General

1. What is the wingspan of the aircraft?
2. Who is the engine manufacturer? What is the model number?
3. What is takeoff power?
4. How many cubic inches in displacement are in the engine?
5. Describe the engine type.
6. Who manufactures the propeller and what type is it?
7. What is the minimum and maximum length of the propeller?
8. What type of fuel is required to be used?
9. What is the oil capacity?
10. What is the maximum ramp weight of the aircraft? What is the definition of ramp weight?
11. What is the maximum takeoff weight? Why is this 8lbs less than the ramp weight?
12. What is the maximum baggage weight?
13. What does SBAS stand for? Satellite Based Augmentation System
14. How many GPS antennas are installed in the aircraft? Why?
15. What does CAS stand for? Explain what it is.
16. What does GS stand for? Explain what it is.
17. What is TAS stand for?
18. What is IAS stand for?
19. Define Vo. What speed is this in the Archer at max gross takeoff weight?
20. Define Vfe.
21. Define Vno.
22. Define Vs.
23. Define Vso.
24. Define Vx.
25. Define Vy.
26. Define ISA
27. What is ADAHRS stand for?
28. What does CAS stand for?
29. What does FOB stand for?
30. What does GPS stand for?
31. What does PFD stand for? MFD?
32. What does TAWS stand for?
33. What does WAAS stand for?
34. What is a reference datum? Where is it located in the Archer?
35. What is a station? Moment? Arm?
36. Define Center of Gravity.
37. Define standard empty weight.
38. Define useful load.
39. Define maximum Ramp weight
40. Define Maximum takeoff weight.

Limitations

1. Define Vne. What speed in KIAS is this for the Archer? What airspeed marking indicates Vne in the cockpit?
2. Define Vno. What speed in KIAS is this for the Archer? What airspeed marking indicates Vno in the cockpit?
3. Define Vo. What speed in KIAS is this for the Archer for maximum gross takeoff weight? Is there an airspeed marking for this on the airspeed indicator?
4. Define Vfe. What speed in KIAS is this for the Archer?? What airspeed marking indicates VFe in the cockpit?
5. What Vspeed is represented by the bottom of the white band? What speed in KIAS is this?
6. What Vspeed is represented by the bottom of the green band? What speed in KIAS is this?
7. Where is the datum located?
8. What are the positive and negative load factor limitations?
9. If the pilots headset is broken but the handheld mic is present, can the pilot go flying?
10. Is this aircraft certified to fly into known icing?
11. How many gallons of useable fuel are available?
12. What are two ways to check RAIM availability?
13. When WAAS is not available, is other non-GPS navigation equipment required if in IMC?
14. What is the G1000 alternate airport flight planning limitation? Can the pilot shoot a GPS approach once at the alternate? Why?
15. When using the Garmin VOR/ LOC/ GS recievers to fly the final approach segment, what navigation data must be selected and presented on the CDI?
16. Which obstacles are charted in the database? Are all obstalces charted in the obstacle database?
17. If the MFD is not operational, what must be operational for ALL flight operations?
18. What is the minimum fully functional equipment required for VRF flight? IFR flight?
19. If the E VOLTS is in the cuation or warning range, what must be done with the emergency battery? What type of flight is prohibited?
20. What is the demonstrated crosswind? Is this a limitation?

