPTS 2-45

CONSTANT AIRSPEED CLIMBS

DESCRIPTION: A constant airspeed is maintained during a climb at a fixed setting by establishing and maintaining the appropriate pitch attitude.

OBJECTIVE: To develop the student's proficiency in the basic skills required for instrument flight.

NOTE: WHEN ESTABLISHED OR CHANGING POWER SETTINGS, CONSIDERATION MUST BE GIVEN TO COWL FLAP, MANIFOLD PRESSURE, AND RPM SETTINGS IN ORDER THAT ENGINE OPERATING LIMITATIONS ARE NOT EXCEEDED.

PROCEDURES:

1. Simultaneously apply climb power and establish the approximate pitch attitude, which will result in desired climb airspeed.
2. Maintain the climb attitude by reference to the attitude indicator and crosscheck the airspeed indicator for the desired performance.
3. Adjust the pitch trim to neutralize control pressures.
4. Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired airspeed.
5. Lead the level off by approximately 10% of the rate of climb, reducing the power to the cruise power setting when the airspeed increases to within 5 knots of the cruise airspeed.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

FOI PTS 2-46
AFH 9-4
Private 2-26

CONSTANT AIRSPEED DESCENTS

DESCRIPTION: A constant airspeed is maintained during a descent at a fixed setting by establishing and maintaining the appropriate pitch attitude.

OBJECTIVE: To develop the student's proficiency in the basic skills required for instrument flight.

NOTE: WHEN ESTABLISHED OR CHANGING POWER SETTINGS, CONSIDERATION MUST BE GIVEN TO COWL FLAP, MANIFOLD PRESSURE, AND RPM SETTINGS IN ORDER THAT ENGINE OPERATING LIMITATIONS ARE NOT EXCEEDED.

PROCEDURES:

1. Simultaneously reduce power and establish the approximate pitch attitude, which will result in desired descent airspeed
2. Maintain the pitch attitude by reference to the attitude indicator and crosscheck the airspeed indicator for the desired performance.
3. Adjust the pitch trim to neutralize control pressures.
4. Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired airspeed.
5. Lead the level off by approximately 10% of the rate of descent, increasing the power to the cruise power setting as the level off is initiated.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

Private PTS 2-27
FOI PTS 2-47
AFH 9-3

CONSTANT RATE CLIMBS

DESCRIPTION: A constant rate of climb and a constant airspeed is maintained during a climb by establishing and maintaining the appropriate pitch attitude and power setting.

OBJECTIVE: To develop the student's proficiency in the basic skills required for instrument flight.

NOTE: WHEN ESTABLISHED OR CHANGING POWER SETTINGS, CONSIDERATION MUST BE GIVEN TO COWL FLAP, MANIFOLD PRESSURE, AND RPM SETTINGS IN ORDER THAT ENGINE OPERATING LIMITATIONS ARE NOT EXCEEDED.

PROCEDURES:

1. Simultaneously establish the approximate climb attitude and power setting, which will result in desired climb rate and airspeed.
2. Maintain the climb attitude by reference to the attitude indicator and crosscheck the airspeed indicator and vertical speed indicator for the desired performance.
3. Adjust the pitch trim to neutralize control pressures.
4. Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired climb rate. Make power changes by reference to the manifold pressure gauge and tachometer to achieve and maintain the desired airspeed.
5. Lead the level off by approximately 10% of the rate of climb, reducing the power to the cruise power setting when the airspeed increases to within 5 knots of the cruise airspeed.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

CONSTANT RATE DESCENTS

DESCRIPTION: A constant rate of descent is maintained during a descent by establishing and maintaining the appropriate pitch attitude and power setting.

OBJECTIVE: To develop the student's proficiency in the basic skills required for instrument flight.

NOTE: WHEN ESTABLISHED OR CHANGING POWER SETTINGS, CONSIDERATION MUST BE GIVEN TO COWL FLAP, MANIFOLD PRESSURE, AND RPM SETTINGS IN ORDER THAT ENGINE OPERATING LIMITATIONS ARE NOT EXCEEDED.

