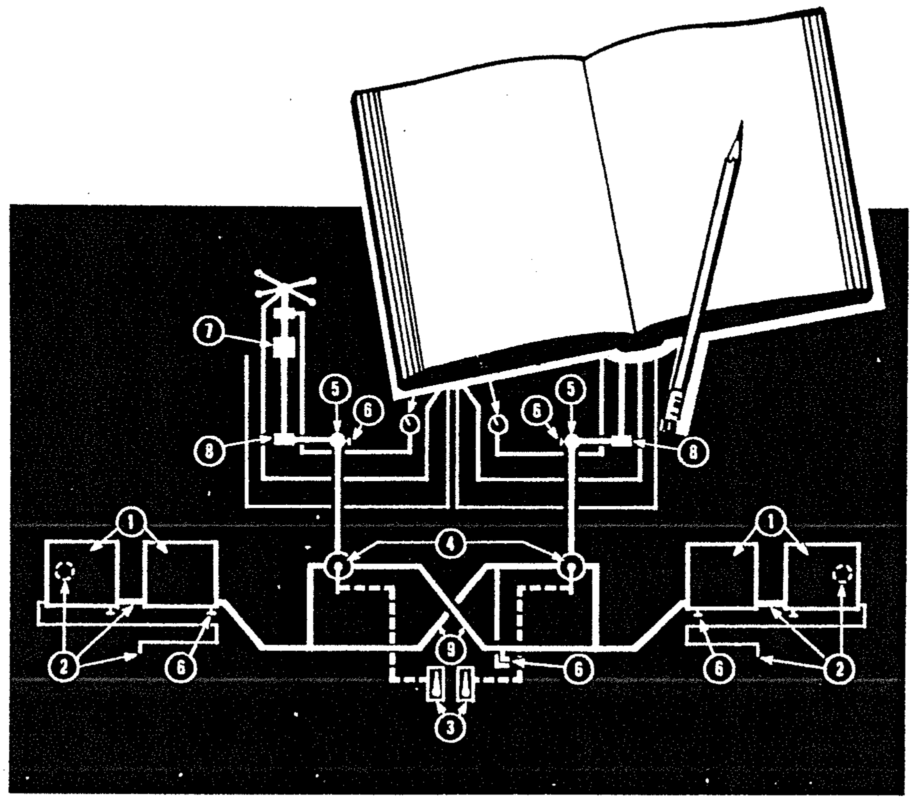


EXERCISES PART 2

EXERCISE 1 — AIRCRAFT SYSTEMS

INTRODUCTION

These exercises are designed to complement Part 1 of the Multi-Engine Manual and the audiovisual presentations. Each exercise is correlated with a specific Study Unit chapter or group of chapters.

When completing the exercises, the answers should be recorded on a separate sheet of paper, thus allowing further review of the exercises after the rating has been obtained. Answers for the exercises are provided at the end of this part of the manual and should be used as a self-check. Those questions which are answered incorrectly should be reviewed and, if necessary, discussed with the flight instructor.

1. The Seminole fuel system incorporates two ________________ -gallon tanks.

2. If the aircraft has a total of 100 gallons of fuel on board, the total usable fuel is ________________ gallons and the total unusable fuel is ________________ gallons.

3. ________ (True, False) Under normal operating conditions, each fuel tank provides fuel for its respective engine.

4. ________ (True, False) Fuel can readily be drained from the engine scupper drain to eliminate moisture and sediment.

5. ________ (True, False) All fuel, regardless of its tank origin, must pass through a fuel selector valve.

6. The electrical generating system in the Piper Seminole incorporates two 60-ampere ________________.

7. ________ (True, False) The AC electrical power the alternators produce is converted to DC power within the reverse current relay switch.

8. Match the following electrical system components to their basic functions.

   ________ Voltage regulator
   ________ Alternator "field" circuit breaker
   ________ Alternator annunciator light
   ________ Overvoltage relay
   ________ Ammeter

   1. Indicates an alternator is off line
   2. Indicates the electrical load being carried by each alternator
   3. Maintains proper load sharing between alternators
   4. Takes the alternator off line if its output exceeds 17 volts
   5. Protects the voltage regulator

9. ________ (True, False) The dual ammeters indicate the total battery discharge once the aircraft is established in a cruise configuration.

10. In the event both alternators fail, the only source of electrical power is the ________________.

11. ________ (True, False) The landing gear and brake system utilize the same hydraulic fluid reservoir.

12. The landing gear is extended and retracted by hydraulic pressure that is supplied by an ________________ powered reversible hydraulic pump.

EXERCISE 1

13. ________ (True, False) During the landing gear extension cycle, it is normal for the red, "unsafe" light to illuminate.

14. The landing gear safety switch is located on the left main gear strut and its operation is dependent upon the degree of ________ extension.

15. The only requirement for manually extending the landing gear is to relieve the ______________ ______________ within the system.

16. Once the gear begins to extend after actuating the manual system, the two forces that aid extension are ______________ and ______________ loads.

17. ________ (True, False) The main advantage of counterrotating propellers is the reduction of vibration, which lowers the level of interior cabin noise.

18. The Seminole propeller utilizes oil pressure for ______________ (high, low) pitch control and nitrogen pressure for ______________ (high, low) pitch control.

19. The feather lock will engage when the engine speed is below ______________ RPM, preventing the propeller from ______________.

20. To feather a propeller, the propeller control lever must be moved to the full ______________ position.

21. The primary mechanism for maintaining a given RPM setting is the propeller ______________.

22. ________ (True, False) Cabin and defrost heat is provided by a heat exchanger mounted on the exhaust manifold of each engine.

23. The fresh air that undergoes the heating process enters the system through the ______________ ______________.

24. The supply of air that is directed to the overhead fresh air outlets enters the system through an inlet in the ______________ ______________.

25. ________ (True, False) The temperature control assembly regulates the temperature of the heat to the cabin interior by adding fresh air to the heated air according to the position of the temperature control selector.

MULTI-ENGINE OPERATION

EXERCISE 2 — MULTI-ENGINE OPERATION

1. ________ (True, False) It is customary to start the left engine on a multi-engine aircraft first because the pilot can see and hear the left engine better.

2. In addition to easier detection of abnormalities, a double-engine runup procedure prior to takeoff in warm weather helps to prevent excessive ____________ ____________ ____________.

3. In addition to the manifold pressure gauges and tachometers, list the other engine instruments that should be checked following the application of power during takeoff.

   1. ____________________
   2. ____________________
   3. ____________________
   4. ____________________

4. Following a normal takeoff, the first power reduction may be made when the aircraft reaches

   1. 100 feet AGL.
   2. best single-engine angle-of-climb speed.
   3. best multi-engine rate-of-climb speed.
   4. an adequate terrain clearance altitude.

5. The accelerate/stop distance performance chart for the Seminole is based on

   1. pressure altitude, full power, and a level runway.
   2. pressure altitude, gradual power application, and maximum braking on a dry runway.
   3. pressure altitude, temperature, takeoff weight, full power application prior to brake release, abort speed (75 KIAS), cowl flaps open, and maximum braking on a dry, paved, level runway.
   4. pressure altitude, temperature, rapid taxi onto the runway, engine failure just before VMCA, and maximum braking on a level runway.

6. ________ (True, False) During initial climb-out, attaining airspeed in excess of the multi-engine best rate-of-climb speed is not as valuable as gaining altitude.

7. The values obtained from multi-engine airplane performance charts are based on

   1. a safety factor of 10 percent.
   2. average aircraft performance.
   3. maximum performance from a properly maintained airplane.
   4. theoretical computations.

8. The landing gear normally should be retracted following liftoff after a positive rate of climb is established and when

   1. a landing is no longer possible on the remaining runway.
   2. the VY airspeed is attained.
   3. the aircraft crosses the airport boundary.
   4. the aircraft is still in ground effect.

9. Illumination of an alternator annunciator warning light indicates

   1. excessive battery drain.
   2. the reverse current relay has tripped.
   3. an alternator has been automatically shut down.
   4. the battery has been excessively charged.

10. A complete loss of hydraulic pressure during cruise will result in

    1. illumination of the hydraulic pressure warning light.
    2. illumination of the gear warning light.
    3. the need to extend the landing gear manually.
    4. full extension of the nose landing gear only.

11. The item that is considered to create the greatest amount of drag is

    1. asymmetrical control deflections.
    2. gear extended.
    3. a windmilling propeller.
    4. one-quarter inch of rime ice.

12. If a go-around becomes necessary during a full-flap approach to landing, what is the correct sequence for drag cleanup?

    1. Gear up, maximum power, flaps up
    2. Flaps to 25°, maximum power, gear up after a positive rate of climb is established, remaining flaps up
    3. Maximum power, flaps to 25°, gear up after a positive rate of climb is established, remaining flaps up
    4. Maximum power, flaps up, gear up after a positive rate of climb is established

13. ________ (True, False) The landing gear creates greater drag and decreases aircraft performance more than the extension of full flaps.

14. During the roll-out after a crosswind landing, asymmetrical thrust may be used to assist directional control by adding power on the ________________ (upwind, downwind) engine.

15. List the methods available to reduce excessively hot cylinder head temperatures during climbout.

    1. ______________________________
    2. ______________________________
    3. ______________________________
    4. ______________________________
    5. ______________________________

16. The most dangerous aspect of operating the engines at excessive cylinder head temperatures is the possibility of

    1. excessive exhaust gas temperatures, leading to burned valves and spark plugs.
    2. detonation, causing engine damage or failure.
    3. excessive piston ring and cylinder wear, leading to excessive oil consumption.
    4. insufficient oil pressure to lubricate crankshaft bearings.

17. If one of the three gear-down indicator lights does not illuminate when the gear selector is placed in the DOWN position, the appropriate action to take initially is to

    1. activate the emergency extension feature.
    2. turn the instrument lights off.
    3. perform a few high-G maneuvers.
    4. replace the bulb with either one of the others which has illuminated.

18. ________ (True, False) If an aircraft is equipped with electrical propeller de-icers, pneumatic de-icing boots on the wings and tail, and a heated pitot tube, it can be assumed the aircraft is certified for IFR flight in known icing conditions.

19. The best way to confirm that the nosewheel on the Seminole is down and locked is by observing the

    1. illumination of the top center gear-down indicator.
    2. nosewheel in the external mirror.
    3. illumination of the top center gear-down indicator and the nosewheel in the external mirror.
    4. the movement of the gear linkage through the transparent housing in the center of the cabin.

20. A convex mirror, for use as a taxi aid and for verifying the position of the nose gear in flight, is located on the

    1. nose of the aircraft.
    2. left engine nacelle.
    3. right engine nacelle.
    4. glare shield.