Emergency procedures

1. Name 3 non hidden CAS warning messages and their associated cause.
2. Name 3 non hidden CAS caution messages and their associated cause.
3. Name 2 non hidden CAS advisory messages and their associated cause.
4. What is the aural alert for the Master Warning? Master Caution?
5. Define “Land as soon as possible”.
6. Define “Land as soon as practical”.
7. What is the main cause of an engine fire during start?
8. What are the procedures for an engine fire before the engine starts? What does this attempt to do?
9. If there is an engine fire in flight, should the pilot attempt to restart the engine after the engine fire is extinguished?
10. If there is an engine failure situation due to fuel exhaustion and the pilot switches tanks to attempt to restart the engine, how long will it take to refill the empty fuel lines?
11. What is the purpose of moving the throttle and mixture control levers to different settings when attempting to restart the engine during an engine failure in flight situation?
12. What are the indications of a Low Oil Pressure situation?
13. What other cues should the pilot look for to determine what the situation is?
14. Should the pilot maintain altitude until over the airport or should they descend as they normally would? Why?
15. What power setting should set during a Low Oil Pressure situation? Why?
16. What would be some causes of a High Oil temperature during flight? On the ground?
17. When there is a High Oil temperature indication, why does the checklist call for Mixture to be full rich and airspeed to be increased?
18. What are some situations that could lead to a loss of fuel flow? How would you determine which checklist to use to remedy the situation?
19. During a Loss of Fuel Flow situation, why after going through the recommended checklist is the electric fuel pump turned off? What even more dangerous situation could it lead to?
20. If there is an engine failure due to an engine driven fuel pump failure, is the electric fuel pump able to provide proper fuel flow to operate the engine?
21. What are the indications of a Fuel Quantity Low situation?
22. How many gallons in the associated fuel tank would cause this indication?
23. Is there a CAS message for total fuel quantity low?
24. What are the recommendations when considering to reset a circuit breaker?
25. Where is the alternator circuit breaker located?
26. Once the alternator fails how much time do we have in electrical power remaining? Why should the pilot try to shed the electrical load in 3 minutes or less?
27. What electrical bus is powered in this situation?
28. What should be done to ensure 30 minutes of battery life? Where would the pilot find the battery discharge rate?
29. What should the pilot tell ATC that would help reduce using the comm radio?
30. How is the overvoltage relay reset? What would cause this to turn the alternator offline?
31. When should the emergency battery activate? What should be done if it does not activate automatically?
32. How does the pilot know that the emergency battery is on? Where can the emergency battery be found?
33. What other CAS messages will appear when operating solely on the emergency bus?
34. How long can the pilot expect electrical power when operating on the emergency battery? What will be operational?
35. If there is a PFD failure, what button should be pressed to present PFD information on the MFD?
36. What features are lost during a PFD failure? What frequency is still available for Comm 1?
37. If the MFD fails, what should the PFD do automatically? What should the pilot do?
38. What features that are installed on our aircraft will become inoperative if the MFD fails?
39. What information would be lost if the PFD display was not automatically or manually switched to Reversionary mode?
40. How is an ADAHRS failure indicated? What flight instruments would be affected?
41. Where is the ADAHRS circuit breaker located?
42. During a total ADAHRS failure why would it be important to check the standby instruments for no failures as well?
43. If the RPM gauge were to become inoperative, how should the pilot set the power?
44. If the fuel flow were to become inoperative, how should the pilot determine fuel flow during the flight?
45. Name the indications that if were invalid would require the GEA circuit breaker to be pulled?
46. If a CAS message appears that is not expected, how should the pilot treat it?
47. What ensure the ability to communicate if power is lost to the audio panel?
48. What is the indication of a dual GPS failure? What are other navigation sources the pilot can use?
49. What does DR stand for? What information is used to compute the aircrafts current position?
50. How long can the pilot use DR mode? How far from the destination airport is it activated?
51. Is the traffic information still accurate in DR mode?
52. When is Loss of Integrity mode active? What is displayed on the center of the moving map?
53. What are the indications of the starter engaged? What are the procedures if in flight?
54. What are the spin recovery technique? Are intentional spins allowed?
55. What is the purpose of opening the storm window during an open door situation?
56. What situations could cause engine roughness?

Normal procedures

1. What airspeed is Vy?
2. What airspeed is Vx?
3. What airspeed is Vo?
4. What airspeed is Vfe?
5. What is the maximum demonstrated crosswind? Is this a limitation?
6. When are the flaps able to support weight?
7. What is the maximum time the pitot heat should be on during ground operations? Why?
8. What are the required documents for the Archer that need to be present?
9. What is the proper inflation for the main gear strut?
10. What is the proper inflation for the nose gear strut?
11. How long should the engine be operated without positive oil pressure?
12. If the engine fails to start on the first attempt how long should the pilot wait to try a second time? How many times should the pilot attempt to start the engine?
13. Which instruments are verified operational when the Emergency Battery is on?
14. What is the minimum volts required when checking the Emergency Battery? If below 23.3 when can it be checked again prior to flight? What happens it fails the check again?
15. When should the Hot engine start procedures be used?
16. What is the recommended RPM range during warm up? What might happen if lower RPMs are used for prolonged periods of time?
17. If during taxi the volts decrease, what action should the pilot take?
18. What action can be taken when fuel vapor bubbles form in the fuel lines?
19. If the E volts was below 23.3 volts during the Before start checklist, what are the procedures to check it again before flight?
20. Why should the pilot limit the time the Alternate Air is open?
21. When performing a Short field takeoff, what flap setting is used? What airspeed should the pilot maintain until the 50ft. obstacle at max gross takeoff weight? What airspeed should the pilot pitch for after the 50ft obstacle?
22. What is the enroute climb airspeed? Why?
23. At what altitude should the pilot lean the mixture?
24. How is Best economy mixture obtained? Best power?
25. What should the pilot do if engine roughness is encountered before peak EGT is reached?
26. Why do we NOT use the electric driven fuel pump in flight?
27. What is final approach speed with flaps at 40°?
28. What can occur if the alternate air is open and full throttle is applied?
29. Why is braking more effective when the flaps are up and back pressure is applied?
30. How should the pilot land the airplane in high wind conditions?
31. If the Aspen EBD standby instrument does not shut down properly how should the pilot turn it off? What would happen if the pilot left it on?
32. What airspeed will the stall warning aural notification activate? What does it sound like?
33. What is the typical loss of altitude after a stall?
34. What is fastest recommended airspeed in turbulent air?