PROCEDURES:

1. Simultaneously establish the appropriate descent attitude and power setting that will result in the desired descent rate and airspeed.
2. Maintain the pitch attitude by reference to the attitude indicator and crosscheck the airspeed indicator and vertical speed indicator for the desired performance.
3. Adjust the pitch trim to neutralize control pressures.
4. Make small pitch adjustments by reference to the attitude indicator as necessary to achieve and maintain the desired descent rate. Make power changes by reference to the manifold pressure gauge and tachometer to achieve and maintain the desired airspeed.
5. Lead the level off by approximately 10% of the rate of descent, increasing the power to the cruise power setting as the level off is initiated.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

AIRSPPEED CHANGES (CHANGE OF AIRSPEED)

DESCRIPTION: Airspeed changes are made in straight and level flight through coordinated pitch, bank, power, and trim corrections.

OBJECTIVE: To develop proficiency in changing airspeed while maintaining a constant altitude and heading solely by reference to flight instruments in a specified configuration.

NOTE: WHEN ESTABLISHED OR CHANGING POWER SETTINGS, CONSIDERATION MUST BE GIVEN TO COWL FLAP, MANIFOLD PRESSURE, AND RPM SETTINGS IN ORDER THAT ENGINE OPERATING LIMITATIONS ARE NOT EXCEEDED.

PROCEDURES:

1. Establish the power setting that will result in the desired airspeed by reference to the manifold pressure gauge and the tachometer.
2. If increased airspeed, "overshoot" the power setting by 3-4" of MP. If decreasing the airspeed, "undershoot" the power setting by 3-4" of MP.
3. As airspeed increases/decreases adjust pitch attitude to maintain altitude.
4. Adjust pitch trim to relieve elevator control pressure.
5. Maintain heading by coordinated use of aileron and rudder.
6. Monitor cylinder head temperature and adjust cowl flaps as necessary.
7. As the desired airspeed is approached, adjust the power setting as necessary to maintain the airspeed.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

TIMED TURNS TO MAGNETIC COMPASS HEADINGS

DESCRIPTION: Turns to specific magnetic compass headings will be accomplished by accurately timing standard or half standard rate turns.

OBJECTIVE: To develop proficiency in making timed turns to specific compass headings without the use of the attitude indicator and the heading indicator.

NOTE: PRIOR TO EXECUTING TIMED TURNS TO MAGNETIC COMPASS HEADINGS, THE TURN AND SLIP INDICATOR MUST BE CALIBRATED BY CHECKING THE ACCURACY OF STANDARD RATE TURNS WITH THE CLOCK CALIBRATING THE TURN AND SLIP INDICATOR SHOULD BE ACCOMPLISHED ON ALL IFR FLIGHTS AS SOON AS PRACTICABLE AFTER TAKEOFF.

PROCEDURES:

1. Determine the number of degrees to be turned.
2. Compute the time needed to accomplish the turn at a standard rate (3 degrees per second) or half standard rate (1 and 1/2 degrees per second).
3. Begin timing as the roll in is started. Establish the appropriate bank angle and check performance using the turn and slip indicator.
4. Maintain a standard or half standard rate of turn as appropriate.
5. When the appropriate time has elapsed, rollout at the same rate as the roll in.
6. Check the new heading and correct if necessary.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

MAGNETIC COMPASS TURNS

DESCRIPTION: Turns to specific headings are accomplished by reference to the magnetic compass.

OBJECTIVE: To develop proficiency in making turns to specific headings by reference to the magnetic compass.

PROCEDURES:

1. Determine the amount of northerly turning error that is appropriate to your desired heading.
2. Establish a turn in the appropriate direction using a bank angle of 15-18 degrees.
3. When turning to a northerly heading, lead the rollout by the amount of the turning error plus the amount of lead needed to rollout of the bank.
4. When turning to a southerly heading, roll out past the desired heading by the amount equal to the turning error minus the amount of lead needed to roll out of the bank.
5. Maintain straight and level flight to check the accuracy of the new heading and correct as necessary.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

PARTIAL PANEL FLIGHT

DESCRIPTION: Flight solely by reference to instruments when one or more instruments are not operating properly.

OBJECTIVE: To develop the ability to recognize instrument indication irregularities and to develop proficiency in maneuvering the aircraft solely by reference to instruments when one or more flight instruments malfunction.

