With the following changes, this text provides complete preparation for the FAA Sport Pilot Knowledge Exam. In order to maintain the integrity of each test, the FAA may rearrange the answer stems to appear in a different order on your test than you see in this book. For this reason, be careful to fully understand the intent of each question and corresponding answer while studying, rather than memorize the A, B, C associated with the correct response.

The following changes are printed in ASA's 2007 Sport Pilot Test Prep, which ships with the Computer Testing Supplement (#ASA-CT-8080-10A). No figures changed this year. We anticipate the FAA will release a new test database in October 2006.

Page Number	Question Number	Correct Answer	Explanation
vii	—	—	**Change "Description of the Tests" to read:**

The Sport Pilot General test is no longer being issued. Instead, Sport Pilot applicants must specify which aircraft category they will be testing in. Use the following table for the Test Code associated with your test:

Test Code	Test Name	Test Prep Study	Number of Questions	Age	Allotted Time
SPA	Sport Pilot Airplane	ALL, AIR	40	15	2.0
SPB	Sport Pilot Lighter-Than-Air (Balloon)	ALL, LTA	40	15	2.0
SPI	Sport Pilot Glider	ALL, GLI	40	15	2.0
SPL	Sport Pilot Lighter-Than-Air (Airship)	ALL, LTA	40	15	2.0
SPP	Sport Pilot Powered Parachute	ALL, PPC	40	15	2.0
SPW	Sport Pilot Weight-Shift Control	ALL, WSC	40	15	2.0
SPY	Sport Pilot Gyroplane	ALL, RTC	40	15	2.0

For the most efficient and effective study program, begin by reading the book cover to cover. Study ***all*** *the questions first,* ***then*** *refer to the table and place emphasis on those questions most likely to be included on your test (identified by the aircraft category above each question number).*

A score of 70 percent must be attained to successfully pass each test.

Sport Pilot Instructors should continue to use the *CFI Test Prep* (#ASA-TP-CFI) to prepare for their test.

Page Number	Question Number	Correct Answer	Explanation
1-17	2232	[A]	**Add a new question to read:** ALL **2232.** The pilot in command is responsible for ensuring that each person on board applicable U.S. registered aircraft is briefed and instructed on how and when to A— fasten and unfasten their seat belt and shoulder harness. B— adjust their seat. C— operate the fire extinguisher. Unless otherwise authorized by the FAA, no pilot may takeoff in a civil aircraft unless the pilot-in-command ensures that each person on board is briefed on how to fasten and unfasten that person's seatbelt, and that each person has been notified to fasten the seatbelt during taxi, takeoff and landing. (B11) — 14 CFR §91.107 2232 [A]
1-18	—	—	**Add new chapter text to follow the second paragraph:** **Serious injury** means any injury which: (1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second or third degree burns, or any burns affecting more than 5 percent of the body surface. **Substantial damage** means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. The following is **not** considered "substantial damage": engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips.
1-19	—	—	**Add new questions to read:** ALL **2211.** Which publication covers the procedures required for aircraft accident and incident reporting responsibilities for pilots? A— FAR Part 61. B— FAR Part 91. C— NTSB Part 830. NTSB Part 830 contains regulations pertaining to notification and reporting of aircraft accidents or incidents and overdue aircraft, and preservation of aircraft wreckage, mail, cargo, and records. (G10) — NTSB Part 830 Answer (A) is incorrect because 14 CFR Part 61 contains regulations on certification of pilots. Answer (B) is incorrect because 14 CFR Part 91 contains regulations on general operating and flight rules. 2211 [C] --- ALL **2212.** Notification to the NTSB is required when there has been substantial damage A— which requires repairs to landing gear. B— to an engine caused by engine failure in flight. C— which adversely affects structural strength or flight characteristics. The operator of an aircraft shall immediately, and by the most expeditious means available, notify the nearest NTSB field office when an aircraft accident occurs. An aircraft accident is an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage which adversely affects the structural strength, performance, or flight characteristics of the aircraft. (G10) — 49 CFR 830.2, 830.5 2212 [C]

Page Number	Question Number	Correct Answer	Explanation
			ALL **2213.** What period of time must a person be hospitalized before an injury may be defined by the NTSB as a “serious injury”? A— 10 days, with no other extenuating circumstances. B— 48 hours; commencing within 7 days after date of the injury. C— 72 hours; commencing within 10 days after date of the injury. “Serious injury” means any injury requiring hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received. (G10) — 49 CFR 830.2 2213 [B]
			ALL **2214.** Which incident would require that the nearest NTSB field office be notified immediately? A— In-flight fire. B— Ground fire resulting in fire equipment dispatch. C— Fire of the primary aircraft while in a hangar which results in damage to other property of more than $25,000. The operator of an aircraft shall immediately and by the most expeditious means available notify the nearest NTSB field office of any in-flight fire. (G11) — 49 CFR 830.5(a)(4) Answers (B) and (C) are incorrect because the regulation specifies “in-flight” fires only. 2214 [A]
2-17	2281	[C]	**Add a new question to read:** ALL **2281.** From which primary source should information be obtained regarding expected weather at the estimated time of arrival if your destination has no Terminal Forecast? A— Low-Level Prognostic Chart. B— Weather Depiction Chart. C— Area Forecast. An Area Forecast (FA) is used to determine forecast enroute weather and to interpolate conditions at airports which do not have Terminal Forecasts (FT) issued. (I57) — AC 00-45E, Chapter 4 2281 [C]
3-6	2240	[A]	**Add a new question to read:** ALL **2240.** Haze creates which of the following atmospheric illusions? A— Being at a greater distance from the runway. B— Being at a closer distance from the runway. C— Haze creates no atmospheric illusions. Atmospheric haze can create the illusion of being at a greater distance from objects on the ground and in the air. (J31) — AIM 8-1-5 2240 [A]
4-3	—	—	**Add new chapter text and questions to read:**

Basic Aerodynamics

Four aerodynamic forces are considered to be basic because they act upon an aircraft during all flight maneuvers: there is the downward-acting force called **weight** which must be overcome by the upward-acting force called **lift**; and there is the rearward-acting force called **drag**, which must be overcome by the forward-acting force called **thrust**. During unaccelerated (straight-and-level) flight, the four aerodynamic forces which act on an aircraft are said to be in equilibrium, or: Lift = Weight and Thrust = Drag.