21. The *safest* sequence to follow during stall recovery at altitude in a multi-engine airplane is to

    1. apply full power, lower the nose, and level the wings.
    2. lower the nose, level the wings, and apply maximum power when the aircraft has reached VMCA.
    3. level the wings and lower the nose, but do not apply maximum power until the aircraft has reached VMCA.
    4. immediately apply full power to stop the descent, then simultaneously lower the nose and level the wings.

22. As the Seminole weight decreases during cruise flight, the maneuvering speed

    1. increases.
    2. decreases.
    3. remains the same.
    4. increases for weights below 3,700 pounds.

23. _______ (True, False) For takeoffs at high density altitudes, the mixture should be leaned on normally aspirated engines as well as on turbocharged engines.

The remaining questions are to be answered by applicants who hold instrument ratings.

24. _______ (True, False) For a normal instrument approach, the landing flaps are extended during the intermediate approach segment.

25. List two reasons why a slower airspeed is desirable during holding pattern procedures.

    1. ________________________________
    2. ________________________________

26. The best procedure for establishing a descent over the final approach fix inbound is to

    1. apply forward pressure and reduce power.
    2. increase power and extend the landing gear.
    3. extend the landing gear and apply forward pressure.
    4. extend the landing gear, extend the remaining flaps, and increase power slightly to compensate for drag.

MULTI-ENGINE OPERATION

EXERCISE 3 — WEIGHT AND BALANCE CONTROL AND PERFORMANCE

1. The standard empty weight plus optional equipment is termed the ________________ ________________ weight.

2. ________ (True, False) The basic empty weight includes all specified equipment, hydraulic fluid, oil, and unusable fuel.

3. The weight which is designated after stress analysis and static and flight tests for normal operation is termed the ________________ ________________ weight.

4. ________ (True, False) The maximum landing weight may be less than the maximum takeoff weight because of structural strength limitations.

5. ________ (True, False) For aircraft weight and balance computations, *any* adult can be considered to weigh 170 pounds and *any* child from 2 to 12 years old can be considered to weigh 80 pounds.

6. An aircraft with a CG location forward of limits will require a takeoff run which is ________________ (longer, shorter) than normal.

7. What is the most dangerous condition for aircraft weight and balance in terms of total weight and CG location?

   1. Overweight and CG forward of limits
   2. Overweight and CG aft of limits
   3. Underweight and CG forward of limits
   4. Underweight and CG aft of limits

8. Assume weight and balance computations reveal that the loading for a particular aircraft is under maximum allowable takeoff weight, but the CG is aft of limits. To bring the CG location within limits, the total aircraft moment must be ________________ (increased, decreased).

9. Assume an aircraft is loaded to the maximum takeoff weight of 4,200 pounds, but the CG is four inches aft of limits. To bring the aircraft within CG limits, the maximum weight shift from the aft baggage compartment (188.0 inches) to the forward compartment (20.0 inches) is

   1. 33 pounds.
   2. 50 pounds.
   3. 100 pounds.
   4. 117 pounds.

Use the accompanying work sheet and the loading graph and weight and balance envelope on page 2-10 to answer questions 10 through 12.

10. Compute the airplane weight and CG location under the following conditions.

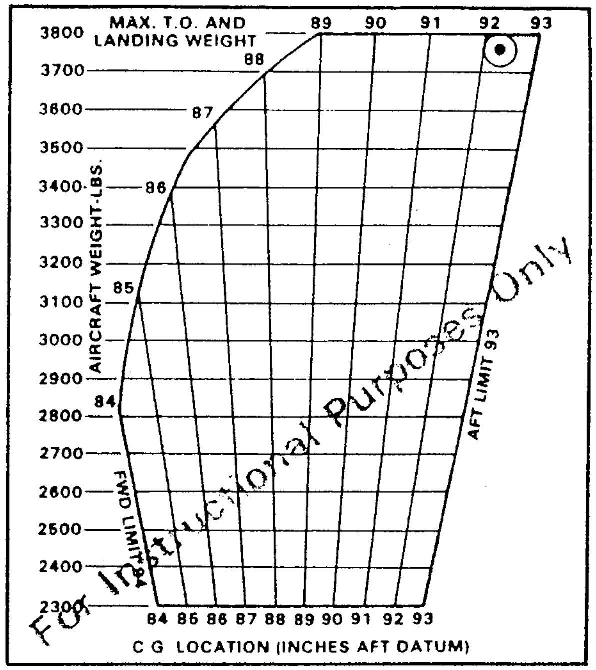
	Weight (Lbs.)	Arm Aft Datum (Inches)	Moment (In.-Lbs.) /1000
Basic Empty Weight	2,508.2	86.0	215.7
Pilot and Front Passenger	340	80.5	
Passengers (Rear Seats)	100	118.1	
Fuel (110 Gallon Maximum)	600	95.0	
Baggage (200 Lb. Limit)	200	142.8	
Moment due to Retraction of Landing Gear			819
Total Loaded Airplane			

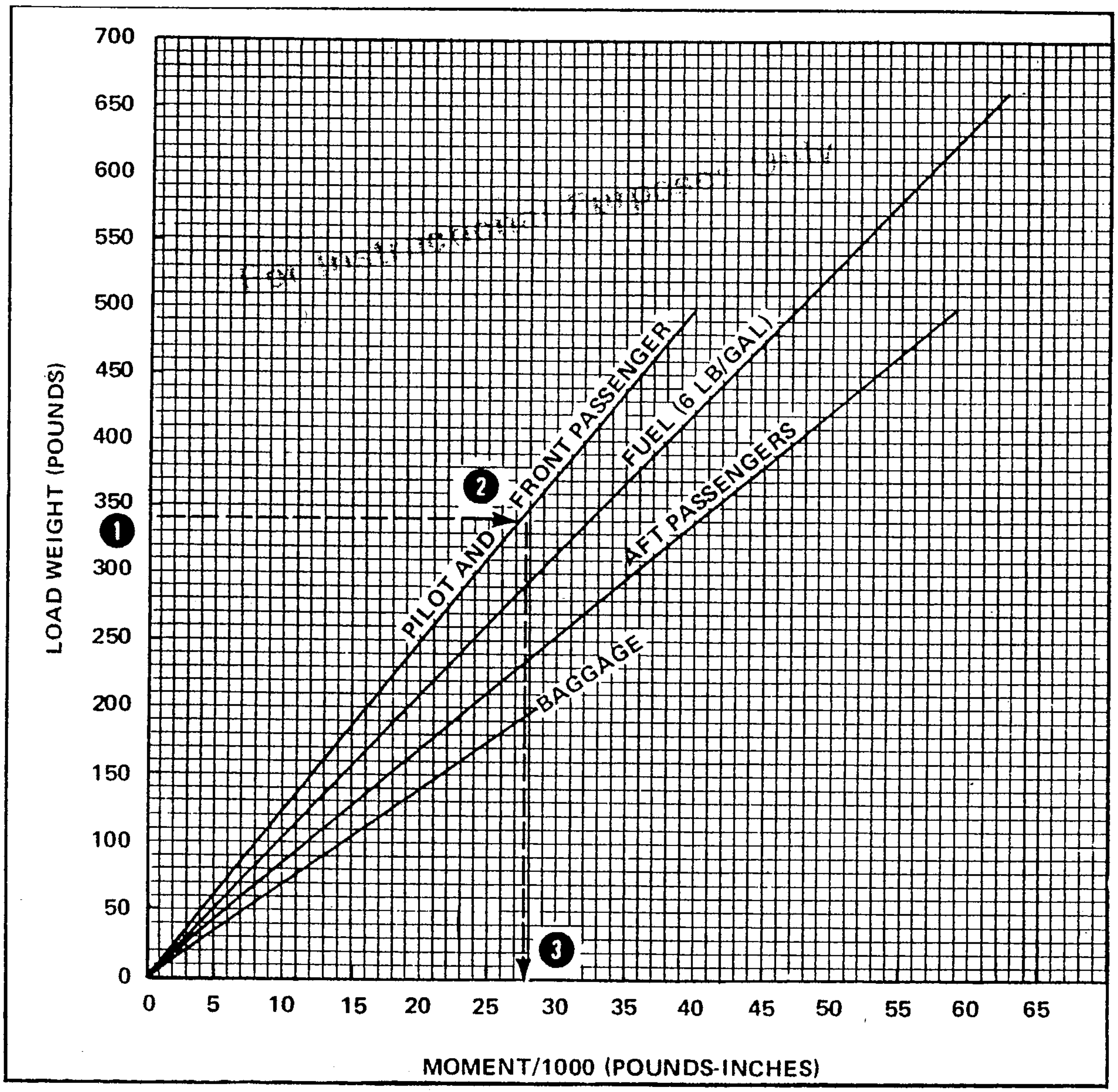
The weight is ________________ pounds, and the CG is ________________ inches aft of the datum.

11. After the airplane consumes 50 gallons of fuel, the rear seat passenger changes places with the front seat passenger who weighs 150 pounds. Based on the new loading, the CG location is ______________ inches from the datum, which is ______________ (within, beyond) limits.

12. How much fuel can be carried if four adults of normal stature occupy the aircraft and the baggage compartment is loaded to limits?

1. 41 pounds
2. 41 gallons
3. 68.6 pounds
4. 68.6 gallons





13. Assume the takeoff weight of an airplane is 4,200 pounds. At an average fuel consumption rate of 20 gallons per hour, what is the minimum time the airplane can fly before landing at the maximum landing weight of 4,000 pounds?

    1. 40 minutes
    2. 50 minutes
    3. 1 hour, 30 minutes
    4. 1 hour, 40 minutes

14. If the field elevation is 1,850 feet and the current altimeter setting is 29.77, the pressure altitude of the airport is ________________ feet.

15. Using the flight computer, determine the density altitude if the field elevation is 800 feet MSL, the altimeter setting is 29.72, and the temperature is 72° Fahrenheit.

    1. 800 feet
    2. 1,000 feet
    3. 1,500 feet
    4. 2,000 feet

16. When calculating density altitude, pressure altitude is corrected for nonstandard

    1. relative humidity.
    2. air temperature.
    3. pressure gradient.
    4. altimeter setting.

Match the effects on aircraft performance with the appropriate operating condition. Some answers may be used more than once.

17. ________ High air temperature
18. ________ Loaded to maximum allowable weight
19. ________ Gravel runway
20. ________ Uphill runway gradient
21. ________ High pressure altitude
22. ________ Sod runway

A. Increased takeoff distance
B. Decreased landing distance
C. Decreased maximum rate of climb
D. Increased landing distance.

Match the types of airspeed with the appropriate definitions. Types of airspeed may be used more than once.

23. ________ Greatest altitude gain for distance traveled
24. ________ Less than maximum rate of climb, good visibility, and engine cooling
25. ________ Meaning of V_Y
26. ________ Meaning of V_X
27. ________ Greatest altitude gained in shortest time

A. Best angle of climb
B. Best rate of climb
C. Cruise climb

Use the Piper Seminole performance charts at the end of the exercise section and, when necessary, the conditions listed below to answer questions 28 through 40.