PROCEDURES:

1. Recognize the failure of one or more instruments by:
 - Lack of needle movement.
 - Radical or irregular needle movement.
 - Conflicting indications.
 - Warning lights, gauges, or flags.
 - Unusual instrument noise.
 - Excessive precession.
2. Evaluate the instruments to use in place of the ones that have failed.
3. Modify your scan as appropriate.
4. Use trim as appropriate
5. Notify ATC if appropriate.
6. Consider action to be taken in the event of actual instrument failure.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

UNUSUAL FLIGHT ATTITUDES (RECOVERY FROM)

DESCRIPTION: The instructor or student will place the aircraft in an unexpected attitude. When told to recover, the student will assume control, stabilize the aircraft, and return it to its original flight path by reference to the available flight instruments.

OBJECTIVE: To learn to recognize and properly recover from unusual attitudes by reference to both full and partial instrument panels.

PROCEDURES:

1. The student is instructed to take his hands and feet off the controls and close eyes.
2. The instructor then puts the aircraft into a critical flight attitude.
3. Then, the instructor will clearly say, "**Open your eyes and recover**".
4. The student will look at the flight instruments to determine what kind of critical attitude the airplane is in, and how best to recover.
5. Recovery is initiated and the aircraft is stabilized.
6. Return to the original flight path as rapidly as practicable.

NOTE: WHILE SPACE DOES NOT ALLOW FOR A DISCUSSION OF ALL POSSIBLE SITUATIONS, TWO COMMON SITUATIONS AND THEIR RESPECTIVE RECOVERY PROCEDURES ARE:

Nose High- airspeed low, trend decreasing:

1. Lower the nose and simultaneously apply full power
2. Level the wings
3. Establish straight and level flight at cruise power on original flight path and altitude.

Nose Low- airspeed high, trend increasing:

1. Reduce power.
2. Level the wings
3. Smoothly raise the nose to level flight attitude.
4. Establish straight and level flight at cruise power on original flight path and altitude.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards, Airplane Flying Handbook FAA-8083-3

AFH 9-7
PTS FOF 2-49
Private 2-27

VOR TRACKING

DESCRIPTION: The aircraft is maneuvered along a VOR radial solely by reference to flight instruments. Heading adjustments are made to correct for the effect of wind.

OBJECTIVE: To develop proficiency in maneuvering along a VOR radial while correcting for the wind effect.

PROCEDURES:

1. Upon intercepting the desired course, maintain a heading corresponding to the OBS setting.
2. When a definite off-course indication occurs, turn 20 degrees in the direction of the CDI deflection.
3. Maintain the new heading until the CDI begins to center.
4. As the CDI centers, turn 10 degrees back toward the selected course. This establishes a wind correction angle of 10 degrees. If the CDI remains centered, maintain this heading.
5. If the CDI begins to show a deflection in the direction opposite the initial deviation, the 10-degree wind correction angle was too large. Turn to a heading parallel to the course selected and allow the wind to take the aircraft back to the desired radial. When the CDI centers establish a 5-degree wind correction angle.
6. 5-degree corrections are normally adequate to keep the CDI centered after the initial wind corrections are made. However, exact center needle accuracy may require heading corrections of less than 5 degrees.

NOTE: IF THE FIRST 20 DEGREES OF HEADING CHANGE FAILS TO CHANGE THE DIRECTION OF THE CDI NEEDLE MOVEMENT WITHIN A REASONABLE PERIOD OF TIME, AN ADDITIONAL 20 DEGREES CORRECTION SHOULD BE MADE (A STRONG CROSSWIND IS INDICATED). AS THE CDI RECENTERS, ESTABLISH A 20-DEGREE WIND CORRECTION ANGLE. THEN, ADJUST THE ANGLE USING THE TECHNIQUE DESCRIBED ABOVE.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

VOR INTERCEPTS

DESCRIPTION: The aircraft is maneuvered to intercept and track a VOR radial solely by reference to flight instruments either inbound or outbound.

OBJECTIVE: To develop proficiency in maneuvering to intercept and track along a VOR radial inbound and outbound.

