BEFORE TAKEOFF — CIGAR

Controls ..... free & correct
Airspeed indicator ..... 0, or wind speed
Attitude indicator ..... centered
Altimeter ..... set to ATIS
Turn coordinator ..... level & ball centered
Heading indicator ..... mag. compass
Vertical speed indicator 0
Fuel selector ..... both
Elevator trim ..... takeoff
Mixture ..... full rich
RUN - UP :
- Primer ..... in & locked
- Oil pressure / temp ..... in green, warm
- Brakes ..... apply
- Throttle ..... 1700 RPM
- Suction gauge ..... in green, 5 psi
- Ammeter ..... positive load
- Magnetos ..... 125 drop / 50 diff.
- Carburetor heat ..... 100 drop
- Throttle ..... < 1000 RPM
- Throttle friction ..... tighten

Radios / Nav / XPDR ..... set, ALT + SQWK
Doors / Windows / Belts ..... secure

HOLDING SHORT

Fuel selector ..... both
Elevator trim ..... takeoff
Carburetor heat ..... off
Mixture ..... full rich below 3,000 ft
Flaps ..... 0° to 10°
Dep. briefing ..... **T.O. abort plan & turn dir.**

I WILL LOSE THE ENGINE,
I WILL PUSH IMMEDIATELY

ON RUNWAY

TIME ..... **NOTE**
Lights ..... strobe & landing on
Camera ..... XPDR ALT / H.I. to rwy hdg
Action ..... static full throttle **> 2270 RPM**

NORMAL TAKEOFF

Rotate (V_R) ..... **50 KIAS**
Lift-off (V_X) ..... **65 KIAS**
Climb-out (V_Y) ..... **78 KIAS**
Flaps ..... raise at safe altitude

CLIMB

Climb-out (V_Y) ..... **78 KIAS**
Landing light ..... off, as needed
Flight plan ..... open

CRUISE

Throttle ..... 2200-2700 RPM (<75% MCP)
Elevator trim ..... adjust to cruise speed
Fuel selector ..... both
Mixture ..... lean above 3,000 ft
Circuit breakers ..... in
Landing light ..... off, as needed
Engine instruments ..... in green
Instruments ..... X-check, H.I. to comp.

DESCENT — A MICE ATM

Altimeter ..... set to ATIS
Approach briefing ..... **complete**
Instruments ..... H.I. & navaids set
Mixture ..... as required
Carburetor heat ..... as required

BEFORE LANDING — GUMPFS

Seat belts ..... adjust & secure
Fuel selector ..... both
Landing light ..... on
Carburetor heat ..... on
Mixture ..... full rich below 3,000 ft
Flaps ..... as required
DMMS ..... **68 KIAS**
Short Final ..... **flaps down, 55 - 68 KIAS**

GO-AROUND

Throttle ..... full open
Carburetor heat ..... off
Flaps ..... retract to 20°
Airspeed ..... 55 KIAS
Flaps ..... 10° until obstacles cleared

CLEAR OF RUNWAY

Elevator trim ..... takeoff
Flaps ..... up
Carburetor heat ..... off
Mixture ..... lean for taxi
Lights ..... strobe & landing off
Radios / XPDR ..... set, ALT + SQWK

ENGINE SHUTOFF

TIME ..... **STOP TIMER**
Lights (except beacon) ..... off
Avionics master switch ..... off
Mixture ..... cut-off
Ignition switch ..... off, remove key
Master switch ..... off
Fuel selector ..... left or right
Control lock ..... install
Pitot cover ..... install

FIRE DURING START

CRANKING ..... continue

ENGINE STARTS:
- power ..... 1700 RPM a few seconds
- engine ..... shutdown, check damage

ENGINE FAILS TO START:
- cranking ..... continue
- fire extinguisher ..... obtain
- engine ..... shutdown
- fire extinguisher ..... use

FIRE DURING FLIGHT

- fuel Selector ..... off
- mixture ..... cut - off
- master switch ..... off
- vents / cabin air / heat ..... off
- airspeed ..... 100 KIAS

ELECTRICAL FIRE

- master switch ..... off
- all electrical switches ..... off
- vents / cabin air / heat ..... off
- fire extinguisher ..... use

If fire appears out, and electrical power is necessary to continue flight:

- master switch ..... on
- circuit breakers ..... DO NOT RESET
- elec. switches ..... ONE AT A TIME, with delay after each until short is isolated

ENGINE POWER LOSS

(A) AVIATE — BEST GLIDE:
- best glide speed ..... **65 KIAS**
  (flaps down @ 60 KIAS)

(B) BEST PLACE TO LAND:
- select field — **1.5 NM ≈ 1000 ft**
- turn towards area
- select best approach for wind
- use NEAREST

(C) CHECK LIST — RESTART:
- fuel selector ..... on
- mixture ..... full rich
- carburetor heat ..... on
- ignition switch ..... both
- primer ..... in & locked

(D) DISTRESS CALL:
- transponder 7700
- tune ..... current ATC, 121.5, or 122.2
- announce ..... aircraft id, position problem, intentions

SETUP APPROACH:
- downwind abeam ..... 1,500 ft AGL
- plan soft-field, power-off approach

SECURE AIRCRAFT:
- fuel Selector ..... off
- mixture ..... cut-off
- ignition ..... off
- flaps ..... as required
- master switch ..... off
- doors ..... unlatch
- touchdown ..... slightly tail low
- brakes ..... apply heavily

IFR DEPARTURE BRIEFING

[W] WEATHER
- Good enough to get back on departure, **pitot heat**

[A] ABNORMAL
- Prepared to abort on take-off

[R] RUNWAY
- Which one, how long, surface condition

[T] TERRAIN
- Hills, water, best direction

[S] SPECIAL NOTES
- Fine print, missed procedure

IFR APPROACH BRIEFING

[A] ATIS

[M] MARKER BEACONS
- Turn on and test if ILS

[I] IDENTIFY
- Set radio & navaid freqs and identify

[C] COURSE
- Set final or next appr. course

[E] ENTRY TYPE
- Full or straight-in? Reversal or procedure turn? Vectors?

