Flight Maneuvers

Cessna 310R

The following is for quick reference only. In all cases, students should refer to and become familiar with the C-310R Information Manual and the appropriate ACS or Practical Test Standards.

CESSNA 310R MANEUVER SHEET

NORMAL TAKEOFF

1. LINE UP ON RUNWAY CENTERLINE.
2. HEELS ON FLOOR AND APPLY FULL POWER.
3. Vr-85
4. Vlof-92 (Vsse)
5. ACCELERATE AND CLIMB AT 120 KIAS TO 500' AGL
6. NO RUNWAY REMAINING---TOUCH BRAKES & GEAR UP

MAXIMUM PERFORMANCE TAKEOFF

1. Flaps 15
2. LINE UP ON CENTERLINE USING ALL AVAILABLE RUNWAY
3. RELEASE BRAKES WHILE APPLYING FULL POWER
4. ROTATE & LIFTOFF AT 85
5. ACCELERATE TO AND CLEAR A 50' OBSTACLE AT 92 (Vsse)
6. TOUCH BRAKES AND GEAR UP WHEN CLEAR OF OBSTACLE AND NO USABLE REMAINING RUNWAY
7. Flaps up
8. ACCELERATE AND CLIMB AT 120 KIAS TO 500' AGL

POWER OFF STALL

1. POWER-15" TO 16" MANIFOLD PRESSURE
2. FLAPS-15 BELOW 158 KIAS
3. GAS-VERIFY FUEL PUMPS ON LOW & FUEL ON MAINS
4. UNDERCARRIAGE-DOWN BELOW 138 KIAS (VERIFY DOWN & LOCKED)
5. MIXTURES-ENRICHEN FOR RECOVERY
6. FLAPS-FULL DOWN BELOW 139 KIAS
7. PROPELLERS - FORWARD BELOW 100 KIAS
8. PITCH TO ATTAIN IMMINENT STALL

--RECOVERY--

9. RELEASE ELEVATOR BACK PRESSURE
10. FULL POWER
11. FLAPS-15 DEGREES

12. PITCH TO Vx-85 KIAS IF OBSTACLE EXISTS OR BLUE LINE 106 KIAS NO OBSTACLE
13. VERIFY POSITIVE RATE OF CLIMB-GEAR UP
14. REMAINING FLAPS-UP

POWER ON STALL

1. POWER-15" TO 16" M.P.
2. FLAPS-REMAIN UP
3. GAS-LOW & MAINS
4. UNDERCARRIAGE-REMAINS UP
5. MIXTURES-ENRICHEN
6. INCREASE PITCH TO DISSIPATE AIRSPEED TO Vlof-92 KIAS
7. PROPELLORS-FORWARD BELOW 100 KIAS
8. INCREASE M.P. TO 20" AND INCREASE PITCH TO ATTAIN A STALL

--**RECOVERY**--

9. RELEASE ELEVATOR BACK PRESSURE
10. PITCH TO Vx-85 IF OBSTACLES EXIST, Vyse-106 IF NO OBSTACLES

SLOW FLIGHT

1. POWER-15" TO 16" M.P.
2. FLAPS-15 BELOW 158 KIAS
3. GAS-LOW & MAINS
4. UNDERCARRIAGE-DOWN BELOW 138 KIAS
5. MIXTURES-ENRICHEN FOR RECOVERY
6. FLAPS-FULL DOWN BELOW 139 KIAS
7. FORWARD-FORWARD BELOW 100 KIAS
8. AS AIRSPEED APPROACHES VMC, ADD APPX. 17" TO 18" M.P. TO MAINTAIN VMC -0 +2 KIAS. MAINTAIN ALTITUDE +OR-50' AND HEADING WITHIN 5 DEGREES OF A SECTION LINE.

--**RECOVERY**--

9. APPLY FULL POWER
10. FLAPS-15 DEGREES
11. GEAR-UP
12. FLAPS-0 DEGREES
13. PITCH MUST BE DECREASED TO MAINTAIN ALTITUDE AS AIRSPEED INCREASES. RESUME NORMAL CRUISE.