Continued

The **four fundamentals** involved in maneuvering an aircraft are: straight-and-level flight, turns, climbs, and descents. Climb depends upon the reserve power or thrust. Reserve power is the available power over and above that required to maintain horizontal flight at a given speed. The best speed for the **glide** is one at which the airplane will travel the greatest forward distance for a given loss of altitude in still air. This best glide speed corresponds to an angle of attack resulting in the least drag on the airplane and giving the best lift-to-drag ratio (L/D_{MAX}).

FAA Figure 68 is a **VG diagram** which plots load factor against indicated airspeed and shows the pilot the limits within which the aircraft will safely handle structural loads. Point C is maneuvering speed (V_A). Any plotted combination of load factor and airspeed which falls in the shaded area may result in structural damage. V_{NO}, the maximum speed for normal operations, is shown by the vertical line from point D to point G on the VG diagrams, and is marked as the upper limit of the green arc on the airspeed indicator. The red line on the airspeed indicator is represented by the line from point E to point F. The line connecting points C, D, and E represents the load factor above which structural damage may occur. The VG diagram is applicable to any aircraft that uses an airfoil for its lift but is least significant to the PPC because it typically operates at one speed in the "normal Operating Range" of the diagram.

Ground effect occurs when flying within one wingspan or less above the surface. The airflow around the wing and wing tips is modified and the resulting pattern reduces the downwash and the induced drag. These changes can result in an aircraft becoming airborne before reaching recommended takeoff speed or floating during an approach to land. An airplane leaving ground effect after takeoff will require an increase in angle of attack to maintain the same lift coefficient, which in turn will cause an increase in induced drag and therefore, require increased thrust. Ground effect is negligible in a PPC because the wing is so high off the ground.

Stability is the inherent ability of an aircraft to return, or not return, to its original flight condition after being disturbed by an outside force, such as rough air. An advantage of an aircraft said to be inherently stable is that it will require less effort to control.

As the angle of attack is increased (to increase lift), the air will no longer flow smoothly over the upper wing surface but instead will become turbulent or "burble" near the trailing edge. A further increase in the angle of attack will cause the turbulent area to expand forward. At an angle of attack of approximately 18–20 degrees (for most wings), turbulence over the upper wing surface decreases lift so drastically that flight cannot be sustained and the wing **stalls**. The angle at which a stall occurs is called the critical angle of attack. An aircraft can stall at any airspeed or any attitude, but will always stall at the same critical angle of attack.

The most critical conditions of **takeoff performance** are the result of some combination of high gross weight, altitude, temperature, and unfavorable wind. In all cases, the pilot must make an accurate prediction of takeoff distance from the performance data of the AFM/POH, regardless of the runway available, and strive for a polished, professional takeoff procedure.

The **maximum endurance** condition would be obtained at the point of minimum power required since this would require the lowest fuel flow to keep the aircraft in steady, level flight. Maximum range condition would occur where the proportion between speed and power required is greatest.

Total range is dependent on both fuel available and specific range. When range and economy of operation are the principal goals, the pilot must ensure that the aircraft will be operated at the recommended long-range cruise condition. By this procedure, the aircraft will be capable of its maximum design-operating radius, or can achieve flight distances less than the maximum with a maximum of fuel reserve at the destination.

Page Number	Question Number	Correct Answer	Explanation

AIR, WSC, PPC, RTC

2237. What is the relationship of lift, drag, thrust, and weight when the airplane is in straight-and-level flight?

A— Lift equals weight and thrust equals drag.
B— Lift, drag, and weight equal thrust.
C— Lift and weight equal thrust and drag.

Lift and thrust are considered positive forces while weight and drag are considered negative forces, and the sum of the opposing forces is zero. That is, lift = weight and thrust = drag. (H300) — FAA-H-8083-25, Chapter 3

2237 [A]

ALL

2231. Name the four fundamentals involved in maneuvering an aircraft.

A— Power, pitch, bank, and trim.
B— Thrust, lift, turns, and glides.
C— Straight-and-level flight, turns, climbs, and descents.

Maneuvering the airplane is generally divided into four flight fundamentals: straight-and-level, turns, climbs, and descents. (H533) — FAA-H-8083-3, Chapter 4

2231 [C]

AIR, WSC, GLI

2239. The best speed to use for a glide is one that will result in the greatest glide distance for a given amount of

A— altitude.
B— fuel.
C— drag.

The best speed for the glide is one at which the airplane will travel the greatest forward distance for a given loss of altitude in still air. This best glide speed corresponds to an angle of attack resulting in the least drag on the airplane and giving the best lift-to-drag ratio (L/D_{MAX}). (H536) — FAA-H-8083-3A, Chapter 3

2239 [A]

AIR, WSC, PPC, RTC

2229. Climb performance depends upon the

A— reserve power or thrust.
B— maximum L/D ratio.
C— cruise power setting.

Climb depends upon the reserve power or thrust. Reserve power is the available power over and above that required to maintain horizontal flight at a given speed. (H942) — FAA-H-8083-25, Chapter 9

2229 [A]

AIR, GLI, WSC

2215. (Refer to Figure 68.) The horizontal dashed line from point C to point E represents the

A— ultimate load factor.
B— positive limit load factor.
C— airspeed range for normal operations.

C to E is the maximum positive load limit. In this case it is 3.8 Gs, which is appropriate for normal category airplanes. (H303) — FAA-H-8083-25

Answer (A) is incorrect because “ultimate load factor” is not a real term; it is not depicted in the figure. Answer (C) is incorrect because this is depicted by the vertical line from point A to point J, to the vertical line from point D to point G.

2215 [B]

AIR, GLI, WSC

2216. (Refer to Figure 68.) The vertical dashed line from point E to point F is represented on the airspeed indicator by the

A— upper limit of the yellow arc.
B— upper limit of the green arc.
C— blue radial line.

V_{NE} (never exceed airspeed), the vertical line from point E to F, is marked on airspeed indicators with a red radial line, the upper limit of the yellow arc. (H303) — FAA-H-8083-25

2216 [A]

AIR, GLI, RTC, WSC

2223. What must a pilot be aware of as a result of ground effect?

A— Wingtip vortices increase creating wake turbulence problems for arriving and departing aircraft.
B— Induced drag decreases; therefore, any excess speed at the point of flare may cause considerable floating.
C— A full stall landing will require less up elevator deflection than would a full stall when done free of ground effect.