[A] ALTITUDES
- Current, FAF, DA / MDA

[T] TIME
- FAF to MAP

[M] MISSED APPROACH
- Briefed

MAXIMUM GLIDE

RANGE in NM @ 65 KIAS, FLAPS UP

AGL	Zero Wind	20 kt. Headwind	40 kt. Headwind
10,000	15	11	6.4
9000	13.5	9.9	5.8
8000	12	8.8	5.1
7000	10.5	7.7	4.5
6000	9	6.6	3.9
5000	7.5	5.5	3.2
4000	6	4.4	2.6
3000	4.5	3.3	1.9
2000	3	2.2	1.3
1000	1.5	1.1	0.6

OTHER EMERGENCY

EXCESSIVE RATE OF CHARGE: turn both sides of master switch OFF, then ON. If light comes on again, terminate flight.

INSUFFICIENT RATE OF CHARGE: Nonessential electric OFF. Terminate flight.

RADIO OUT: Check circuit breakers & VOLUME. Recycle alternator switch. If in B, C, or D airspace, squawk 7600. Terminate flight.

TWR SIGNALS	ON GROUND	IN FLIGHT
Steady Green	Cleared To Takeoff	Cleared To Land
Flashing Green	Cleared To Taxi	Return For Landing
Steady Red	STOP	Yield & Continue Circling
Flashing Red	Taxi Clear of Landing Area	Airport Unsafe — Do Not Land
Flashing White	Return To Starting Point	–
Alternating Red & Green	Use Extreme Caution	Use Extreme Caution

PREFLIGHT — CABIN

Pitot cover ..... remove
Papers (A.R.O.W.) ..... valid
Control lock ..... remove
Ignition switch ..... off, keys on dash
Avionics master & elec. ..... off
Circuit breakers ..... in
Master switch ..... on
Gyros ..... no unusual noise
Fuel gauges ..... note level
Flaps ..... lower in stages
Avionics master switch ..... on
Navigational instruments (IFR) :
- Marker beacons ..... test hi / low
- VOR ..... test
- GPS ..... database valid / self test OK
- Transponder ..... test, set ALT + 1200

Radios ..... copy ATIS
Avionics master switch ..... off
Pitot ..... verify cover off
Pitot heat ..... on, test, off
Lights (beacon, strobe, nav) ..... all working
Master switch ..... off
ADHRS ..... mount, secure battery
EFB (inc. phone) ..... mount, secure battery, connect ADHRS, reset level, update weather from Internet display taxi diagram

Windshield ..... clean

PREFLIGHT — NOSE

Spinner ..... check for security, no cracks
Propeller ..... check for nicks, max. 1/8“
Cooling air intake ..... free of restrictions
Carburetor air filter ..... free of restrictions
Muffler ..... check for security
Landing light(s) ..... check condition & clean
Nose wheel strut ..... inspect & check inflation
Tire ..... check wear & inflation
Static source opening ..... check for stoppage

PREFLIGHT — LEFT WING

Fuel tank ..... check quantity & secure cap
Tire ..... inspect for wear & inflation
Brakes ..... inspect for leaks & pad wear
Pitot tube ..... check intakes (2) clear
Fuel vent ..... clear
Tie down ..... remove
Wingtip ..... check lights, rivet line & shake
Aileron ..... check hinges, pushrod, counterweights & movement
Flaps ..... check pushrod & movement
Fuel drain ..... check fuel quality

PREFLIGHT — EMPENNAGE

Fuselage ..... no structural damage
Elevator ..... hinges, links & counterweights
Rudder ..... hinges, links & counterweights
Antennae ..... no damage
Tie down ..... remove

PREFLIGHT — RIGHT WING

Fuel drain ..... check fuel, paper napkin test
Flaps ..... hinge, pushrod & movement
Aileron ..... hinge, pushrod & counterweight
Wingtip ..... lights, rivet line & shake wing
Tie down ..... remove
Tire ..... inspect for wear & inflation
Brakes ..... inspect for leaks & pad wear
Fuel tank ..... check quantity & secure cap

PREFLIGHT — NOSE RIGHT

Oil level ..... no less than 6 quarts
Fuel strainer ..... check fuel quality
Airplane ..... free to roll & no bald-spots
Overall ..... **FINAL WALK-AROUND**, no openings, no forgotten objects

BEFORE STARTING ENGINE

Preflight inspection ..... COMPLETE
Seat & seat belts ..... secure
Fuel selector ..... both
Avionics master switch ..... off
Circuit breakers ..... in
Brakes ..... test and set

STARTING ENGINE

Mixture ..... full rich
Carburetor heat ..... off
Prime ..... as required (< 3 strokes)
Primer ..... in & locked
Throttle ..... open 1/8 inch
Rotating beacon ..... on
Master switch ..... on
Brakes ..... set
Propeller area ..... “CLEAR”
Ignition ..... start (30s, 2m intervals)
Throttle ..... < 1000 RPM
Oil pressure ..... green in 30 sec, or stop
TIME ..... **START TIMER**

BEFORE TAXIING

Mixture ..... lean for taxi
Flaps ..... retract
Heading indicator (H.I.) ..... mag. compass
Avionics master switch ..... on
Radios / Nav / XPDR ..... on, set, ALT + 1200
Communications ..... as required
Brakes ..... test