DEPARTURE AIRPORT

Field elevation .... 1,650 feet MSL
Altimeter setting 29.87
Temperature.................... 32°C
Weight at takeoff .... 3,800 lb.
Usable fuel .... 95.0 gal.
Runway length .... 3,000 ft.
Wind .... Calm

CRUISE

Anticipated altitude .... 8,500 ft.
Reported OAT .... 21°C
Enroute altimeter setting 29.84

28. The pressure altitude at the departure airport is ________________ feet.

29. Measured from the beginning of the takeoff roll, the zero-degree flap takeoff distance required to clear a 50-foot obstacle is approximately ________________ feet.

30. ________ (True, False) If an engine fails at liftoff on a normal takeoff procedure, there is sufficient runway available to stop the aircraft in the remaining distance.

31. The best multi-engine rate of climb that may be expected after takeoff is approximately ______________ feet per minute.

32. The highest pressure altitude at which the engines can develop 65 percent power is approximately ______________ feet.

33. When using 55 percent power at the anticipated cruise altitude, the fuel consumption should be ______________ GPH and the engines should be operated between ____________ and ____________ RPM.

34. When using the best power mixture setting for 55 percent power at the anticipated cruise altitude, the true airspeed should be approximately ______________ knots.

35. The maximum demonstrated crosswind component for the Seminole is 17 knots and the observed windspeed at takeoff time is 26 knots. Using the crosswind component chart, the maximum angle (to the nearest 10°) between the runway and wind direction is ______________ degrees.

36. Use the landing distance over a 50-foot obstacle chart for the Seminole to determine the approximate landing distance required under the following conditions.

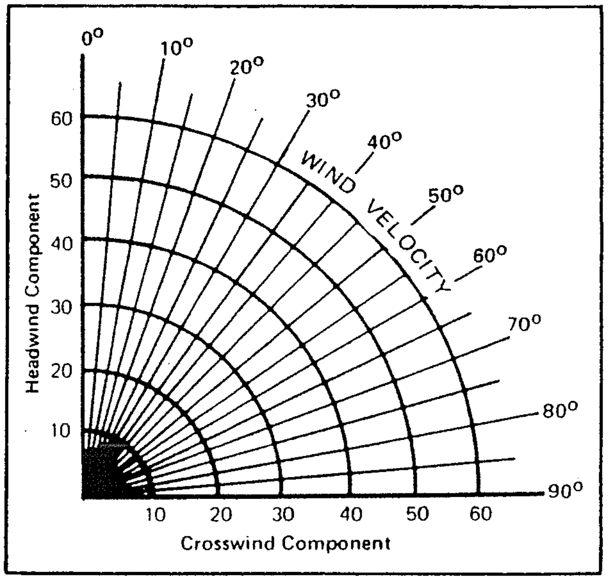
Temperature. . . . . 15°C
Altimeter setting 30.22
Field elevation. . . . . 1,300 ft. MSL
Landing weight. . . . . 3,600 lb.
Headwind component. . . . . 13 knots
Runway. . . . . Paved, level, and dry

The approximate landing distance is ______________ feet.

37. Under the conditions listed in the previous question, the recommended approach speed is ______________ KIAS.

38. On a standard day at 5,000 feet pressure altitude, a Seminole loaded to 3,600 pounds should have a single-engine climb rate of about ______________ FPM.

39. At 8,000 feet on a standard day, a 55 percent cruise power setting in lieu of 65 percent will increase the no-reserve cruise range by ______________ NM.



40. In a fully loaded Seminole with the gear and flaps extended, an increase in bank from 0° to 45° will increase the stalling speed from ____________ to ____________ KIAS.

EXERCISE 4 — ENGINE-OUT OPERATION

1. When the engine-out rate of climb becomes 50 FPM, the airplane has reached the engine-out ______________ ceiling.

2. If an engine-out climb is not possible, the slowest rate of descent can be attained by using the best ______________ -of-climb airspeed.

3. _______ (True, False) Climb performance is decreased approximately 80 percent with one engine inoperative.

4. _______ (True, False) VMCA decreases as density altitude increases or power is reduced.

5. The most prominent initial indication of an engine failure is a

   1. sudden decrease in RPM and manifold pressure.
   2. sudden yaw in the direction of the operating engine.
   3. pronounced rolling and yawing tendency toward the inoperative engine.
   4. zero indication on the fuel flow indicator for the inoperative engine.

6. With one engine inoperative, the primary aerodynamic control used to overcome yaw is the ______________.

7. _______ (True, False) When considering asymmetrical thrust, an airplane like the Piper Seminole with counterrotating propellers does not have a critical engine.

8. Refer to the appropriate graph at the end of this section to determine the accelerate/stop distance under the following conditions.

   Temperature . . . . 15°C
   Field elevation . . . . 1,880 feet
   Altimeter setting 29.80
   Weight . . . . 3,500 lb.
   Headwind . . . . 10 knots

   The accelerate/stop distance is approximately ______________ feet.

9. Under the same conditions listed in question 8, but using 3,400 pounds for the weight, the accelerate/stop distance is reduced by ______________ feet.

10. _______ (True, False) The accelerate/stop distance is not affected by changes in runway gradient or surface.

11. The two most critical phases of flight in a multi-engine airplane are ______________ and ______________.

12. _______ (True, False) Multi-engine airplanes with a maximum weight of less than 6,000 pounds must have an engine-out climb rate of 50 FPM at an altitude of 5,000 feet.

Refer to the single-engine climb performance chart at the end of the exercise section to answer questions 13 through 15.

13. Determine the rate of climb and best rate-of-climb airspeed with one engine inoperative under the following conditions.

    Field elevation . . . . 2,000 ft.
    Altimeter setting 29.92
    Temperature . . . . 29°C
    Weight . . . . 3,600 lb.

    The rate of climb is ______________ FPM, and the best rate-of-climb airspeed is ______________ KIAS.

14. On a standard day, the approximate single-engine service ceiling for a 3,400-pound airplane is ______________ feet.

15. On a standard day, the approximate single-engine absolute ceiling at 3,600 pounds airplane weight is ______________ feet.

16. The V-speed that produces the maximum rate of climb (or minimum rate of descent) with one engine inoperative is called ______________ .

17. Engine-out performance can be increased by banking the airplane three to five degrees toward the ______________ engine.

18. If an engine fails while enroute, the alternate airport which is selected should be the closest one in terms of ______________.

19. List the procedures used in the Piper Seminole to crossfeed fuel from the left nacelle tank to the right engine when the left engine is inoperative.

1. ______________________________
2. ______________________________
3. ______________________________

20. If an engine failure occurs below VMCA, the appropriate action to maintain control of the airplane is to __________ power to reduce __________ thrust, and lower the nose of the aircraft.

21. List three methods of identifying an inoperative engine.

1. ______________________________
2. ______________________________
3. ______________________________

22. List in sequence the power control adjustments which should be made immediately following an engine failure.

1. ______________________________
2. ______________________________
3. ______________________________

23. The final confirmation used to identify an inoperative engine is to close the appropriate ______________ and note the lack of any change in ______________ thrust.

24. ________ (True, False) During an engine-out approach to a landing, a higher than normal approach speed is used.

25. ________ (True, False) The normal flap extension procedure should be used throughout the engine-out approach to landing.

26. During an engine-out approach, the landing gear is extended on the ______________ leg of the traffic pattern.

27. The appropriate takeoff procedure when an engine failure occurs prior to reaching the recommended liftoff speed is to

1. place both mixtures in idle cutoff and apply full flaps for aerodynamic braking.
2. feather both propellers and apply the brakes, if necessary.
3. immediately retard both throttles, apply heavy braking only if required, and do not change the takeoff configurations.
4. retard the throttle on the operative engine, retract flaps (if extended), and apply immediate, heavy braking.

28. The maximum recommended flap extension for an engine-out approach in the Piper Seminole is ______________°.

29. ________ (True, False) The engine-out landing normally will require more distance during the landing roll than will the normal two-engine landing.

30. Because of performance considerations during engine-out maneuvering, the maximum angle of bank usually is limited to ______________°.

31. A propeller should not be feathered immediately when

1. an in-flight engine fire occurs.
2. the engine RPM does not respond to the propeller control.
3. propeller icing produces severe vibrations.
4. the engine is producing partial power.

EXERCISE 4

The remaining questions are to be answered by applicants who hold instrument ratings.

32. ________ (True, False) During an engine-out straight-in approach to landing, it is advisable to extend the landing gear only after the runway is in sight and the landing is assured.

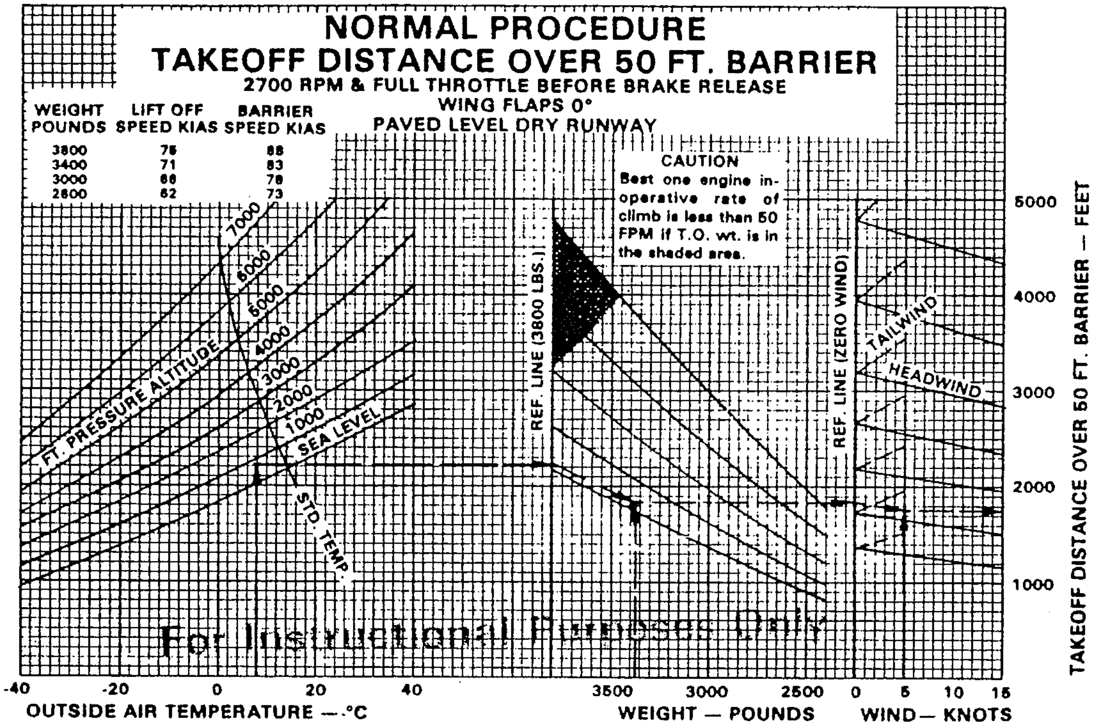
33. If a missed approach becomes necessary after an engine-out instrument approach, the recommended climb speed is