Performance

1. How will the pilot get the airplane to fly the performance listed in the charts?
2. What is 21°C in Fahrenheit?
3. What is 100 KIAS in KCAS at 0° flaps?
4. What is the stall speed at 2300lbs with 25° flaps at 20° of bank? When do you think this scenario would occur?
5. What is the stall speed at 2300lbs with 40° flaps at 45° of bank? When do you think this scenario would occur?
6. What is the rotation speed for 2,300lbs with no flaps? What is the speed to clear the 50ft obstacle?
7. What is the ground roll takeoff distance when the OAT is 30°C at 2,500ft field elevation at 2300lbs with a 5kt headwind component with no flaps? To clear a 50ft obstacle?
8. What is the ground roll takeoff distance when the OAT is 30°C at 2,500ft field elevation at 2300lbs with a 5kt headwind component with 25° flaps? To clear a 50ft obstacle?
9. What would the average rate of climb be if taking off from 2,500ft with 30°C and climbing to 7,500ft with 15°C with mixture full rich? What airspeed must be flown for the actual performance to meet the calculated performance?
10. Define absolute ceiling. What is the absolute ceiling for our aircraft?
11. Define service ceiling. What is the service ceiling for our aircraft?
12. Using the conditions in the previous question, what is the Time, Fuel, Distance to climb? What airspeed must be flown for the actual performance to meet the calculated performance?
13. Will the distance number calculated in the previous question be accurate if there is any wind?
14. How can you accurately determine the distance to climb is there is wind?
15. Which chart can you use to determine the amount of horsepower produced at any given altitude or RPM setting?
16. What is the expected fuel flow when set to Best Economy at 65% power?
17. Since the wheel pants are removed on our aircraft what speed adjustment do we need to make when calculating our cruise TAS?
18. How are Range and Endurance measured?
19. What is the difference between the two Range charts on pages 5-26 and 5-27?
20. How much is the range reduced by if the wheel pants are removed?
21. What would the range be in our aircraft if flown at 5,000ft at 8.2 GPH with a 45 min reserve?
22. What airspeed and power setting is used when calculating Time, Fuel, Distance to Descend?
23. Calculate the Time, Fuel, Distance to Descend with the given conditions: Cruise at 5,000ft at 20C descending to 1,500ft at 30C.
24. What weight is the glide range chart calculated for? Would this range increase or decrease with a reduction in weight?
25. If cruising at 6,500ft with a terrain elevation below at 1,500ft, what would the glide range be?
26. What would the landing performance and ground roll numbers be when the field elevation is 1,500ft, at 30C with a 10 kt headwind at 2,200lbs?

Weight and Balance

1. What are the pros and cons for having the center of gravity towards the front of the envelope?
2. What are the pros and cons for having the centery of gravity towards the rear of the envelope?
3. Where is the datum located?
4. How much does 100LL weigh per gallon?
5. Prepare a weight and balance sheet with for the following flight:
   1. Pilot: 185 lbs, Passenger 1: 125 lbs, Passenger 2: 200 lbs
   2. Fuel: Full
   3. Baggage: 230lbs

