Preflight check		
1	Control wheel	Remove restraint
2	Avionics & battery master	Off
3	Magnetos	Off
4	Landing gear selector	Down
5	Battery master	On
6	Fuel quantity gauge	Check each tank
7	Wing flaps	Lower
8	Battery master	Off
Right wing		
1	Control surfaces	Check
2	Wing tip and nav light	Check
3	Outboard (aux) fuel tank	Check
4	Fuel tank vents and drains	Check
5	Tie down and wheel chock	Check
6	Main gear strut inflation	2 - 3 in.
7	Tire wear and inflation	Check
8	Oil quantity	5 - 7 quarts
9	Propeller	Check for nicks
10	Area around propeller	Clear of debris
11	Cowling	Secure
12	Inboard (main) fuel tank	Check
Nose section		
1	Windshield	Clean
2	Heater and ventilating air inlet	Clear
3	Nose gear strut	2 - 3 in.
4	Tire wear and inflation	Check
Left wing		
1	Inboard (main) fuel tank	Check
2	Cowling	Secure
3	Area around propeller	Clear of debris
4	Propeller	Check for nicks
5	Oil quantity	5 - 7 quarts
6	Tire wear and inflation	Check
7	Main gear strut inflation	2 - 3 in.
8	Tie down and wheel chock	Remove
9	Outboard (aux) fuel tank	Check
10	Stall warning switch	Free
11	Pitot head	Check
12	Wing tip and nav light	Check
13	Control surfaces	Check
Fuselage and empennage		
1	Static vents	Holes clear
2	Baggage door	Secure
3	Control surfaces	Check
4	Nav lights	Check
5	Antennas	Check
6	Dorsal fin ventilating air inlet	Clear
7	Tie down	Remove
For night operation		
1	Nav and landing lights	Check

Preflight check		
2	Panel and cabin lights	Check
3	Flashlight	On board

Before starting engines		
1	Time	Record
2	Seats	Adjusted
3	Seat belts	Secure
4	Brakes	Set
5	Fuel strainers	Drain 5 sec. each
6	Fuel selectors	Aux (or main)
7	Circuit breakers	Check in
8	Cowl flaps	Open
9	Alternate air	In/closed
10	Alternators	On
11	Beacon	On
12	Alternate static source	Closed
13	Landing gear selector	Down
14	Controls	Free and correct

Engine start - cold		
1	Mixtures	Rich
2	Propeller controls	Full forward
3	Throttles	1/2” open
4	Magnetos	On
5	Battery master	On
6	Fuel pumps	Prime for 1-3 seconds
Clear prop		
7	Starter	Engage (max 15 sec)
8	Throttle	1000 RPM
9	Oil pressure	Check
10	Mixture	Lean for taxi
In no oil pressure in 30 seconds, stop engine.		
11	Repeat procedure for other engine	

Engine start - hot		
1	Mixture	Idle cut-off
2	Throttle	Full forward - open
3	Battery master	On
4	Magnetos	On
5	Electric fuel pump	On
6	Mixture	Full rich to purge lines - then idle cut-off
7	Electric fuel pump	Off
Clear prop		
8	Magnetos	On
9	Starter	Engage
10	Throttle	Retard
11	Mixture	Advance slowly to full rich
12	Oil pressure	Check

Engine start - flooded		
1	Mixture	Idle cut-off
2	Throttle	Full forward - open
3	Electric fuel pump	Off
Clear prop		
4	Magneto switches	On
5	Starter	Engage
6	Throttle	Retard
7	Mixture	Advance slowly to full rich
8	Oil pressure	Check
Starter cranking periods must be limited to 30 seconds with a two minute rest between cranking periods.		

Before taxi		
1	Fuel computer	Set
2	Mixtures	Lean for taxi
3	Fuel pumps	Off
4	Wing flaps	Retract
5	Wing flap selector	Off position
6	Landing gear light	Check green
7	Avionics & PFD	On
8	Fuel cross-feed	Test 1 min
9	Pitot heat (if IMC anticipated)	Test
10	Electric trim	Test
11	Autopilot	Test
12	Aux fuel tanks	Test 1 min

Taxi		
1	Brakes	Check
2	Steering	Check
3	Flight instruments	Check

Run up		
1	Brakes	Set
2	Fuel selectors	Main tanks
3	Mixtures	Rich
Above 5,000’ density alt. lean mixtures until any engine roughness is eliminated.		
4	Throttles	1800 RPM
5	Propellers	Cycle (300 - 400 RPM drop)
6	Magnetos	Check
(Max drop 175 RPM, max diff 50 RPM)		
7	Vacuum	Check
8	Engine instruments	Check
9	Throttles	Check idle, then 1000 RPM

Before takeoff		
1	Fuel selectors	Main tanks
2	Flaps	0 - 15 degrees
3	Trim tab	Set for takeoff
4	Flight instruments	Check
5	Safety briefing	Complete