STEEP TURNS

1. SLOW TO ATTAIN Va, APPX. 16" TO 18" M.P. AND 2500 RPM
2. ROLL INTO 45 DEGREES OF BANK FOR 360 DEGREES OF TURN, ADDING BACK PRESSURE AND POWER TO MAINTAIN ALTITUDE +OR- 50' AND AIRSPEED +OR- 5 KIAS. ROLL OUT ON DESIRED SECTION +OR- 10 DEGREES.
3. REPEAT IN OPPOSITE DIRECTION

VMC DEMONSTRATION

1. POWER-15" TO 16" M.P.
2. FLAPS-REMAIN UP
3. GAS-LOW & MAINS
4. UNDERCARRIAGE-REMAINS UP
5. MIXTURES-ENRICHEN RIGHT, LEAN LEFT TO APPX. #3 TO RETAIN HEAT
6. PROP CONTROLS-SLOWLY FULL FORWARD
7. LEFT ENGINE POWER-IDLE (WINDMILL)
8. RIGHT ENGINE POWER-FULL POWER
9. INCREASE PITCH TO DISSIPATE AIRSPEED WHILE MAINTAINING DIRECTIONAL CONTROL WITH RUDDER. AT THE FIRST INDICATION OF LOSS OF DIRECTIONAL CONTROL, DECREASE PITCH TO REGAIN DIRECTIONAL CONTROL. (IF DECREASING PITCH DOES NOT STOP THE YAW, POWER MUST ALSO BE REDUCED.)
10. ONCE DIRECTIONAL CONTROL IS REGAINED, INCREASE POWER TO FULL ON OPERATING ENGINE TO ACCELERATE TO AND MAINTAIN ALTITUDE AT Vsse-92 KIAS.
11. ENRICHEN MIXTURE ON LEFT ENGINE AND RESUME NORMAL CRUISE IF LEFT ENGINE CHT IS NORMAL, IF NOT-ALLOW ENGINE TO WARM WITH 10"-11"M.P. WITH LEANED MIXTURE BEFORE INCREASING TO CRUISE POWER.

DRAG DEMONSTRATION

1. POWER-15" TO 16" M.P.
2. GAS-LOW & MAINS
3. UNDERCARRIAGE-REMAINS UP
4. MIXTURES-ENRICHEN RIGHT, LEAN LEFT TO APPX. #3 TO RETAIN HEAT
5. PROP CONTROLS-SLOWLY FULL FORWARD
6. LEFT ENGINE-IDLE (WINDMILL), ALLOW AIRSPEED TO DISSIPATE. AS AIRSPEED APPROACHES Vyse, INCREASE POWER TO ZERO THRUST (SIMULATED FEATHER) ON LEFT ENGINE. 7. INCREASE POWER ON RIGHT ENGINE TO MAINTAIN LEVEL FLIGHT AT Vyse

8. FLAPS-LOWER TO 15 WHILE DECREASING PITCH TO MAINTAIN Vyse AND NOTE DESCENT RATE (APPX. 200-250 FPM)
9. LANDING GEAR-EXTEND WHILE DECREASING PITCH TO MAINTAIN Vyse AND NOTE DESCENT RATE (APPX. 200-300 FPM)
10. FLAPS-LOWER TO 35 WHILE DECREASING PITCH TO MAINTAIN Vyse AND NOTE DESCENT RATE (APPX. 400-500 FPM)
11. LEFT ENGINE POWER-DECREASE FROM ZERO THRUST (SIMULATED FEATHER) TO WINDMILL (IDLE) WHILE INCREASING RIGHT RUDDER TO MAINTAIN HEADING AND DECREASING PITCH TO MAINTAIN Vyse AND NOTE DESCENT RATE (APPX. 500 TO 600 FPM)

--RECOVERY--

12. RETRACT FLAPS TO 15, MAINTAIN Vyse
13. RETRACT LANDING GEAR, MAINTAIN Vyse
14. RETRACT FLAPS TO 0, MAINTAIN Vyse
15. INCREASE LEFT ENGINE M.P. TO 12" TO WARM CHT INTO GREEN ARC. 16. ENRICHEN LEFT ENGINE MIXTURE
17. RESUME NORMAL CRUISE

Engine Inoperative GO-AROUND

Refer to POH

Warning:
Level flight may not be possible for certain combinations of weight, temperature, and altitude. In any event, do not attempt and engine inoperative go-around after wing flaps have been extended beyond 15 degrees.

WEIGHT:
- Takeoff . . . . . 5500 Pounds
- Landing . . . . . 5400 Pounds

SPEED, BEST POWER MIXTURE:
- Maximum - Sea Level . . . . . 207 KTAS
- Maximum Recommended Cruise
  - 75% Power at 7500 Feet . . . . . 194 KTAS