The reduction of the wing-tip vortices, due to ground effect, alters the spanwise lift distribution and reduces the induced angle of attack, and induced drag causing floating. (H317) — FAA-H-8083-25, Chapter 3

Answer (A) is incorrect because wing-tip vortices are decreased. Answer (C) is incorrect because a full stall landing will require more up-elevator deflection, due to the increased lift in ground effect.

2223 [B]

AIR, GLI, WSC, PPC, RTC

2224. An airplane said to be inherently stable will

A— be difficult to stall.
B— require less effort to control.
C— not spin.

A stable aircraft will tend to return to the original condition of flight if disturbed by a force such as turbulent air. This means that a stable airplane is easy to fly. (H302) — FAA-H-8083-25, Chapter 3

Answer (A) is incorrect because stability of an aircraft has an effect on its stall recovery, not the difficulty of stall entry. Answer (C) is incorrect because an inherently stable aircraft can still spin.

2224 [B]

ALL

2225. The angle of attack at which an airfoil stalls will

A— increase if the CG is moved forward.
B— remain the same regardless of gross weight.
C— change with an increase in gross weight.

When the angle of attack is increased to between 18° and 20° (critical angle of attack) on most airfoils, the airstream can no longer follow the upper curvature of the wing because of the excessive change in direction. The airfoil will stall if the critical angle of attack is exceeded. The indicated airspeed at which stall occurs will be determined by weight and load factor, but the stall angle of attack is the same. (H912) — FAA-H-8083-25, Chapter 3

Answers (A) and (C) are incorrect because an airfoil will always stall at the same angle of attack, regardless of the CG position or gross weight.

2225 [B]

ALL
2233. The direct cause of every stall is excessive

A— angle of attack.
B— density altitude.
C— upward vertical velocity.

The direct cause of every stall is an excessive angle of attack. There are any number of flight maneuvers that may produce an increase in the angle of attack, but the stall does not occur until the angle of attack becomes excessive. (H300) — FAA-H-8083-25, Chapter 3

2233 [A]

ALL
2234. The most critical conditions of takeoff performance are the result of some combination of high gross weight, altitude, temperature, and

A— unfavorable wind.
B— obstacles surrounding the runway.
C— powerplant systems.

The most critical conditions for takeoff performance are the result of some combination of high gross weight, altitude, temperature, and unfavorable wind. In all cases, the pilot must make an accurate prediction of takeoff distance from the performance data of the AFM or POH, regardless of the runway available, and strive for a polished, professional takeoff procedure. (H946) — FAA-H-8083-25, Chapter 9

2234 [A]

AIR, WSC, RTC
2230. Maximum endurance is obtained at the point of minimum power to maintain the aircraft

A— in steady, level flight.
B— in a long range descent.
C— at its slowest possible indicated airspeed.

The maximum endurance condition is obtained at the point of minimum power required since this would require the lowest fuel flow to keep the airplane in steady, level flight. Maximum range condition occurs where the proportion between speed and power required is greatest. (H317) — FAA-H-8083-25, Chapter 9

2230 [A]

AIR, WSC, RTC
2236. When range and economy of operation are the principal goals, the pilot must ensure that the airplane will be operated at the recommended

A— specific endurance.
B— long-range cruise performance.
C— equivalent airspeed.

Total range is dependent on both fuel available and specific range. When range and economy of operation are the principal goals, the pilot must ensure that the airplane is operated at the recommended long-range cruise condition. By this procedure, the airplane will be capable of its maximum design-operating radius, or can achieve lesser flight distances with a maximum of fuel reserve at the destination. (H945) — FAA-H-8083-25, Chapter 9

2236 [B]

Page Number	Question Number	Correct Answer	Explanation
4-4	—	—	Add new questions to read:

Add new questions to read:

ALL
2217. What is absolute altitude?

A— The altitude read directly from the altimeter.
B— The vertical distance of the aircraft above the surface.
C— The height above the standard datum plane.

Absolute altitude is height above the surface. This height may be indicated directly on a radar altimeter (if so equipped). Absolute altitude may be approximately computed from indicated altitude and chart elevation data. (H312) — FAA-H-8083-25, Chapter 6

Answer (A) is incorrect because the altitude read from the altimeter is indicated altitude. Answer (C) is incorrect because the height above the standard datum plane is pressure altitude.

2217 [B]

ALL
2227. What effect does high density altitude, as compared to low density altitude, have on propeller efficiency and why?

A— Efficiency is increased due to less friction on the propeller blades.
B— Efficiency is reduced because the propeller exerts less force at high density altitudes than at low density altitudes.
C— Efficiency is reduced due to the increased force of the propeller in the thinner air.

The propeller produces thrust in proportion to the mass of air being accelerated through the rotating blades. If the air is less dense, propeller efficiency is decreased. (H308) — FAA-H-8083-25, Chapter 9

2227 [B]

Page Number	Question Number	Correct Answer	Explanation
4-7	—	—	Add new chapter text and questions to read:

Ignition and Electrical Systems

Most reciprocating engines used to power small aircraft incorporate two separate magneto ignition systems. A magneto ("mag") is a self-contained source of electrical energy, so even if an aircraft loses total electrical power, the engine will continue to run. The main advantages of the dual ignition system are increased safety and improved engine performance.

When checking for magneto operation prior to flight, the engine should run smoothly when operating the magneto selector set to "BOTH," and should experience a slight drop in revolutions per minute (RPM) when running on only one or the other magneto.

AIR, WSC, PPC, RTC
2238. An electrical system failure (battery and alternator) occurs in a magneto equipped aircraft during flight. In this situation, you would

A— probably experience engine failure due to the loss of the engine-driven fuel pump and also experience failure of the radio equipment, lights, and all instruments that require alternating current.
B— probably experience failure of the engine ignition system, fuel gauges, aircraft lighting system, and avionics equipment.
C— experience avionics equipment failure.