Cleared for Takeoff		
1	Lights	Set
2	Transponder	On
3	Mixtures	Rich
4	Fuel Pumps	On
5	Cabin Door	Secure

Takeoff		
1	Throttles	Smooth and steady increase
2	Engine instruments	Check
3	Airspeed	Alive
	Positive rate of climb	
4	Brakes	Tap
5	Landing gear	Retract
6	Gear indicator	Amber
7	Climb at Vy	97 kts
8	Flaps	Retract

Short field takeoff		
1	Flaps	15 degrees
2	Brakes	Partial power before brake release
3	70 kts	Back pressure on yoke
4	After breaking ground	78 kts
5	Clearing obstacle	Gear & flaps up
6	Climb speed	98 kts

Soft field takeoff		
1	Yoke	Full aft to relieve airplane weight
2	Throttles	Slowly advance
3	After breaking ground	Stay in ground effect
4	Climb out of ground effect	78 or 98 kts
5	Positive rate of climb	Gear & flaps up

After Takeoff		
	At 500' AGL	
1	Verify gear	Up
2	Verify flaps	Up
3	Electric fuel pumps	Off
4	Fuel flow/engine instruments	Check

Max performance climb		
1	Power	Full throttle and RPM

Normal climb		
1	Full power	Until 1000' AGL
2	En route climb speed	113 kts
3	Manifold pressure	25 in hg
4	Propeller controls	2500 RPM
5	Cylinder head temp	Maintain in green

Cruise		
1	Power	Set per power table
2	Mixture	Adjust to EGT gauge
	100 degrees rich of peak EGT for 75% power	
	50 degrees rich of peak EGT for 65% power	
3	Aux fuel	Use only in cruise flight
4	Engine gauges	Monitor
5	Cowl flaps	Close, monitor CHTs

Approach/Descent		
1	Seat belts	Fasten
2	Fuel selectors	Main tanks
3	Cowl flaps	Open

Before Landing		
1	Landing gear	Down under 130 kts
2	Gear indicator	Green
3	Flaps	As required under 108 kts
4	Propeller controls	Full forward
5	Mixture	Enrichen as required
6	Electric fuel pumps	On

GUMPS (on short-final)		
1	Gas	Main tanks
2	Undercarriage	Green
3	Mixture	Rich
4	Props	Full forward
5	Switches	Lights & fuel pumps

Short field landing		
1	Approach speed	78 kts on final
2	Throttles	Carry power until flare
3	Flaps	Retract after touchdown
4	Yoke	Full aft to put weight on main landing gear
5	Brakes	As Necessary

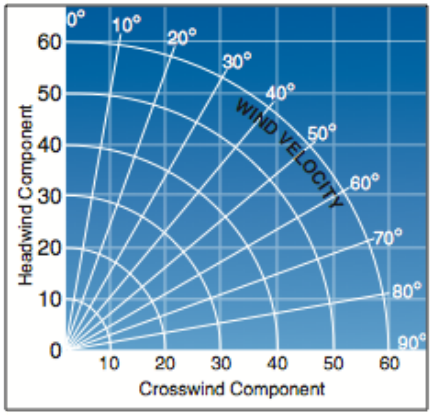
Soft field landing		
1	Approach speed	78 kts
2	Throttles	Carry power until flare
3	Flaps	Leave extended to maximize wing lift
4	Yoke	Back pressure to relieve airplane weight
5	Brakes	Minimize brake application

Go around		
1	Propeller controls	Full forward
2	Throttles	Full forward
3	Pitch	Climb attitude
4	Flaps (if fully extended)	Retract to T/O
5	Landing gear	Retract
6	Gear indicator	Amber
7	Flaps	Retract
	Perform climb checklist	

After landing		
1	Flaps	Retract
2	Lights	As required
3	Transponder	1200 & GND/STBY
4	Mixtures	Lean for taxi
5	Electric fuel pumps	Off
6	Cowl flaps	Open
7	Cabin heater	Off

Shutdown		
1	Avionics master	Off
2	Mixtures	Idle cut-off
3	Magnetos	Off
4	Battery master	Off
5	Pilot window	Closed
6	Pitot cover	Install

V speeds		
Vso	Stall speed (gear and flaps extended)	60
Vs	Stall speed (clean)	64
Vmca	Single engine minimum control speed	76
Vr	Rotation speed	76
Vx	Best angle-of-climb speed	78
Vxse	Best single engine angle-of-climb speed	82
Vapp	Final approach to landing speed	83
Vsse	Minimum intentional single engine speed	84
Vfe	Recommended flap extension speed	87
Vyse	Best single engine rate-of-climb speed	91
Vy	Best rate-of-climb speed	97
Vfe	Flap extension speed	107
Vlo	Recommended gear speed	108
Vlo	Landing gear operation speed	129
Va	Maneuvering speed / turbulent air penetration speed	141
Vno	Max structural cruising speed	171
Vne	Never exceed speed	203
Best en route rate-of-climb speed		113
Demonstrated crosswind component		17