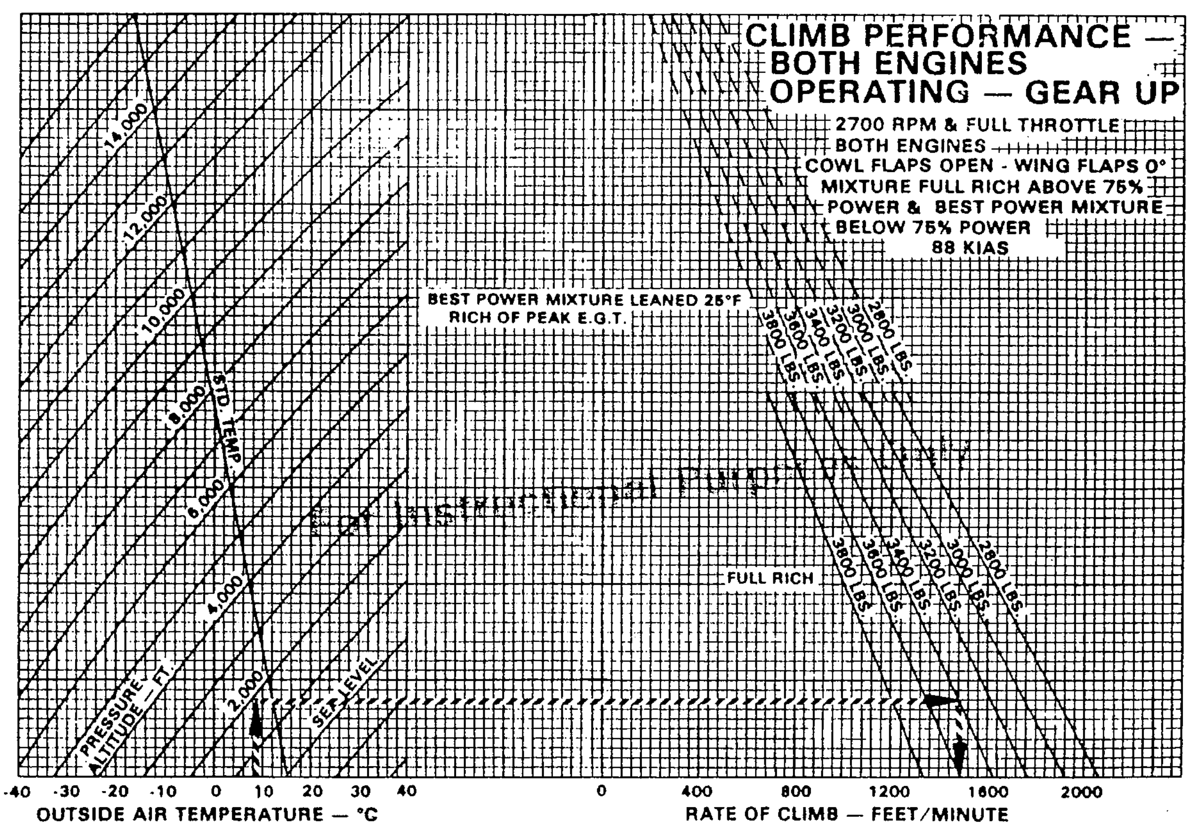
    1. V_X.
    2. V_{XSE}.
    3. V_Y.
    4. V_{YSE}.

34. As an additional safety factor, the pilot should not depart on an instrument flight when the weather at the departure airport is less than

    1. landing minimums.
    2. takeoff minimums.
    3. alternate minimums.
    4. the minimum vectoring altitude.

35. ________ (True, False) During an engine-out approach, it is advisable to leave the wing flaps retracted so that a missed approach may be executed with less requirement to eliminate drag.


NORMAL PROCEDURE
TAKEOFF DISTANCE OVER 50 FT. BARRIER
2700 RPM & FULL THROTTLE BEFORE BRAKE RELEASE
WING FLAPS 0°
PAVED LEVEL DRY RUNWAY
WEIGHT POUNDS | LIFT OFF SPEED KIAS | BARRIER SPEED KIAS
3800 76 88
3400 71 83
3000 66 78
2600 62 73
CAUTION
Best one engine inoperative rate of climb is less than 50 FPM if T.O. wt. is in the shaded area.
FT. PRESSURE ALTITUDE
7000
6000
5000
4000
3000
2000
1000
SEA LEVEL
STD. TEMP.
REF. LINE (3800 LBS.)
REF. LINE (ZERO WIND)
TAILWIND
HEADWIND
5000
4000
3000
2000
1000
TAKEOFF DISTANCE OVER 50 FT. BARRIER — FEET
For Instructional Purposes Only
-40 -20 0 20 40
OUTSIDE AIR TEMPERATURE — °C
3500 3000 2500
WEIGHT — POUNDS
0 5 10 15
WIND — KNOTS

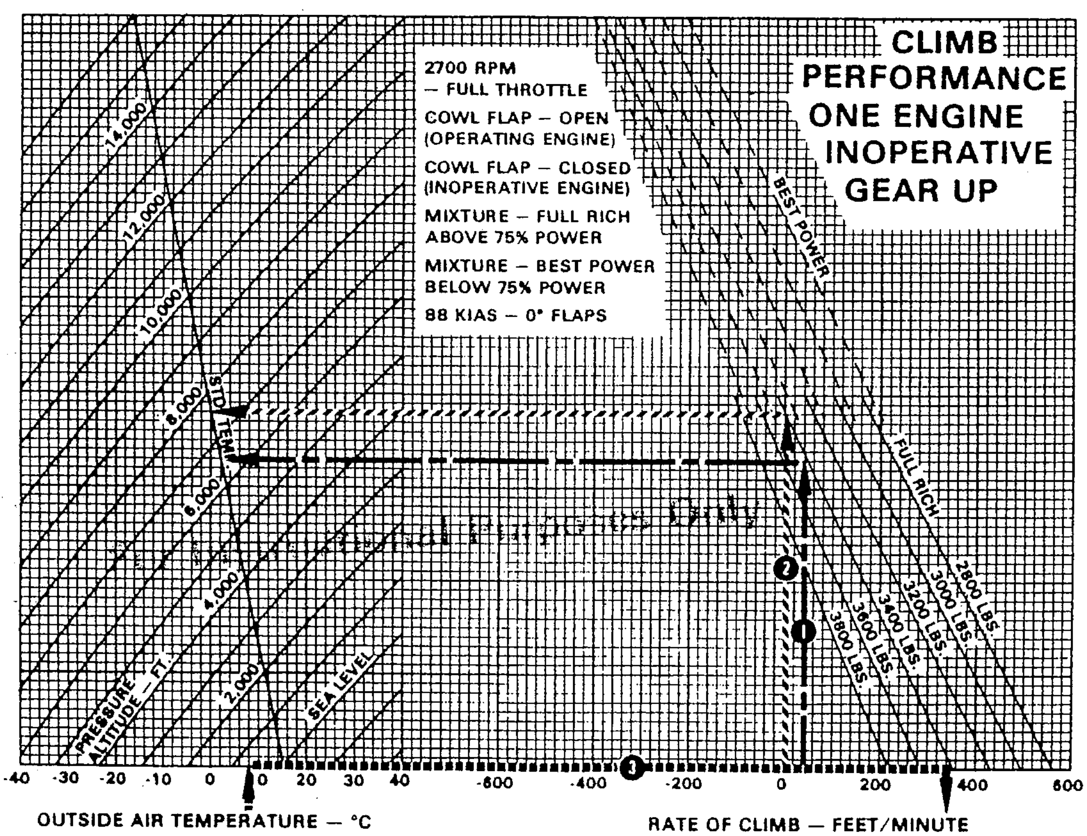

CLIMB PERFORMANCE — BOTH ENGINES OPERATING — GEAR UP
2700 RPM & FULL THROTTLE
BOTH ENGINES
COWL FLAPS OPEN - WING FLAPS 0°
MIXTURE FULL RICH ABOVE 75% POWER & BEST POWER MIXTURE BELOW 75% POWER
88 KIAS
BEST POWER MIXTURE LEANED 25°F RICH OF PEAK E.G.T.
FULL RICH
14,000
12,000
10,000
8,000
6,000
4,000
2,000
SEA LEVEL
PRESSURE ALTITUDE — FT.
STD. TEMP.
3800 LBS.
3600 LBS.
3400 LBS.
3200 LBS.
3000 LBS.
2800 LBS.
For Instructional Purposes Only
-40 -30 -20 -10 0 10 20 30 40
OUTSIDE AIR TEMPERATURE — °C
0 400 800 1200 1600 2000
RATE OF CLIMB — FEET/MINUTE

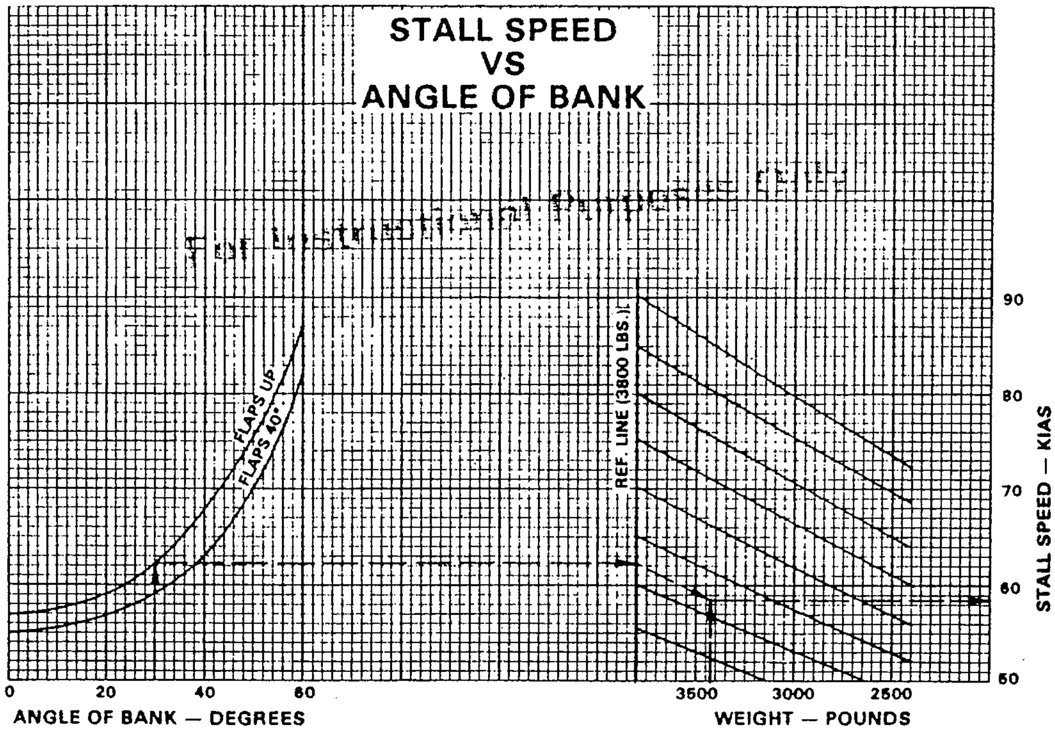
FUEL AND POWER CHART - LYCOMING (L) O-360-E SERIES (PER ENGINE)