PROCEDURES:

1. Reset the heading indicator by reference to the magnetic compass.
2. Tune and identify the station.
3. Parallel the desired course.
4. Center the CDI needle with a "TO" or "FROM" indication as appropriate and note the course "TO" or "FROM" the station as indicated by the OBS setting.
5. Set the OBS to the desired course.
6. To intercept a course is 30 degrees or less from the present course, turn 45 degrees in the direction of CDI deflection. To intercept a course more than 30 degrees from the present course, turn 90 degrees in the direction of the CDI needle deflection.
7. Maintain the intercept heading until the CDI starts to center.
8. As the CDI centers, turn on course and begin tracking procedures to correct for wind.

NOTE: AS PROFICIENCY IS GAINED AND FAMILIARITY WITH THE RELATIONSHIP BETWEEN INTERCEPT ANGLE, DISTANCE FROM THE STATION AND THE MAGNITUDE OF OFF COURSE DEVIATION IS DEVELOPED; INTERCEPT ANGLES OTHER THAN 45 AND 90 DEGREES SHOULD BE USED AS APPROPRIATE.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

VOR TIME AND DISTANCE CHECK

DESCRIPTION: Time and distance to the station is calculated by flying a timed perpendicular course between two radials.

OBJECTIVE: To develop proficiency in orientation and use of VOR radials in computing time and distance to the station.

PROCEDURES:

1. Reset the heading indicator by reference to the magnetic compass.
2. Tune and identify the station.
3. Center the CDI with a "TO" indication.
4. Turn to the heading indicated on the OBS and re-center the CDI.
5. Rotate the OBS 10 degrees left or right.
6. Turn the aircraft to a heading 80 degrees in the direction of CDI deflection.
7. Maintain the new heading and note the time when the CDI centers.
8. Rotate the OBS 10 more degrees in the same direction as step 5.
9. Note the time when the CDI again centers.
10. Turn the aircraft to track direct to the station.
11. Compute the time and distance to the station using the following formulas:

Time to station (minutes) = Seconds for bearing change/Degrees of bearing change.

Distance to Station (NM) = Minutes for bearing change x TAS(kts)/Degrees of bearing Change.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards

NDB TRACKING

DESCRIPTION: The aircraft is maneuvered along a NDB "bearing from" or a "course to" solely by reference to flight instruments. Heading adjustments are made to correct for the effect of wind.

OBJECTIVE: To develop proficiency in maneuvering along a NDB "bearing from" or a "course to" while correcting for wind effect.

PROCEDURES:

1. Upon intercepting the desired "bearing from" or "course to" with the ADF pointer centered on the nose or tail, maintain a heading corresponding to the course to be flown.
2. When a definite off-course indication is indicated by a 5-degree pointer deflection, turn 20 degrees in the direction of the CDI deflection.
3. Maintain the new heading until the correction angle is equal to the angle between the ADF pointer and the nose or tail of the aircraft.
4. Turn 10 degrees back towards the original heading. This establishes a 10-degree wind correction angle.
5. If the ADF pointer deviates toward the nose (or further away from the tail), the wind correction angle is too small. Turn parallel to the "bearing from" or "course to" and allow the wind to take the aircraft back to the desired course. When established on course, fly a 5-degree wind correction angle.
6. 5-degree corrections are normally adequate to keep the aircraft on course after the initial wind corrections are made. However, exact course accuracy may require heading corrections of less than 5 degrees.

NOTE: IF THE FIRST 20 DEGREES OF HEADING CHANGE FAILS TO CHANGE THE DIRECTION OF THE CDI NEEDLE MOVEMENT WITHIN A REASONABLE PERIOD OF TIME, AN ADDITIONAL 20 DEGREES CORRECTION SHOULD BE MADE (A STRONG CROSSWIND IS INDICATED). AS THE ADF POINTER INDICATES A PROPER ON COURSE INDICATION, ESTABLISH A 20-DEGREE WIND CORRECTION ANGLE. THEN, ADJUST THE ANGLE USING THE TECHNIQUE DESCRIBED ABOVE.

REFERENCES: Instrument Flying Handbook FAA-H-8083-15, FAA Instrument Rating Practical Test Standards