Go around

1	Throttles	Forward
2	Climb	Positive rate
3	Speed	91 kts minimum
4	Flaps	Partially up
5	Landing gear	Up
6	Cowl flaps	Open

Engine out - takeoff roll

1	Throttles	Closed
2	Brakes	As required
3	Fuel selectors	Off
4	Master/magnetos	Off

Engine out- initial climb or enroute

Maintain directional control pitch attitude & airspeed

1	Mixtures	Enrichen
2	Propellers	Forward
3	Throttles	Forward
4	Flaps	Up
5	Gear	Up
6	Identify	Dead foot, dead engine
7	Verify	Inop engine, throttle: close

- fix or feather? -

If time permits, fix:

1	Fuel selector	Switch
2	Alternate air	On
3	Mixture	Adjust
4	Throttle	Adjust
5	Electric fuel pump	On
6	Engine gauges	Determine cause

If decision to feather:

1	Propeller	Feather
2	Mixture	Idle cut-off
3	Airspeed	Vyse 91 kts or higher
4	Fuel pump	Off
5	Magnetos	Off
6	Cowl flap	Closed
7	Fuel	Crossfeed as necessary

Electrical fire

1	Master	Off
2	Vents	Open
3	Door	Open if needed
4	Cabin heater	Off
5	Fire extinguisher	As required

Propeller overspeed

1	Propeller	Reduce RPM
2	Throttle	Retard
3	Airspeed	Reduce
4	Throttle	Below 2700 RPM
5	Propeller - if necessary	Feather
6	Land ASAP to investigate	

Engine fire - during start

Continue start attempt

If engine starts:

1	Throttle	2000 RPM or more (1 min)
2	Engine	Shutdown

If no start:

3	Starter	Continue cranking
4	Mixture	Idle cut-off
5	Throttle	Full open
6	Electric fuel pump	Off
7	Fuel selector	Off
8	Call for fire fighting assistance if needed	
9	Master	Off
10	If fire continues	Extinguish or retreat

Engine fire - in flight

1	Throttle	Close
2	Propeller	Feather
3	Mixture	Idle cut-off
4	Fuel selector	Off
5	Electric fuel pump	Off
	If fire persists - increase airspeed to Vne	
6	Land	Nearest airport

Single engine landing

1	Inop engine	Secured
2	Landing assured	Lower gear
3	Flaps	Extend 15
4	Airspeed	91 kts

Icing

1	Alternate air	On
2	Propellers	Full forward
3	Throttles	Full forward
4	Mixtures	Adjust for smooth operation
5	Heater/defroster	On
6	Pitot heat	On
7	Airspeed	Maintain higher
8	Flaps	No flaps on landing

Manual gear extension

1	Master	Check on
2	Circuit breaker	Check & reset
3	Airspeed	Below 87 kts
4	Landing gear switch	Down
5	Landing gear switch	Center “off”
6	Motor release handle	Disengage
	Gear should free-fall	
	If necessary, use gear extension handle	
7	Extend handle	Full forward
8	Handle locked full forward	Gear is down

Dual engine failure

1	Directional control	Maintain
2	Best glide speed	96 kts
3	Propellers	Feather
4	Mixtures	Cut-off
5	Fuel selectors	Off
6	Transponder	7700
7	Seatbelts/harness	Secured
8	Flaps	As needed
9	Gear	Down
10	Master	Off
11	Magnetos	Off
12	Door	Unlatch

Engine troubleshooting & securing procedure

1	Fuel selector	Switch to fullest tank
2	Cross feed	As required
3	Electric fuel pump	On
4	Magnetos	Check on
5	Mixture	Enrichen/adjust
6	Alternate air	On
7	Engine gauges	Determine cause

If power is restored:

8	Electric fuel pump	Off
9	Alternate air	Off

If power is not restored:

10	Propeller	Feather
11	Mixture	Idle cut-off
12	Fuel selector	Off
13	Electric fuel pump	
14	Magneto switches	Off
15	Cowl flap	Closed
16	Alternator	Off
17	Electrical load, if necessary	Reduce

Single engine fuel crossfeed

1	Inoperative engine side	Fuel valve on **main** or **aux**
2	Operative engine side	Crossfeed on
3	Do not put both fuel selector valves on crossfeed	
	Before landing:	
4	Operative engine side	Main
5	Inoperative engine side	Off
6	Operative engine fuel pump	On

Air start - unfeathering procedure

1	Fuel selector	On main or aux
2	Mixture	Rich
3	Prop	Match to other prop
4	Throttle	¼” open
5	Alternator	On
6	Magnetos	On
7	Starter	Engage up to 30 seconds
	When engine starts:	
8	Oil pressure	Check
9	Cowl flap	As required
10	Warm engine	18” MP