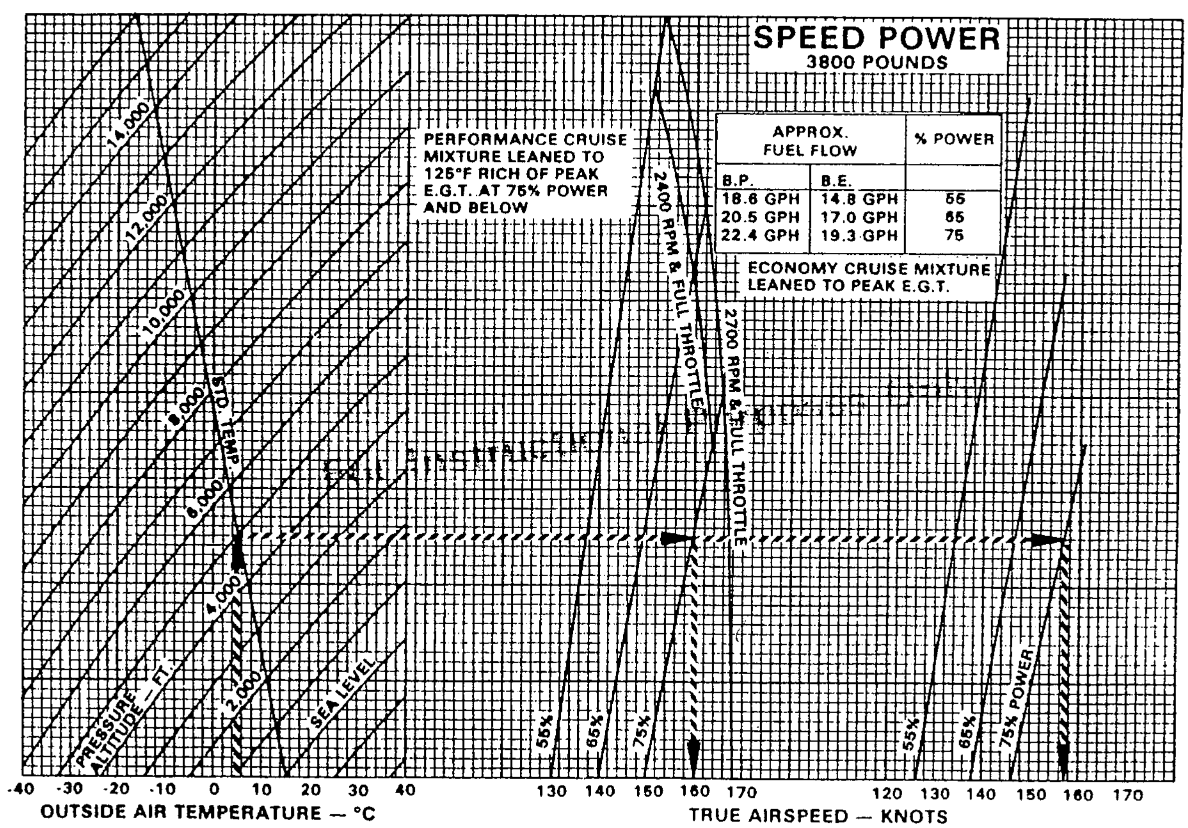
Press. Alt. Feet	Std. Alt. Temp. °C	99 BHP - 55% Rated Power Approx. Fuel Flow-9.3 Gal/Hr.* RPM AND MAN. PRESS. 2100	2200	2300	2400	117 BHP - 65% Rated Power Approx. Fuel Flow-10.3 Gal/Hr.* RPM AND MAN. PRESS. 2100	2200	2300	2400	135 BHP - 75% Rated Power Approx. Fuel Flow-11.2 Gal/Hr.* RPM AND MAN. PRESS. 2200	2300	2400	Press. Alt. Feet
SL	15	22.2	21.7	21.2	20.7	24.5	24.0	23.4	22.9	26.4	25.8	25.2	SL
1000	13	21.9	21.4	21.0	20.4	24.2	23.7	23.1	22.6	26.1	25.5	24.9	1000
2000	11	21.6	21.1	20.7	20.2	23.9	23.4	22.9	22.3	25.8	25.2	24.6	2000
3000	9	21.3	20.8	20.4	19.9	23.6	23.1	22.6	22.1	25.4	24.9	24.4	3000
4000	7	21.0	20.6	20.1	19.7	23.2	22.7	22.3	21.8	FT	24.7	24.1	4000
5000	5	20.8	20.3	19.9	19.4	22.9	22.4	22.0	21.5	—	FT	23.8	5000
6000	3	20.5	20.2	19.6	19.2	22.6	22.1	21.7	21.3	—	—	FT	6000
7000	1	20.2	19.7	19.3	18.9	FT	21.8	21.5	21.0				7000
8000	-1	19.9	19.5	19.1	18.6		FT	21.2	20.7				8000
9000	-3	19.6	19.2	18.8	18.4	—	—	FT	20.3				9000
10,000	-5	19.3	18.9	18.5	18.1	—		—	FT				10,000
11,000	-7	FT	18.6	18.3	17.9								11,000
12,000	-9	—	FT	18.0	17.6								12,000
13,000	-11	—	—	FT	17.4								13,000
14,000	-13	—	—	—	FT								14,000

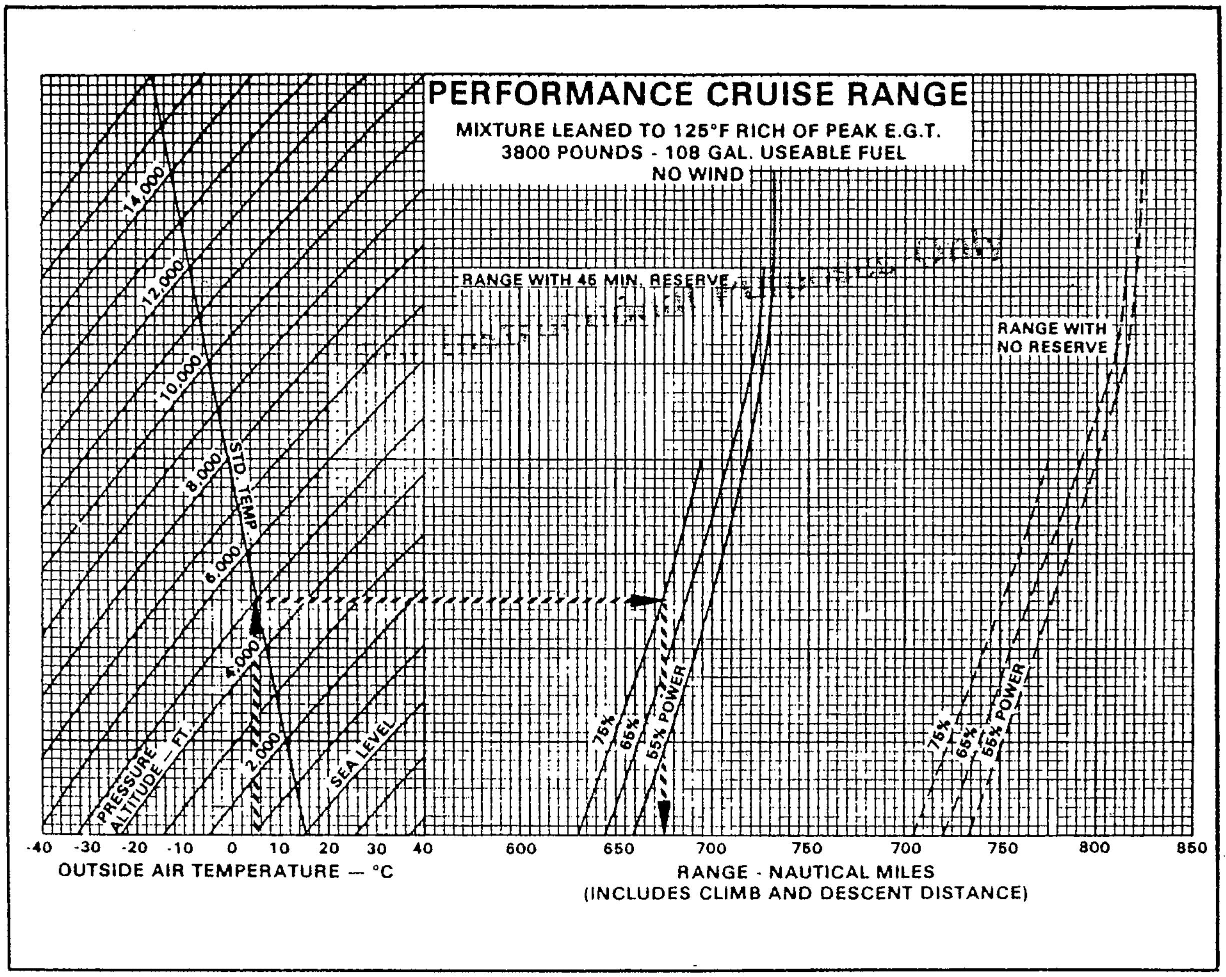
NOTE: To maintain constant power, correct manifold pressure approximately 0.17" Hg. for each 6°C variation in carburetor air temperature from standard altitude temperature. Add manifold pressure for air temperatures above standard.