If you experience an inflight electrical system failure, you have an avionics equipment failure and cannot use your electrical fuel boost pump. (Z03) — FAA-H-8083-25, Chapter 5

Answer (A) is incorrect because the engine-driven fuel pumps are mechanical and not dependent on the electrical system. Answer (B) is incorrect because the ignition system of an aircraft reciprocating engine is powered by two self-contained magnetos that are not dependent upon the aircraft electrical system.

2238 [C]

AIR, WSC, PPC, RTC

2242. One purpose of the dual ignition system on a two-cycle engine is to provide for

A— system redundancy in the ignition system.
B— uniform heat distribution.
C— balanced cylinder head pressure.

The dual ignition system has two magnetos to supply the electrical current to two spark plugs for each combustion chamber. This provides both a redundancy of ignition and an improvement of engine performance. (H307) — FAA-H-8083-25, Chapter 5

2242 [A]

AIR, WSC, PPC, RTC

2243. The formation of ice in a carburetor's throat is indicated by

A— rough engine operation, followed by a decrease in oil pressure.
B— a rapid increase in RPM, followed by rough engine operation.
C— a drop in RPM, followed by rough engine operation.

Carb ice restricts the airflow into the engine reducing its power and resultant RPM, which also results in rough engine operation. (H05) — The Powered Parachute Bible, Chapter 5

Answers (A) and (B) are incorrect because oil pressure is not significantly affected by carb ice, and carb ice will not increase RPM.

2243 [C]

AIR, WSC, PPC, RTC

2244. The purpose of the fuel tank vent system is to

A— remove dangerous vapors from the aircraft and prevent an explosion.
B— allow air to enter the tank as fuel is consumed.
C— ensure a proper fuel to air ratio.

Fuel tanks are not normally sealed systems; they need air venting because the fuel level is falling, therefore no vacuum builds up in the fuel tank. (H01) — The Powered Parachute Bible, Chapter 1

Answer (A) is incorrect because fuel tanks are isolated and fuel vapors are prevalent within the fuel tank confined area. Answer (C) relates to 2-stroke engines only. It is incorrect because fuel and oil are mixed either before the mixture is poured into the fuel tank (pre-mix), or after when oil is injected into the air/fuel mixture oil before it goes into the combustion chamber.

2244 [B]

AIR, WSC, PPC, RTC

2245. A standby source of fuel to an engine in a powered parachute is typically

A— from an electrically powered pump.
B— through gravity feed.
C— from a pressurized fuel tank.

Some engines use an electric boost pump similar to an airplane to supply a back-up pump in case the engine-driven fuel pump fails when low to the ground. (H05) — The Powered Parachute Bible, Chapter 5

Answer (B) is incorrect because if a gravity feed system was used, then this would supply fuel and no standby pump would be needed. Answer (C) is incorrect because pressurized fuel tanks are not normally used for light-sport aircraft.

2245 [A]

Page Number	Question Number	Correct Answer	Explanation

AIR, WSC, PPC, RTC

2246. The fuel vents on many powered parachutes and weight shift control aircraft are located

A— in the fuel cap.
B— adjacent to the crankcase breather.
C— in the fuel tank pressure relief valve.

The fuel vent in many but not all fuel tanks is in the fuel cap. (H01) — The Powered Parachute Bible, Chapter 1

Answer (B) is incorrect because the crankcase breather is used on a 4-stroke engine and has nothing to do with the fuel supply system on a 2-stroke engine. Answer (C) is incorrect because most PPCs do not have pressurized fuel tanks nor a fuel tank pressure relief valve.

2246 [A]

AIR, WSC, PPC, RTC

2247. Combusted fuel is expelled from a 2-cycle engine through an

A— exhaust valve and exhaust port.
B— exhaust valve.
C— exhaust port.

All 2-stroke engines expel exhaust through a passage called the exhaust port. (H04) — The Powered Parachute Bible, Chapter 4

Answers (A) and (B) are incorrect because only some higher power engines use an exhaust valve, while all have an exhaust port.

2247 [C]

AIR, WSC, PPC, RTC

2248. Fuel enters a two-cycle engine through an

A— intake port and intake valve.
B— intake port and reed valve.
C— intake valve and reed valve.

The air/fuel/oil mixture enters the crankcase through an intake port that some types of valve systems use to close off the crankcase and pressurize the air/fuel/oil mixture, before it is ported up to the top of the piston. Many engines use the positioning of the piston as the intake valve system, others use a rotary valve, while still others use a one-way flow “reed” or “poppet” valve. (H05) — The Powered Parachute Bible, Chapter 5

Answer (B) is incorrect because not all two-stroke engines use a reed valve. Answer (C) is incorrect because you must have an intake port.

2248 [A]

AIR, WSC, PPC, RTC

2249. The first indication of carburetor ice in an aircraft with a four-cycle engine and fixed-pitch propeller is

A— an increase in RPM.
B— a decrease in RPM.
C— a decrease in oil pressure.

The first symptom of carb ice in a 4-stroke engine is a reduction in engine RPM. (H05) — The Powered Parachute Bible, Chapter 5

Answer (A) is incorrect because carb ice reduces RPM. Answer (C) is incorrect because carb ice has no noticeable effect on oil pressure.

2249 [B]

Page Number	Question Number	Correct Answer	Explanation

AIR, WSC, PPC, RTC

2250. Air cooled engines dissipate heat

A— through cooling fins on the cylinder and head.
B— by air flowing through the radiator fins.
C— through the cylinder head temperature probe.

Air cooled engines use fins on the cylinder and head, forcing air past them as the primary means to dissipate heat. (H05) — The Powered Parachute Bible, Chapter 5

Answer (B) is incorrect because air cooled engines do not have separate radiators; only water and oil coolers need a radiator. Answer (C) is incorrect because the probe is not used to dissipate heat.

2250 [A]

AIR, WSC, PPC, RTC

2251. Coolant in a liquid cooled engine is normally circulated by

A— capillary attraction.
B— an electric pump.
C— an engine driven pump.

Most liquid-cooled systems are driven from some mechanical source or pump on the engine. (H05) — The Powered Parachute Bible, Chapter 5

Answer (A) is incorrect because capillary attraction is not normally used for engine cooling. Answer (B) is incorrect because electric pumps are usually used as coolant pumps.

2251 [C]

AIR, WSC, PPC, RTC

2252. In order to improve engine efficiency, two-cycle engine exhaust systems are tuned to

A— close the exhaust valve to stop the fuel mixture from exiting the cylinder.
B— stop the fuel mixture from exiting the cylinder before combustion.
C— use a reed valve to stop the fuel mixture from exiting the cylinder.