RANGE, RECOMMENDED LEAN MIXTURE:
- Maximum Recommended Cruise
  - 75% Power at 7500 Feet . . . . . 494 Nautical Miles, (600 Pounds Usable Fuel) 2.62 Hours and 193 KTAS
  - 75% Power at 7500 Feet . . . . . 884 Nautical Miles, (978 Pounds Usable Fuel) 4.63 Hours and 193 KTAS
  - 75% Power at 7500 Feet . . . . . 1132 Nautical Miles, (1218 Pounds Usable Fuel) 5.91 Hours and 194 KTAS
- Maximum Range
  - 10,000 Feet (600 Pounds Usable Fuel) . . . . . 616 Nautical Miles, 4.12 Hours and 148 KTAS
  - 10,000 Feet (978 Pounds Usable Fuel) . . . . . 1152 Nautical Miles, 7.87 Hours and 145 KTAS
  - 10,000 Feet (1218 Pounds Usable Fuel) . . . . . 1511 Nautical Miles, 10.46 Hours and 144 KTAS

RATE-OF-CLIMB AT SEA LEVEL:
- All Engines . . . . . 1662 Feet Per Minute
- Single-Engine . . . . . 370 Feet Per Minute

SERVICE CEILING:
- All Engines . . . . . 19,750 Feet
- Single-Engine . . . . . 7400 Feet

TAKEOFF PERFORMANCE: (82 KIAS, 15° Wing Flaps And 5500 Pounds Weight)
- Ground Roll . . . . . 1335 Feet
- Total Distance Over 50-Foot Obstacle . . . . . 1700 Feet

LANDING PERFORMANCE: (93 KIAS, 35° Wing Flaps And 5400 Pounds Weight)
- Ground Roll . . . . . 640 Feet
- Total Distance (Over 50-Foot Obstacle) . . . . . 1790 Feet

STANDARD EMPTY WEIGHTS: (Approximate)
- 310R . . . . . 3337 Pounds
- 310R II . . . . . 3578 Pounds

BAGGAGE ALLOWANCE: . . . . . 950 Pounds

WING LOADING: . . . . . 30.73 Pounds Per Square Foot

POWER LOADING: . . . . . 9.65 Pounds Per Horsepower

FUEL CAPACITY: (Total)
- Standard . . . . . 102 Gallons
  - With Auxiliary Tanks (40 Gallons Usable) . . . . . 143 Gallons
  - With Auxiliary Tanks (63 Gallons Usable) . . . . . 166 Gallons
  - With Auxiliary Tanks (63 Gallons Usable) And Wing Locker Tanks . . . . 207 Gallons

OIL CAPACITY: (Total) . . . . . 26 Quarts

ENGINES:
- Continental Six-Cylinder, Fuel-Injected Engines IO-520M
- 285 Rated Horsepower At 2700 Propeller RPM

PROPELLERS:
- Constant Speed, Full Feathering, Three-Bladed 6'4.5" Diameter 0850334-26

NOTE: Range data includes allowances for start, taxi, takeoff, climb, descent and 45-minute reserve at 45% power.

AIRSPEED LIMITATIONS TABLE

SPEED	IAS	CAS	REMARKS
Maneuvering Speed V_A (Knots)	148	150	Do not make abrupt control movements above this speed.
Maximum Flap Extended Speed V_{FE} (Knots) 15^o 35^o	158 139	160 140	Do not exceed this speed with the given flap setting.
Maximum Gear Operating Speed V_{LO} (Knots)	138	140	Do not extend landing gear above this speed.
Maximum Gear Extended Speed V_{LE} (Knots)	138	140	Do not exceed this speed with landing gear extended.
Air Minimum Control Speed - V_{MC_A} (Knots)	80	81	This is the minimum flight speed at which the airplane is controllable with a bank of not more than 5^o with one engine inoperative and the remaining engine operating at takeoff power.
Best Single-Engine Rate-of-Climb Speed V_Y (Knots)	106	107	This speed delivers the greatest gain in altitude in the shortest possible time with one engine inoperative at sea level, standard day conditions and 5500 pounds weight.
Never Exceed Speed V_{NE} (Knots)	223	227	Do not exceed this speed in any operation.
Maximum Structural Cruising Speed V_{NO} (Knots)	181	183	Do not exceed this speed except in smooth air and then only with caution.

Figure 2-1

AIRSPEED INDICATOR TABLE

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
Red Radial	80	Air minimum control speed.
White Arc	72 to 139	Operating speed range with 35° wing flaps. Lower limit is maximum weight stalling speed in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green Arc	79 to 181	Normal operating range. Lower limit is maximum weight stalling speed with flaps and landing gear retracted. Upper limit is maximum structural cruising speed.
Blue Radial	106	Best single-engine rate-of-climb speed at sea level standard day conditions and 5500 pounds weight.
Yellow Arc	181 to 223	Caution range. Operations must be conducted with caution and only in smooth air.
Red Radial	223	Maximum speed for all operations.

Figure 2-2