*Best Power

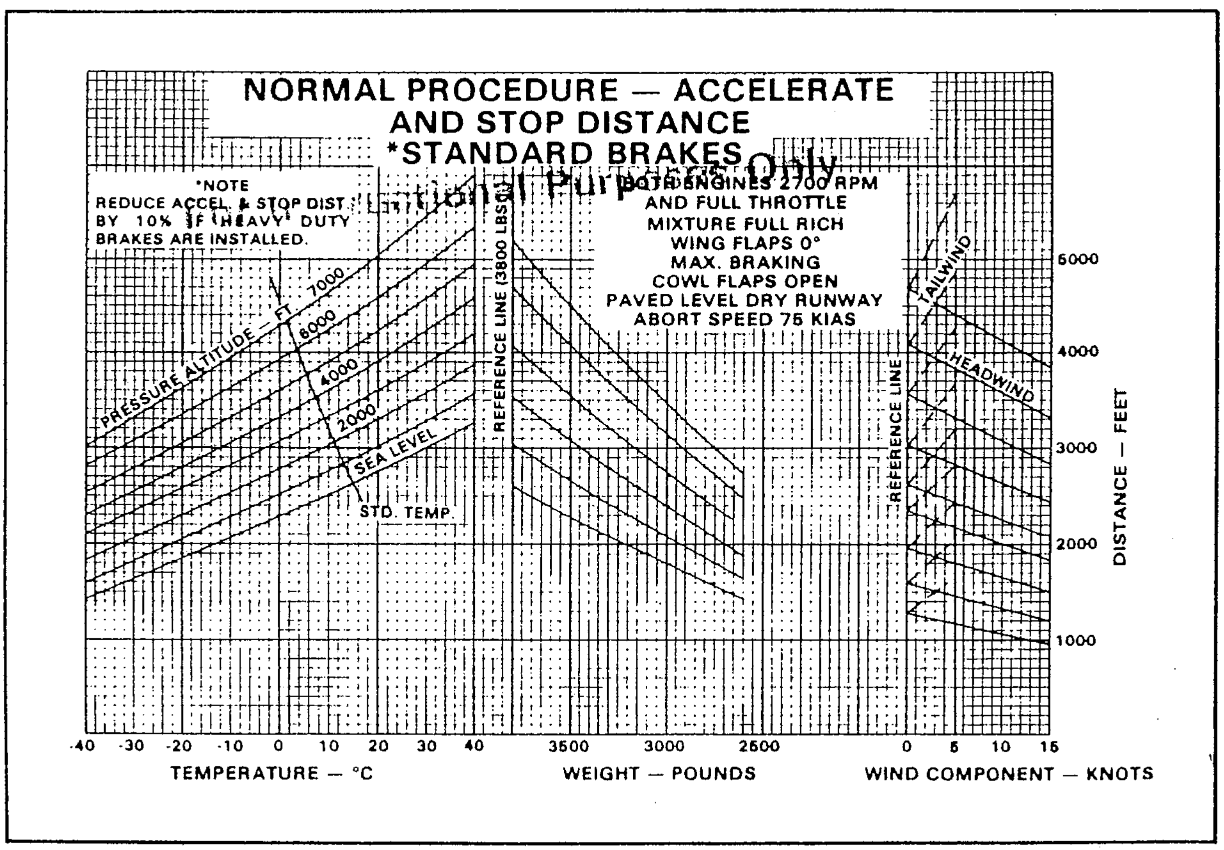



STALL SPEED
VS
ANGLE OF BANK
FLAPS UP
FLAPS 40°
REF. LINE (3800 LBS.)
90
80
70
60
50
STALL SPEED — KIAS
0
20
40
60
ANGLE OF BANK — DEGREES
3500
3000
2500
WEIGHT — POUNDS

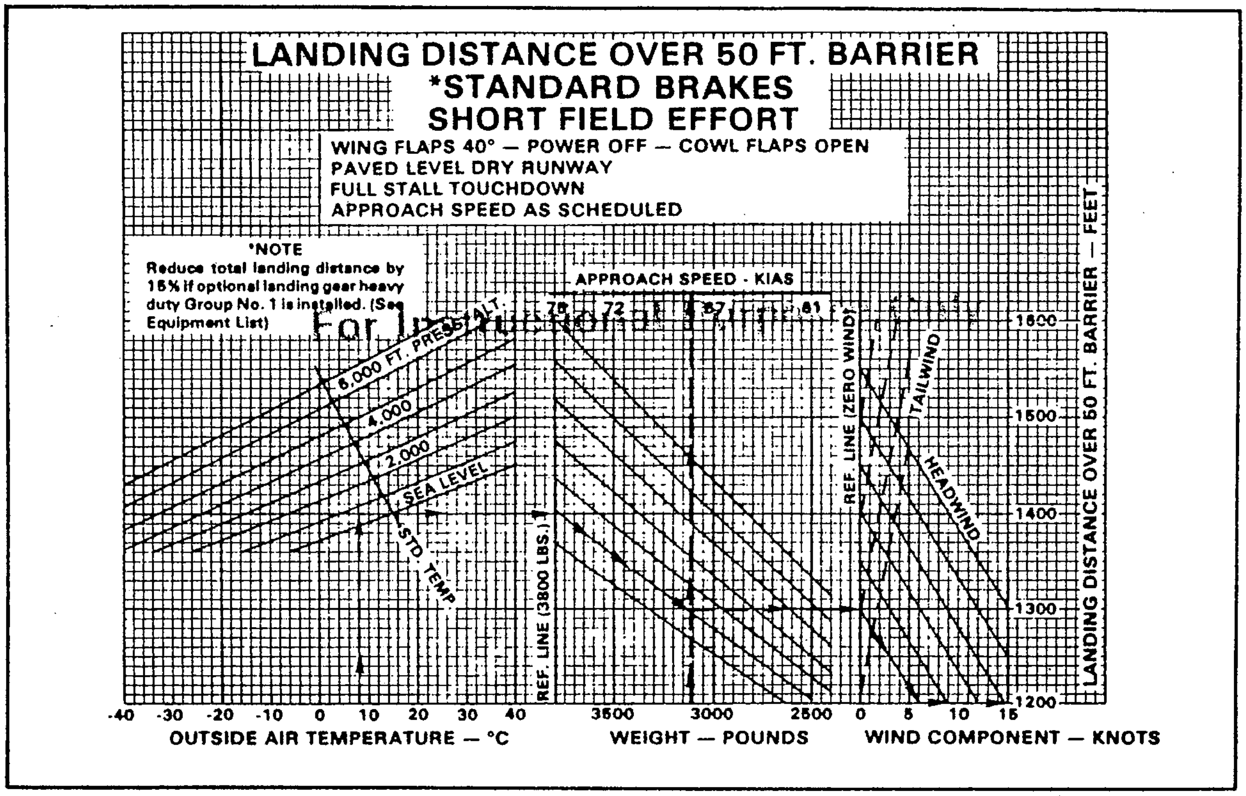

SPEED POWER
3800 POUNDS
PERFORMANCE CRUISE MIXTURE LEANED TO 125°F RICH OF PEAK E.G.T. AT 75% POWER AND BELOW
APPROX. FUEL FLOW
% POWER
B.P.
B.E.
18.6 GPH
14.8 GPH
55
20.5 GPH
17.0 GPH
65
22.4 GPH
19.3 GPH
75
ECONOMY CRUISE MIXTURE LEANED TO PEAK E.G.T.
14,000
12,000
10,000
8,000
6,000
4,000
2,000
SEA LEVEL
STD. TEMP.
PRESSURE ALTITUDE — FT.
2400 RPM & FULL THROTTLE
2700 RPM & FULL THROTTLE
55%
65%
75%
75% POWER
-40
-30
-20
-10
0
10
20
30
40
OUTSIDE AIR TEMPERATURE — °C
130
140
150
160
170
120
TRUE AIRSPEED — KNOTS



PERFORMANCE CRUISE RANGE
MIXTURE LEANED TO 125°F RICH OF PEAK E.G.T.
3800 POUNDS - 108 GAL. USEABLE FUEL
NO WIND
RANGE WITH 45 MIN. RESERVE
RANGE WITH NO RESERVE
14,000
12,000
10,000
8,000
6,000
4,000
2,000
SEA LEVEL
STD. TEMP.
PRESSURE ALTITUDE — FT.
75%
65%
55% POWER
-40 -30 -20 -10 0 10 20 30 40
OUTSIDE AIR TEMPERATURE — °C
600 650 700 750 700 750 800 850
RANGE - NAUTICAL MILES
(INCLUDES CLIMB AND DESCENT DISTANCE)



NORMAL PROCEDURE — ACCELERATE AND STOP DISTANCE
*STANDARD BRAKES
*NOTE
REDUCE ACCEL. & STOP DIST. BY 10% IF 'HEAVY' DUTY BRAKES ARE INSTALLED.
BOTH ENGINES 2700 RPM
AND FULL THROTTLE
MIXTURE FULL RICH
WING FLAPS 0°
MAX. BRAKING
COWL FLAPS OPEN
PAVED LEVEL DRY RUNWAY
ABORT SPEED 75 KIAS
PRESSURE ALTITUDE — FT
7000
6000
4000
2000
SEA LEVEL
STD. TEMP.
REFERENCE LINE (3800 LBS.)
REFERENCE LINE
TAILWIND
HEADWIND
6000
4000
3000
2000
1000
DISTANCE — FEET
-40 -30 -20 -10 0 10 20 30 40
TEMPERATURE — °C
3500 3000 2500
WEIGHT — POUNDS
0 5 10 15
WIND COMPONENT — KNOTS


LANDING DISTANCE OVER 50 FT. BARRIER
*STANDARD BRAKES
SHORT FIELD EFFORT
WING FLAPS 40° — POWER OFF — COWL FLAPS OPEN
PAVED LEVEL DRY RUNWAY
FULL STALL TOUCHDOWN
APPROACH SPEED AS SCHEDULED
*NOTE
Reduce total landing distance by 15% if optional landing gear heavy duty Group No. 1 is installed. (See Equipment List)
APPROACH SPEED - KIAS
75
72
67
61
6,000 FT. PRESS ALT.
4,000
2,000
SEA LEVEL
STD. TEMP
REF. LINE (3800 LBS.)
REF. LINE (ZERO WIND)
TAILWIND
HEADWIND
1600
1500
1400
1300
1200
LANDING DISTANCE OVER 50 FT. BARRIER — FEET
-40 -30 -20 -10 0 10 20 30 40
OUTSIDE AIR TEMPERATURE — °C
3500 3000 2500
WEIGHT — POUNDS
0 5 10 15
WIND COMPONENT — KNOTS

PIPER MULTI-ENGINE EXERCISE ANSWERS

EXERCISE 1 — AIRCRAFT SYSTEMS

1. 55
2. 98, 2
3. True
4. False
5. True
6. alternators
7. False
8. 3, 5, 1, 4, 2
9. False
10. battery
11. False
12. electrically
13. True
14. strut
15. hydraulic pressure
16. gravity, springs
17. False
18. low, high
19. 800, feathering
20. aft
21. governor
22. False
23. combustion heater
24. dorsal fin
25. False