If there is not an exhaust valve, tuned exhaust systems are designed to provide back pressure pulses at the exhaust port. The tuned exhaust bounces pressure back at the appropriate time, so the fuel mixture stays in the combustion chamber while both intake and exhaust ports are open. (H04) — The Powered Parachute Bible, Chapter 4

Answer (A) is incorrect because if the exhaust port has a valve, it is not as critical to have a tuned exhaust to provide back pressure at the exhaust port. There are not usually exhaust valves in a 2-stroke engine; however, some 2-stroke engines do have them. An example of this is the RAVE exhaust valve on the ROTAX 618. Answer (C) is incorrect because the reed valve is typically used for the intake air/fuel mixture.

2252 [B]

AIR, WSC, PPC, RTC

2253. 2-cycle engine thrust and fuel efficiency can be greatly compromised when

A— exhaust systems are installed that are not specifically tuned for an engine.
B— carbon deposits build up on exhaust valves.
C— intake valve lifters fail to pressurize and provide adequate fuel to the combustion chamber.

The exhaust systems should be tuned to the engine for maximum efficiency. (H04) — The Powered Parachute Bible, Chapter 4

Answer (B) is incorrect because most 2-stroke engines do not have exhaust valves. Answer (C) is incorrect because not all 2-stroke engines have intake valve lifters.

2253 [A]

AIR, WSC, PPC, RTC
2254. The purpose of a kill switch is to

A— shut off the fuel to the carburetor.
B— ground the lead wire to the ignition coil shutting down the powerplant.
C— ground the battery eliminating current for the ignition system.

The kill switch shuts down the engine. (H06) — The Powered Parachute Bible, Chapter 6

Answer (A) is incorrect because a fuel valve shuts off fuel. Answer (C) is incorrect because the battery should already be grounded.

2254 [B]

AIR, WSC, PPC, RTC
2255. A typical two-cycle engine ignition coil is powered by

A— a battery.
B— a battery or an alternator.
C— a magneto.

The magneto is an engine-driven generator that powers the ignition system and also supplies extra power to aircraft electrical system. (H07) — The Powered Parachute Bible, Chapter 7

Answers (A) and (B) are incorrect because the battery is further down the line, and is also powered by the magneto.

2255 [C]

AIR, WSC, PPC, RTC
2256. Many 4-cycle engines utilize what type of lubrication system?

A— Forced.
B— Gravity.
C— Fuel/oil mixture.

Most 4-stroke engines have an oil pump that forces the oil through the system. (H05) — The Powered Parachute Bible, Chapter 5

Answer (B) is incorrect because gravity systems are not a typical oil supply system. Answer (C) is incorrect because a fuel/oil mixture system is on 2-stroke engines only.

2256 [A]

AIR, WSC, PPC, RTC
2257. Adding more oil to the fuel than specified by the manufacturer of a 2-cycle engine will result in

A— increased engine performance.
B— increased carbon buildup and engine fouling.
C— increased engine lubrication and optimal performance.

Extra oil in the fuel would cause inefficient burning and more carbon buildup as a result. (H05) — The Powered Parachute Bible, Chapter 5

Answers (A) and (C) are incorrect because oil does not increase performance.

2257 [B]

AIR, WSC, PPC, RTC
2258. Pilots should refrain from revving an engine with a reduction drive because

A— the crankshaft counterbalances may be dislodged and cause extreme engine vibration.
B— the propeller blade tips may exceed their RPM limits.
C— the torque exerted on the gears during excessive acceleration and deceleration can cause the gear box to self-destruct.

Revving the engine causes more stress than not revving it; it is good practice to not rev it unnecessarily. (H05) — The Powered Parachute Bible, Chapter 5

Answer (A) is incorrect because not all engines have counterbalances. Answer (B) is incorrect because the propeller is designed to not exceed its maximum RPM at full power.

2258 [C]

AIR, WSC, PPC, RTC
2259. During preflight, the fuel vent system should always be checked

A— to ensure the vent is closed.
B— to ensure the vent is open.
C— to ensure the vent system pressure is in the green range.

The fuel vent needs to be open for flight for the air to fill the fuel tank as the fuel is consumed. (H01) — The Powered Parachute Bible, Chapter 1

Answer (A) is incorrect because a closed fuel vent would cause a power loss in flight when air is unable to fill the tank as fuel is used. Answer (C) is incorrect because there is no pressure in the fuel tank since it is vented.

2259 [B]

AIR, WSC, PPC, RTC
2260. Carburetor ice can form

A— only at temperatures near freezing and the humidity near the saturation point.
B— when the outside air temperature is as high as 100 degrees F and the humidity is as low as 50%.
C— at any temperature or humidity level.

Carburetor ice can form when the outside air temperature is as high as 100°F and the humidity is as low as 50%. This is not the optimum conditions for the ice to form, but it can form under these conditions. (H05) — The Powered Parachute Bible, Chapter 5

Answer (A) is incorrect because carb ice can form when it is as high at 100°F. Answer (C) is incorrect because some moisture is needed to form the ice.

2260 [B]

Page Number	Question Number	Correct Answer	Explanation
4-7	—	—	**Add a new section titled "Powered Parachute and Weight-Shift Control Operations" followed by new questions to read as follows:**

Powered Parachute and Weight-Shift Control Operations

The explanations for the answers given describe the concepts that should be understood before taking the test. Many of these questions are based on older weight-shift and PPC designs and unique characteristics of specific designs. The answers given are the best of the choices provided.

WSC
2261. As a weight shift aircraft wing approaches a stall, the wing tips

A— decrease the wing's angle of attack.
B— act in much the same way as ailerons on a three-axis aircraft.
C— increase the wing's angle of attack.

As the angle of attack of the wing is increased, the nose is at a higher angle of attack and therefore stalls first while the tips keep flying. This drops the nose and as a result, decreases the wing's angle of attack. (H22) — Trikes, the Flex-Wing Flyers, Chapter 3

Answer (B) is incorrect because the wing tips act the same way ailerons do while flying normally and while approaching a stall. Answer (C) is incorrect because the tips only increase the wing's angle of attack when the wing is at a low angle of attack, far from a stall.