Operations of systems

1. What kind of material is the basic airframe made of?
2. Describe the type of engine in the Archer.
3. What supplies heat to the cabin and windshield defrosting?
4. What is the propeller made of?
5. Describe the principle the injector is based on.
6. How is the alternate air door opened? Where is the control located? Does it open automatically like other aircraft?
7. List why would the pilot open the alternate air door.
8. Why would the pilot not open the alternate air door during takeoff?
9. What is the purpose of the Throttle and Mixture? How does the pilot adjust the friction of these controls?
10. How does the pilot shut down the engine?
11. What type of system is used to move the flight controls?
12. What is the difference between a stabilator and elevator?
13. What is the purpose of the trim tab?
14. Describe the flaps system in the Archer.
15. What type of struts are used in the gear system? What is their normal extension?
16. What is the steerable range for the nosewheel?
17. Describe the brake assembly the Archer equipped with.
18. Describe the parking brake system.
19. What type of fluid is used in the brake system? What color is it?
20. How is the parking brake set?
21. List the main components of the G1000 system.
22. \_\_\_\_\_\_width of the trapezoid on the G1000 is equal to \_\_\_\_\_\_ ball width.
23. How is a standard rate turn displayed?
24. What does ADAHRS stand for?
25. What are the two main components of the ADAHRS? What information do they each provide?
26. Describe the operation of a AHRS.
27. What checks the validity of the information calculated by the AHRS?
28. What will be displayed if the AHRS fails?
29. How is the course set during a failed AHRS situation?
30. What is the quickest way the AHRS will align in flight?
31. What is displayed when a component fails in the ADC?
32. What mode will the PFD go into if the MFD fails? What action should the pilot take?
33. What will occur when the pilot acknowledges a CAS red warning message?
34. Are CAS advisory messages acknowledgeable?
35. If the PFD becomes inoperative how does the MFD go into Reversionary Mode?
36. What does the TIS use to obtain traffic information?
37. Will the TIS show all airborne traffic?
38. When is an altitude trend arrow displayed next to the traffic symbol?
39. What does it mean if the database cycle information is yellow during the power up of the MFD screen?
40. If COM1 and COM2 fail how is the fail-safe communications path activated to COM1?
41. What kind of transponder do we have in our aircraft? Is our aircraft equipped with ADS-B?
42. What normally powers the Aspen EBD? What if the alternator fails, what powers it?
43. How long will the Aspen operate typically on the emergency battery? What if the emergency battery is depleted, what will then power it? How does the pilot know that the Aspen is being powered by the last power source possible?
44. Is flight into IMC permitted if any component of the emergency or standby systems is inoperative?
45. What is the total capacity of the fuel tanks? How much fuel is in tank if the fuel level is at the tabs?
46. How is fuel level calculated by the GEA?
47. What two pieces of information is set when the FOB SYNC soft button is pressed? What parameters are able to be calculated when the pilot presses the FOB SYNC softkey after startup?
48. What are the three positions for the fuel selector?
49. What safety feature is incorporated into the selector to prevent accidental selection of the OFF position?
50. When should the electric fuel pump be turned on?
51. Will the pump provide enough fuel flow in case of an engine driven fuel pump failure?
52. How many fuel drain positions are there and where are they located?
53. Draw and label the fuel system.
54. Why do the fuel lines not draw fuel from the lowest point in the tank?
55. What is the purpose of the vents in the tanks?
56. What is a fuel flow transducer?
57. What is the voltage rating of the primay and emergency batter?
58. What is the voltage and amperage rating of the alternator?
59. Describe the components that are powered when only the battery master switch is on.
60. If it is found that the primary batter is dead, how should it be charged?
61. How is the alternator driven?
62. Once the engine is running and the ALTR switch is activated, what is the primary source of electrical power?
63. What is the purpose of the voltage regulator? At what voltage level does is remove the alternator from the circuit?
64. When does the Emergency battery provide electrical power to? When does this occur?
65. What is powered through the Emergency bus and for how long? What must be the voltage prior to flight for this to be true?
66. What allows the Emergency battery to power only the emergency bus but still be charged by the alternator?
67. Draw the electrical diagram for the following: a circuit breaker, diode, fuse, ground, battery and switch.
68. Why should strobe lights not be used in IMC?
69. Name the busses in the electrical system.
70. Name all of the batteries in the aircraft and when they are the primary source of power.
71. What are the numbers associated with the circuit breakers for each electrical component?
72. How is the cockpit lighting adjusted for nighttime conditions?
73. Where is the pitot/ static mast located?
74. Where are the pressure lines plumed to?
75. Where is the alternated static source located? What conditions must be met when using the alternate static source? How will the flight instruments read when using the alternate static soruce?
76. What kind of readings will a partially or completely blocked pitot head give?
77. Are there any moving parts in the pitot/ static system and its associated instruments in the G1000?
78. How is heat provided to the cabin? What danger must the pilot be aware of?
79. What is the stall warning system for the Archer? When is it activated?
80. When should the battery of an ELT be replaced?
81. When should the ALT switch be turned to ON?

Handling, service and maintenance

1. What is the minimum safe quantity for oil?
2. What is the proper procedure for draining the fuel strainer next to the firewall?

Operating Tips

1. What is the best speed for takeoff?
2. How long should a pilot wait to reset a circuit breaker?
3. What is incorrect about this statement regarding CBU Archers?

“Hand starting of the engine is not recommended, however, should hand starting of the engine be required, only experienced personnel should attempt this procedure. The magneto selector should be placed to “LEFT’’ during the starting procedure to reduce the probability of “kick back.’’ Place the ignition switch to “BOTH’’ position after the engine has started.”