EXERCISE 2 — MULTI-ENGINE OPERATIONS

1. False
2. cylinder head temperatures
3. 1. fuel pressure gauges
   2. oil pressure gauges
   3. oil temperature gauges
   4. cylinder head temperature gauges
4. 4
5. 3
6. True
7. 3
8. 1
9. 3
10. 2
11. 3
12. 4
13. False
14. upwind
15. 1. enrich the mixtures
    2. use a higher climb speed
    3. open cowl flaps fully
    4. increase engine RPM
    5. level off momentarily
16. 2
17. 4
18. False
19. 3
20. 2
21. 2
22. 2
23. False
24. True
25. 1. Fuel consumption reduced
    2. Size of holding pattern and required airspace reduced
    3. Transition to approach less complicated
    4. altitude control less difficult
26. 3

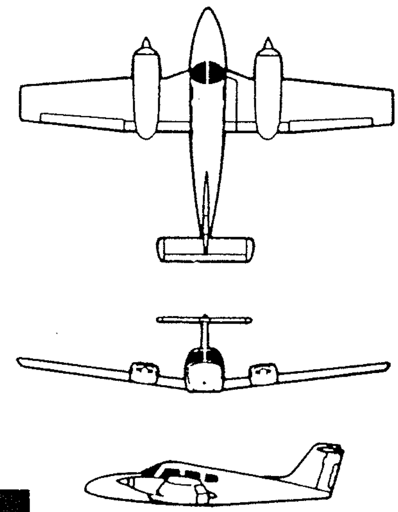
EXERCISE 3 — WEIGHT AND BALANCE CONTROL AND PERFORMANCE

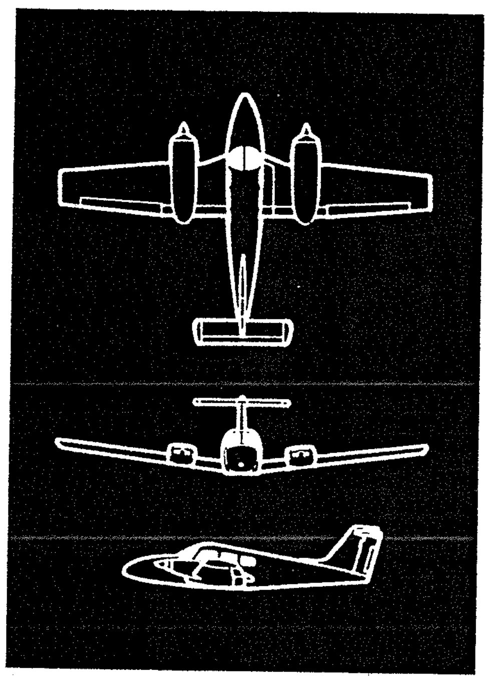
1. basic empty
2. True
3. maximum takeoff
4. True
5. False
6. longer
7. 2
8. decreased
9. 3
10. 3,748.2, 91.0
11. 91.2, within
12. 4
13. 4
14. 2,000
15. 4
16. 2
17. A, C, D
18. A, C, D
19. A, D
20. A, B
21. A, C, D
22. A, D
23. A
24. C
25. B
26. A
27. B
28. 1,700
29. 3,190
30. False
31. 1,000
32. 10,000
33. 18.6, 2,100, 2,400
34. 146
35. 40
36. 1,210
37. 73
38. 70
39. 15
40. 55, 66

EXERCISE 4 — ENGINE-OUT OPERATIONS

1. service
2. rate
3. True
4. True
5. 3
6. rudder
7. True
8. 2,450
9. 100
10. False
11. takeoff, climb
12. False
13. 110, 88
14. 6,600
15. 6,500
16. V_{YSE}
17. operative
18. time
19. 1. Right engine fuel selector — crossfeed
    2. Left engine fuel selector — off
    3. Electric fuel pumps — off
20. reduce, asymmetrical
21. 1. The control application required to counteract yaw and roll
    2. The engine instruments
    3. Closing the throttle of the suspected engine
22. 1. Both mixtures — rich
    2. Both propeller controls — high RPM
    3. Both throttles — maximum power
23. throttle, asymmetrical
24. False
25. False
26. downwind
27. 3
28. 25
29. True
30. 15
31. 4
32. False
33. 4
34. 1
35. True

FLIGHT TUTORS





PART 3

INTRODUCTION

The Flight Tutors for the Piper Multi-Engine Course are a comprehensive series of essay exercises. These exercises are strategically placed throughout the curriculum and allow the student to research pertinent subject areas prior to a thorough discussion of the answers with the instructor. It is necessary for the student to have access to the pilot's operating handbook for the aircraft used in training.

The Flight Tutors are assigned by the instructor according to the curriculum. The student should complete the appropriate exercises on a separate sheet of paper and bring them to the tutoring sessions. Answers for the Flight Tutors are not given in this manual, but will be supplied by the instructor.

FLIGHT TUTOR 1 — AIRCRAFT FAMILIARIZATION

1. Is it possible to operate both engines from one fuel cell simultaneously?
2. What is the best procedure for fuel management during takeoff, cruise, and landing?
3. What is the maximum usable fuel for this aircraft?
4. What is the minimum fuel grade that may be used in this aircraft?
5. Describe the positions on the fuel management control panel.
6. What is the purpose of the electrical fuel pumps, and under what conditions are they put in operation?
7. Is it recommended procedure to operate both fuel selectors in the CROSSFEED position simultaneously?
8. If this aircraft has only two fuel quantity indicators and four fuel tanks, how may the pilot determine fuel quantity in any given fuel cell?
9. At what position in the fuel system is the fuel pressure metered? Why?
10. Where are the fuel system quick drains located?
11. During the preflight inspection for airplanes equipped with a gascolator, should the gascolator be drained before the fuel tanks are checked for contamination?
12. If the fuel quantity of one fuel cell is inadvertently exhausted, explain the procedure for switching tanks. Why?
13. Is the electrical system in this aircraft protected by circuit breakers or fuses?
14. What are the primary sources of electrical power?
15. Is this aircraft equipped with alternators or generators? Are there any advantages or disadvantages to the type of system used?
16. What is the purpose of the ammeters? What do they indicate?
17. How can an alternator failure be detected and what procedure should be followed if this occurs?
18. In the event both alternators fail, what is the primary power source for the electrical system?
19. What is the recommended procedure for resetting a circuit breaker?
20. How can the pilot detect an alternator overvoltage and what procedure should be followed if an overvoltage is detected?
21. Are the alternators installed in the aircraft direct drive or belt driven?

22. Is the aircraft equipped with an electric or hydraulic retractable landing gear system? Explain the system, components, and basic operation.

23. Explain the procedure for manually extending the landing gear if the primary source of power fails.

24. If a forced landing is necessary, what determines whether the landing gear should be extended or retracted for the landing?

25. What is the structural component that normally limits the landing gear extension speed?

26. Is there a maximum landing gear retraction speed? If so, what is it?

27. At approximately what manifold pressure setting will the landing gear warning horn sound when the gear is retracted?

28. Where is the emergency locator transmitter found in this aircraft?

29. Explain the proper leaning procedures for the fuel mixtures.

30. Where is the alternate static source located and how is it put into operation?

31. Explain the avionic installation in this aircraft (transmitting and receiving capabilities, navigation, speaker, headset).

32. For this aircraft, what are the basic empty weight, maximum takeoff weight, and maximum landing weight?

33. At maximum takeoff weight, what is the center of gravity range in inches?

34. If loaded to maximum capacity, the greatest movement in the center of gravity will occur when weight is shifted from what loading position (fuel, baggage, or passenger)?

35. Assuming the following conditions, determine whether the aircraft is loaded within the center of gravity range.

    Pilot and front passenger . . . . 340 lb.
    Rear passengers . . . . 100 lb.
    Fuel tanks . . . . Full
    Baggage (aft compartment) . . . . . . 95 lb.

36. Assuming that the aircraft is loaded with the CG at the extreme rear of the center of gravity limit, explain the handling characteristics of the aircraft during normal operations, such as takeoffs and landings.

37 Given the following conditions, determine the accelerate-stop distance, the normal takeoff ground run, and the takeoff distance necessary to clear a 50-foot obstacle.

    Field elevation. . . . . 2,000 ft.
    Temperature . . . . 31°C
    Altimeter setting 29.72
    Runway . . . . Hard surfaced
    Weight . . . . Maximum takeoff weight
    Headwind component . . . . 10 knots

38. Assuming the aircraft is loaded to maximum takeoff weight, compute the average rate of climb between the pressure altitudes of 5,000 and 10,000 feet if the respective temperatures are both 15°C.

39. Determine the indicated stalling speed under the following conditions.

    Angle of bank . . . . 50°
    Flaps . . . . 0°

40. Given the following conditions, determine the normal landing roll and the landing distance over a 50-foot obstacle.

    Field elevation. . . . . 3,500 ft.
    Temperature . . . . 26°C
    Altimeter setting 30.32
    Weight . . . . Maximum landing weight
    Headwind component . . . . 15 knots

41. Determine the power settings that will provide 65 percent rated horsepower under the following conditions.

    Pressure altitude. . . . . 7,000 ft.
    Temperature . . . . 18°C

42. Is the propeller pitch controlled by oil pressure, nitrogen pressure, or both?

43. What is the maximum positive load factor?

44. What is the air minimum control speed and single-engine absolute ceiling for this aircraft? What is the significance of each of these values?

45. Are intentional spins prohibited in this aircraft?

46. List the following airspeeds and the corresponding airspeed indicator color codes, where applicable.

    1. Stalling speed with gear down, flaps down
    2. Stalling speed with gear up, flaps up
    3. Best angle-of-climb airspeed
    4. Best rate-of-climb airspeed
    5. Enroute climb airspeed
    6. Normal approach speed
    7. Maximum flap extended speed
    8. Maximum landing gear extended speed
    9. Design maneuvering speed
    10. Maximum structural cruising speed
    11. Never-exceed speed
    12. Minimum safe single-engine speed
    13. Best single-engine rate of climb airspeed
    14. Air minimum control speed

FLIGHT TUTOR 2 — MULTI-ENGINE PROCEDURES

1. Prior to departure, how may the pilot determine that the engines are warm enough for takeoff?

2. How may the use of asymmetrical thrust be of value during a crosswind taxi operation?

3. What is the demonstrated crosswind component for this aircraft?

4. Explain the correct technique for executing a short-field takeoff over a 50-foot obstacle.

5. How does the use of flaps affect the takeoff distance over a 50-foot obstacle?

6. What is the minimum rotation speed for a normal takeoff?

7. After takeoff, what is the minimum altitude that must be attained before the power is reduced to climb thrust? Why?

8. What is the normal climb airspeed and power setting?

9. What determines the configuration of the cowl flaps during a climb?

10. If oil and cylinder head temperatures appear to be above normal during cruise, is it advisable to reduce the manifold pressure and RPM settings? Why?

11. What is the most effective method of synchronizing the RPM of the propellers?

12. Explain the procedure for establishing flight at minimum controllable airspeed. What determines whether or not the aircraft is at minimum controllable airspeed?

13. During flight at minimum controllable airspeed, what is the speed differential when the gear and the flaps are extended and when they are retracted?