2261 [A]

WSC
2262. During a wing stall, the wing tips of a weight shift aircraft are

A— ineffective for stall recovery.
B— effective for stall recovery.
C— effective only when combined with maximum engine output.

Since the wing tips are at a lower angle of attack, they do not normally stall when the rest of the wing is stalled. They keep flying, creating an up-force in back of the CG—causing the nose to rotate down and decrease the angle of attack of the wing—therefore they are very effective for stall recovery. (H22) — Trikes, the Flex-Wing Flyers, Chapter 3

Answer (A) is incorrect because the tips are very effective for stall recovery, allowing the nose to fall through. Answer (C) is incorrect because the tips have more effect for stall recovery than the engine power.

2262 [B]

WSC
2263. The crosstube is positioned by

A— a quick release pin.
B— self-locking bolts.
C— restraining cables attached to the rear of the keel.

The crossbar is pulled back to tension the airframe into the sail with the crossbar cables. These are attached to a connection point on the rear of the keel. (H22) — Trikes, the Flex-Wing Flyers, Chapter 3

Answers (A) and (B) are incorrect because these are fasteners and would only make smaller variations in the crossbar position if these fasteners were adjusted to different settings.

2263 [C]

WSC

2264. On some trikes, the hang point is part of

A— a variable trim arrangement that allows the pilot to adjust the aircraft center of gravity during flight to obtain the most favorable aircraft performance.
B— an adjustable trim arrangement that allows the pilot to adjust the aircraft center of gravity during flight to obtain the most favorable aircraft performance.
C— an adjustable trim arrangement that allows the center of gravity to shift fore and aft along the wing's keel.

Most trikes have an adjustment to move the position on the keel fore and aft on the ground. This is a common way to adjust the trim speed and bar position of the wing. (H22) — Trikes, the Flex-Wing Flyers, Chapter 3

Answers (A) and (B) are incorrect because although this is a viable design concept that has been and may be used for trikes, not many incorporate the complexity of a variable CG during flight.

2264 [C]

WSC

2265. The keel pocket's purpose is to

A— act as a longitudinal stabilizer, keeping the wing from wandering left and right.
B— act as a roll stabilizer, keeping the wing from wandering left and right.
C— act as a yaw stabilizer, keeping the wing from wandering left and right.

The most significant effect a keel pocket could have on stability would be for yaw. This was an early design concept used in the development of the flex wing. Today, the wing sweep, washout, and airfoil shape are designed to optimize the tracking (yaw) for the vertical axis. Keel pockets today are a fabric channel in the sail material the keel is inserted into, to hold the keel in place at the root of the wing. (H22) — Trikes, the Flex-Wing Flyers, Chapter 3

Answers (A) and (B) are incorrect because the keel pocket does not supply this stability.

2265 [C]

WSC

2266. How does the wing design feature "washout" affect the production of lift?

A— The wing tips continue producing lift when the main body of the wing is not producing lift.
B— The main body of the wing continues to produce lift when the wing tips are not producing lift.
C— The center of lift moves from the trailing edge of the wing, to the leading edge of the wing, as the wing begins to stall.

The washout/twist in the wing, starts with a high angle of attack at the root/nose, and decreases the angle of attack as the you approach each tip. This washout/twist, sweep, and airfoil shape is designed into the wing to make the nose lose lift first while the tips keep flying at high angles of attack. (H22) — Trikes, the Flex-Wing Flyers, Chapter 3

Answer (B) is incorrect because this happens only when the wing is at very low angles of attack where the wing is not near the critical angle of attack to stall. Answer (C) is incorrect because this is not the design of any trike wing and would produce a wing that would be unstable near the stall.

2266 [A]

Page Number	Question Number	Correct Answer	Explanation

WSC

2267. The wing of a weight-shift aircraft twists so that the angle of attack

A— from the center of the wing to the wing tip is variable and can be adjusted by the pilot in flight to optimize performance.
B— changes from a low angle of attack at the center of the wing, to a high angle of attack at the tips.
C— changes from a high angle of attack at the center of the wing, to a low angle of attack at the tips.

The fundamental design of the flex wing is for the wing to twist from a high angle of attack at the nose, to a lower angle of attack at the tips. (H22) — Trikes, the Flex-Wing Flyers, Chapter 3

Answer (A) is incorrect because this would provide a wing that would be unstable and dangerous. Flex wings are not designed this way. Answer (B) is incorrect because this only applies for some wing designs but not all. Varying the twist in the wing is common to most high performance hang gliders in flight and used as one method to trim weight-shift wings as well.

2267 [C]

PPC

2268. During flight, advancing thrust will

A— increase airspeed.
B— cause the aircraft to climb.
C— cause the aircraft to increase airspeed and climb.

Throttle controls vertical speed in a PPC. Advancing the throttle will produce decreased descent rates or increased climb rates. Speed in a PPC is controlled by the weight and not the throttle. (H01) — The Powered Parachute Bible, Chapter 1

Answers (A) and (C) are incorrect because throttle does not affect airspeed.

2268 [B]

PPC

2269. The torque effect of an engine that rotates clockwise in a powered parachute is counteracted by

A— increasing the length of the right and decreasing the length of the left riser cables.
B— decreasing the length of the left riser cables.
C— decreasing the length of right riser cables.

A clockwise or right-turning propeller when viewed from the rear creates an opposite reaction to turn the undercarriage aircraft to the left. Therefore, a slight right-hand turn needs to be built into the aircraft to accommodate for this torque. Many designs are used by manufacturers to accomplish this. Decreasing the length of the right-hand riser will accomplish this by bringing the right side of the wing down. (H02) — The Powered Parachute Bible, Chapter 2

Answers (A) and (B) are incorrect because they would create a turn in the wrong direction.

2269 [C]

PPC

2270. The steering bars

A— are used during taxi operations with the parachute stowed.
B— control the outboard trailing edge of the parachute.
C— control the main landing gear brakes.

The steering bars are the main control to turning in flight. Pushing on the right-hand steering bar will pull the right control line, lower the trailing edge of the right wing, create more drag on the right side and turn the aircraft to the right. (H01) — The Powered Parachute Bible, Chapter 1

Answers (A) and (C) are incorrect because the steering bars control the wing and are not used for ground operations.