14. How is the pitch trim affected during flight at minimum controllable airspeed when the gear and flaps are retracted?

15. Explain the procedure for setting up and executing approach-to-landing and departure stalls.

16. What is the speed differential between power-off stalls with and without gear and flaps extended?

17. What is the maximum steep turn entry speed?

18. What power setting is recommended during steep turns?

19. What are the maximum flap extended and gear extended speeds?

20. During a short-field approach to landing, what is the primary control for adjusting rate of descent?

21. During a short-field landing, what speed is used on the final approach? How does this speed compare with the air minimum control speed?

The remaining questions are to be answered by applicants who hold instrument ratings.

22. Explain the recovery procedure for a nose-high critical attitude.

23. What rule of thumb is used for leading the desired heading during roll-out from a standard-rate turn?

24. Are there any differences in compass errors between a single-engine and multi-engine airplane? Explain.

25. Explain the recovery procedure for a power-on steep spiral.

FLIGHT TUTOR 3 — ENGINE-OUT PROCEDURES

1. Does the airplane have a *critical engine?*

2. Do the propellers have a minimum RPM feathering limit? If so, what is the limit?

3. Does the shutdown of either engine affect the operation of the landing gear, flaps, or hydraulic system?

4. With one engine inoperative, will the alternator on the remaining engine maintain the battery charge and operate all the electrical equipment?

5. Define accelerate-stop distance and explain why it is an important performance consideration.

6. If the takeoff density altitude is greater than the engine-out service ceiling, can the pilot anticipate a positive rate of climb in the event of an engine failure?

7. If a positive engine-out rate of climb is not possible, how is the minimum rate of descent obtained?

8. Explain why the climb performance of a twin-engine airplane is decreased more than 50 percent with one engine inoperative.

9. Why does a five-degree bank toward the operative engine decrease the amount of rudder deflection required to counteract yaw?

10. Explain why takeoff and initial climb are the two most critical phases of flight in regard to an engine failure.

11. If the left engine fails, which rudder must be applied to counteract yaw?

12. If an engine fails, why are the throttles and propeller controls for both engines advanced to the maximum power position?

13. Why is the throttle of the suspected inoperative engine reduced to idle prior to beginning the feathering procedures?

14. If an engine failure occurs below VMCA, what procedure must be used to regain control of the airplane?

15. What airplane weight and configuration is used by the manufacturer to determine VMCA?

16. When considering an engine failure, which is more valuable — airspeed in excess of VYSE or additional altitude? Why?

17. If an engine failure occurs below VMCA while the aircraft is still on the runway, what is the best procedure to follow?

18. What is the most common cause of an engine failure while enroute?

19. In the event of an engine failure enroute, is the distance or the time required to reach the alternate airport the most important consideration?

20. Why is it usually necessary to crossfeed fuel from the fuel tanks associated with the inoperative engine during prolonged single-engine flight?

21. Assuming an engine failure, describe the correct fuel selector position to crossfeed fuel to the operative engine.

22. Should the fuel crossfeed be used during an engine-out approach and landing?

23. During a long, cross-country flight, will there be any change in the single-engine service ceiling as the flight progresses? If so, how will it change?

24. On what leg of the traffic pattern is the landing gear extended during a single-engine landing approach? Why?

25. Are full flaps normally used for an engine-out landing?

26. Is a higher than normal approach speed used for the engine-out approach?

27. Is a successful engine-out go-around probable from a low altitude when the airspeed is less than VYSE?

FLIGHT TUTOR 4 — ORAL EXAM PREPARATION

1. What documents are required to be on board the aircraft during flight operations, and what is the significance of each?

2. When are the next annual inspection and 100-hour inspection due or the next "event" if programmed inspection is being used?

3. Begin with the slowest V-speed that is shown on the airspeed indicator and describe in order each speed, including its significance.

4. Based upon the following data, determine the location of the center of gravity.

   Pilot and front passenger . . . . 350 lb.
   Rear passenger. . . . . 100 lb.
   Fuel tanks. . . . . Full
   Baggage (aft compartment) . . . . . . 75 lb.

5. Use the weight and balance data from the previous question. When an intermediate stop is made, the aircraft has consumed 28 gallons of fuel and the rear seat passenger deplanes. How many inches will the center of gravity move and in which direction?

6. Define the term *critical engine*. What determines the critical engine?

7. Define accelerate-stop distance and its significance.

8. What is the accelerate-stop distance under the following conditions.

   Field pressure altitude. . . . . 2,500 ft.
   Temperature . . . . 11°C
   Weight . . . . Maximum takeoff weight
   Headwind component. . . . . 10 knots

9. Compute the takeoff distance over a 50-foot obstacle based upon the following data.

   Field elevation. . . . . 3,000 ft.
   Altimeter setting 30.20
   Temperature . . . . 20°C
   Weight . . . . Maximum takeoff weight
   Headwind component. . . . . 15 knots

10. Using the data from the previous question, determine the takeoff distance if obstacles are not present.

11. What power setting will produce 65 percent rated power at 7,000 feet if the temperature is 1°C?

12. Based upon the information from the previous question, what will be the true airspeed and maximum range if the aircraft is fully serviced to maximum takeoff weight?

13. Determine the stalling speed differential between the two configurations listed below.

    1. Power . . . . Off
       Flaps . . . . Retracted
       Weight . . . . Maximum takeoff weight
       Angle of bank . . . . 55°

    2. Power . . . . Off
       Flaps . . . . Extended
       Weight . . . . Maximum takeoff weight
       Angle of bank . . . . 35°

14. How does weight affect the stalling speed of the aircraft?

15. Compute the average multi-engine rate of climb between the altitudes of 5,000 and 10,000 feet MSL under the following conditions.

    Altimeter 30.17
    Temperature at 5,000 feet . . . . -1°C
    Temperature at 10,000 feet . . . . . . -18°C
    Weight . . . . Maximum takeoff weight
    Airspeed. . . . . Best rate of climb

16. Based upon the previous question, what airspeed should be used initially to achieve the best rate of climb?

17. Given the following conditions, determine the average single-engine rate of climb between sea level and 2,000 feet MSL.

    Altimeter 29.92
    Temperature at sea level . . . . 25°C
    Temperature at 2,000 feet . . . . 21°C
    Weight . . . . Maximum takeoff weight

18. Explain how the best single-engine rate of climb and best single-engine angle-of-climb airspeeds change with an increase of altitude.

19. Explain the relationship between density altitude and the single-engine service ceiling.

20. What is the single-engine service ceiling for this aircraft and what is its significance in relation to takeoffs and go-arounds?

21. Given the following data, determine the landing distance required over a 50-foot obstacle.

    Field pressure altitude . . . . 1,500 ft.
    Temperature . . . . 27°C
    Weight . . . . Maximum landing weight
    Headwind . . . . 15 knots

22. Determine the landing ground run distance given the following conditions.

    Field elevation . . . . 500 ft.
    Altimeter setting 29.29
    Temperature . . . . 21°C
    Weight . . . . Maximum landing weight
    Headwind 0

23. What is the correct takeoff and landing technique during operations on a runway that has an accumulation of snow or mud?

24. Explain the technique of using asymmetrical power during crosswind taxi.

25. Explain the electrical system installed in this aircraft.

26. During single-engine operations, are there any restrictions and/or recommendations placed upon the electrical system operation?

27. Explain the hot starting procedure for this aircraft and how the pilot can determine when this procedure is necessary.

28. Explain the procedure for correcting an engine overheating problem.

29. Explain the correct and most accurate engine leaning procedures.

30. Explain the fuel system.

31. Explain the proper procedure for fuel management for both twin-engine and single-engine operations.

32. Are there any restrictions placed upon the aircraft with regards to minimum fuel for operation?

33. What is the danger of operating an aircraft with a leaking fuel strainer?

34. What is the procedure if an engine failure occurs below VMCA on the takeoff ground run?

35. List four methods of determining the inoperative engine.

36. Can the manifold pressure gauge and/or the tachometer indication be a reliable clue to which engine has failed?

37. Explain the propeller feathering procedures.

38. Under what circumstances may it be inadvisable to feather a propeller?

39. Once the propeller control is placed in the feathering detent, approximately how many seconds are required for the propeller to feather?

40. Is there any engine RPM limitation on propeller feathering?

41. Explain the in-flight engine restart procedure if a propeller is feathered.

42. Explain why it is advisable to bank the aircraft five degrees toward the operating engine during single-engine operations.

43. What gear/flap configurations and conditions were used to determine the published air minimum control speed?

44. During single-engine operations, what is the slowest airspeed that is considered to be safe?

45. What is the proper recovery method if the pilot inadvertently allows the speed to dissipate to the air minimum control speed during single-engine operations?

46. Is the greatest amount of drag created by the extension of landing gear, extension of full flaps, or a windmilling propeller?

47. Explain the correct drag cleanup procedure for a go-around following a full flap approach to a landing.

48. How does landing gear extension affect the air minimum control speed?

49. Is the landing gear electric, hydraulic, or a combination of the two?

50. How many seconds are required for the landing gear to retract fully? In what situation could this become critical?

51. Is it recommended for the pilot to make a definite effort to neutralize the rudder pressure prior to the landing gear retraction cycle?

52. What is the purpose of the landing gear safety switch and where is it located?

53. Which is the more critical situation — inability to normally extend or inability to retract the landing gear?

54. Explain the landing procedure and configuration if the nosewheel will not extend and the two main wheels extended normally.

55. Explain the manual landing gear extension procedure.

56. On airplanes so equipped, what action should be taken in the event the propeller de-icing equipment fails on one prop?

57. If the airplane is autopilot equipped, is any limitation placed upon autopilot operation during single-engine flight?

58. What type of installation provides heated air to the cabin? Is there any limitation or restriction to this unit's operation?

59. Where is the alternate static source located and how is it put into operation?

The remaining questions are to be answered by applicants who hold instrument ratings.

60. Explain the proper use of power, flaps, and landing gear during a nonprecision approach.

61. If engine shutdown and propeller feathering become necessary, what is the primary consideration when choosing an airport for approach and landing?

62. At what point during an instrument approach should the approach airspeed be firmly established?

63. What is the recommended approach airspeed with both engines operating normally?

64. Following an engine failure in instrument conditions, describe the methods of identifying the inoperative engine.

65. Describe the procedures and aircraft configuration used during the execution of an engine-out circle-to-land approach.

66. Why is the weather at the departure airport of great significance to the safety of the departure?

67. At what point during an engine-out straight-in approach may the pilot consider himself committed to land?

68. What airspeed and power settings are recommended for holding pattern procedures?

69. What is the recommended climb airspeed during a missed approach if one engine is inoperative?

70. Explain the use of rudder trim during an engine-out approach.

71. Is it recommended that a zero-flap approach be executed if one engine is inoperative?