2270 [B]

PPC
2271. The center of gravity tube is

A— lengthened for heavier pilots.
B— shortened for lighter pilots.
C— lengthened for lighter pilots.

The lighter the pilot, the more rearward the wing attachment should be for the hanging airframe to be balanced properly. Most modern designs have a number of hook-in points fore and aft on the airframe. For the tube CG adjustment system, lengthening the CG tube moves the wing hang point back to account for the lightweight person in the front. (H01) — The Powered Parachute Bible, Chapter 3

Answer (A) is incorrect because this would balance the airframe with the nose wheel too low. Answer (B) is incorrect because this would move the CG forward and the front wheel would be too high.

2271 [C]

PPC
2272. The fan guard surrounds the propeller and

A— increases aerodynamic efficiency.
B— reduces "P" factor.
C— protects the parachute suspension lines from damage.

The purpose of the fan guard is to protect the parachute lines from hitting the prop. (H01) — The Powered Parachute Bible, Chapter 1

Answers (A) and (B) are incorrect because the fan guard reduces performance and has no effect on P factor.

2272 [C]

PPC
2273. Cross ports in the parachute ribs aid in

A— weight reduction of the canopy.
B— the pressurization of the neighboring cells.
C— drying of the canopy.

Cross ports in the wing ribs allow air to flow sideways from cell to cell, called "cross flow" in the wing. This causes the cells next to each other to transfer pressure inside the wing and cells to pressurize neighboring cells. (H02) — The Powered Parachute Bible, Chapter 2

2273 [B]

PPC
2274. Splicing severed suspension lines

A— is permissible if using the same size material as the original line.
B— is a very dangerous practice.
C— is an acceptable field repair.

Splicing lines is dangerous because you can change the airfoil; the lines could come loose and go through the prop. (H02) — The Powered Parachute Bible, Chapter 2

Answers (A) and (C) are incorrect because it is a dangerous practice.

2274 [B]

PPC
2275. Tying a severed suspension line

A— will change the shape of the wing and is not permissible.
B— is permissible if it is shortened no more than six inches.
C— is an acceptable field repair.

Tying a severed suspension line would shorten it and create a discontinuity in the wing shape and is not acceptable. (H02) — The Powered Parachute Bible, Chapter 2

Answers (B) and (C) are incorrect because it is a dangerous practice.

2275 [A]

PPC
2276. What gives your powered parachute wing/canopy its airfoil shape?

A— The risers because, by decreasing the length of the right riser you will get the precise airfoil shape.
B— The suspension lines as they are precisely measured and fitted to a specific location.
C— The air as it enters the cell openings on the leading edge of the airfoil.

The precise lengths of the suspension lines determine the bottom shape of the airfoil. Airfoil-shaped ribs attached to the bottom of the airfoil where the suspension lines are attached define the top shape of the airfoil. (H02) — The Powered Parachute Bible

Answer (A) is incorrect because the decreased length of the right riser is used to counteract torque on some designs, thus causing a turn. Answer (C) is incorrect because the air inflates the canopy to whatever airfoil shape the suspension lines and ribs define.

2276 [B]

PPC
2277. Swapping wings from one brand or type of powered parachute to another is

A— permissible as long as the basic shape of the parachutes are similar.
B— dangerous since every wing is designed for a specific aircraft.
C— permissible if the overall area of the parachutes is the same.

Every wing is designed for a specific airframe configuration, engine torque and weight. (H02) — The Powered Parachute Bible, Chapter 2

Answers (A) and (C) are incorrect because there can be a different length in the lines between the right and left, which has nothing to do with the shape and area of the wing.

2277 [B]

PPC
2278. Degradation of the parachute's protective polyurethane coating results in

A— increased takeoff distances, decreased maximum gross weight, and increased fuel consumption.
B— reduced takeoff distances, increased maximum gross weight, and reduced fuel consumption.
C— increased takeoff distances, increased maximum gross weight, and increased fuel consumption.

A degradation of the fabric results in air leaking through the fabric and a loss in performance since this creates more drag. (H02) — The Powered Parachute Bible, Chapter 2

Answers (B) and (C) are incorrect because there is no increased gross weight.

2278 [A]

Page Number	Question Number	Correct Answer	Explanation

PPC
2279. Flaring allows the pilot to touchdown at a

A— higher rate of speed and a slower rate of descent.
B— lower rate of speed and a higher rate of descent.
C— lower rate of speed and a lower rate of descent.

Flaring slows you down and decreases your descent rate for a soft and slow landing. (H01) — The Powered Parachute Bible, Chapter 1

Answers (A) and (B) are incorrect because flaring does not produce a higher rate of speed or a higher rate of descent.

2279 [C]

PPC
2280. Flaring during a landing

A— decreases the powered parachute's speed due to increased drag.
B— increases the powered parachute's speed due to reduced drag.
C— decreases the powered parachute's drag due to increased speed.

Flaring or pulling down on the trailing edge creates more drag and slows the aircraft similar to a flap on an airplane. (H01) — The Powered Parachute Bible, Chapter 1

Answers (B) and (C) are incorrect because flaring does not increase the speed of a PPC.

2280 [A]

5-9 — — Add new questions to read:

ALL
2218. The "taxiway ending" marker

A— indicates taxiway does not continue.
B— identifies area where aircraft are prohibited.
C— provides general taxiing direction to named taxiway.

Taxiway ending markers are used to indicate that the taxiway does not continue. (J05) — AIM 2-3-4

2218 [A]

ALL
2219. What is the purpose of No Entry sign?

A— Identifies paved area where aircraft are prohibited from entering.
B— Identifies area that does not continue beyond intersection.
C— Identifies the exit boundary for the runway protected area.

The "no entry" sign prohibits an aircraft from entering an area. Typically, this sign would be located on a taxiway intended to be used in only one direction or at the intersection of vehicle roadways with runways, taxiways or aprons where the roadway may be mistaken as a taxiway or other aircraft movement surface. (J05) — AIM 2-3-8

Answer (B) is incorrect because this is the purpose of a hold position sign. Answer (C) is incorrect because this is the purpose of the runway boundary sign.

2219 [A]

Page Number	Question Number	Correct Answer	Explanation

5-17 | 2241 | [B]

Add a new question to read:

ALL
2241. Unless otherwise specified, Federal Airways include that Class E airspace extending upward from

A— 700 feet above the surface up to and including 17,999 feet MSL.
B— 1,200 feet above the surface up to and including 17,999 feet MSL.
C— the surface up to and including 18,000 feet MSL.

Federal airways are part of Class B, C, D, or E airspace. They are 8 miles wide, 4 miles either side of centerline. They usually begin at 1,200 feet AGL and continue up to but not including 18,000 feet MSL, or FL180. (A66) — 14 CFR 71.5

2241 [B]

6-4 | 2220 | [C]

Add a new question to read:

AIR, RTC, PPC, WSC
2220. Filling the fuel tanks after the last flight of the day is considered a good operating procedure because this will

A— force any existing water to the top of the tank away from the fuel lines to the engine.
B— prevent expansion of the fuel by eliminating airspace in the tanks.
C— prevent moisture condensation by eliminating airspace in the tanks.

Water in the fuel system is dangerous and the pilot must prevent contamination. The fuel tanks should be filled after each flight, or at least after the last flight of the day. This will prevent moisture condensation within the tank, since no air space will be left inside. (H307) — FAA-H-8083-25, Chapter 5

Answer (A) is incorrect because water will settle to the bottom of a gas tank. Answer (B) is incorrect because fuel is allowed to expand by the fuel vent, whether or not the tanks are full.

2220 [C]

6-5 | — | —

Add new chapter text and a new question to read:

Surface Operations

Taxiing to or from the runway generally presents no problems during calm or light wind conditions. However, when taxiing in moderate to strong wind conditions, the airplane's control surfaces or weight-shift control wing must be used to counteract the effects of wind. In airplanes equipped with a nose wheel (tricycle-gear), use the following taxi procedures:

1. The elevator should be in the neutral position when taxiing into a headwind.
2. The upwind aileron should be held in the up position when taxiing in a crosswind (or the upwind wing will tend to be lifted).
3. The elevator should be held in the down position and the upwind aileron down when taxiing with a quartering tailwind (the most critical condition for a nosewheel-type airplane).

When an airplane equipped with a tailwheel is taxied into a headwind, the elevator should be held in the up position to hold the tail down. In a quartering tailwind, both the upwind aileron and the elevator should be in the down position. See Figure 6-3.

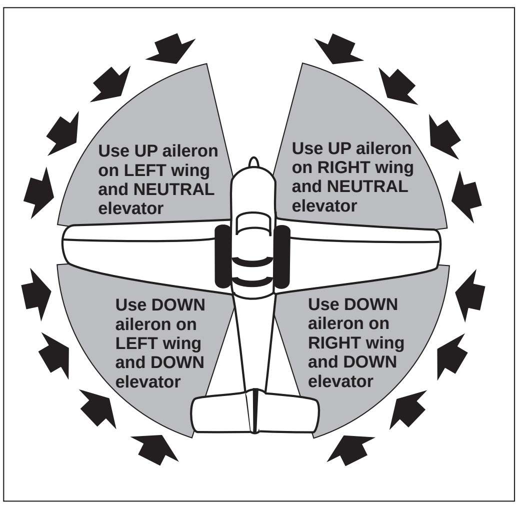

Figure 6-3. Control position while taxiing

Page Number	Question Number	Correct Answer	Explanation
			AIR **2228.** When taxiing an airplane with strong quartering tailwinds, which aileron position should be used? A— Neutral. B— Aileron down on the side from which the wind is blowing. C— Aileron up on the side from which the wind is blowing. Taxiing with a quartering tailwind provides the most hazardous conditions. In this case, the elevator should be in the down position and the aileron on the upwind side should also be in the down position to keep the wing from lifting. (H516) — FAA-H-8083-3, Chapter 2 2228 [B]
6-12	**2226**	**[A]**	**Add a new question to read:** ALL **2226.** During departure, when visual separation is employed by Air Traffic Control (ATC), traffic is no longer a factor when A— the other aircraft turns away or is on a diverging course. B— visual contact with the other aircraft is lost. C— the other aircraft is passed. Traffic is no longer a factor when during approach phase the other aircraft is in the landing phase of flight or executes a missed approach; and during departure or en route, when the other aircraft turns away or is on a diverging course. (J16) — AIM 4-4-13 2226 [A]
6-15	**2235**	**[C]**	**Add a new question to read:** ALL **2235.** The greatest vortex strength occurs when the generating aircraft is A— light, dirty, and fast. B— heavy, dirty, and fast. C— heavy, clean, and slow. The strength of a vortex is governed by the weight, speed, and the shape of the wing of the generating aircraft. Maximum vortex strength occurs when the generating aircraft is heavy, clean, and slow. (J27) — FAA-H-8083-25, Chapter 12 2235 [C]
7-8	**2221**	**[B]**	**Add a new question to read:** ALL **2221.** When converting from true course to magnetic heading, a pilot should A— subtract easterly variation and right wind correction angle. B— add westerly variation and subtract left wind correction angle. C— subtract westerly variation and add right wind correction angle. When converting a true course to a true heading, subtract a left wind correction angle or add a right wind correction angle. When converting from a true heading to a magnetic heading, add westerly variation or subtract easterly variation. (H985) — FAA-H-8083-25, Chapter 14 Answer (A) is incorrect because right wind correction is added. Answer (C) is incorrect because westerly variation is added. 2221 [B]

Page Number	Question Number	Correct Answer	Explanation
7-25	2222	[A]	**Add a new question to read:**

ALL
2222. (Refer to Figure 61, point 1.)
GIVEN:
Departure point .... Georgetown Airport (Q61)
Departure time 0637
Winds aloft forecast (FD) at your altitude 1008
Airspeed .... 8 kts

At 0755, the aircraft should be

A— over Auburn Airport (AUN).
B— over the town of Auburn.
C— slightly west of the town of Garden Valley.

1. Calculate time en route:
   0735 - 0637 = 1:18 = 1.3 hours
2. Compute distance traveled:
   Distance = Speed x Time
   8 x 1.3 = 10.4 NM
3. Plot course of 100° + 180° = 280° out to a distance of 10.4 NM from Georgetown Airport (Q61), point 1. The aircraft should be just south of there.

(H985) — FAA-H-8083-25, Chapter 14

2222 [A]