Training Guide for Fixed-Wing Ultralights

Safety Information for

Instructors and Students

Introduction

Ultralight aviation in the United States is the most unencumbered opportunity for solo flight in the world. Tremendous freedoms are given to ultralight pilots. However, at the same time there are strict limitations that must be followed. With this freedom, however, come responsibilities to ensure the safety of other individuals in the airspace as well as on the ground.

In 1982 the FAA issued Federal Aviation Regulation Part 103, Ultralight Vehicles. With this regulation, the FAA chose to identify ultralights as vehicles and not aircraft. Because they are vehicles and not aircraft, this regulation allows individuals to operate ultralight vehicles without requiring FAA pilot or vehicle certification.

Upon publishing Part 103 the FAA said it did not wish to issue pilot certificates for ultralight operators. Instead, the FAA said individuals who want to fly ultralights should participate in industry-established self-regulation and training programs. Since 1983 EAA has maintained programs to support Part 103 and has held an exemption to Part 103 that allowed the operation of 2-place ultralight training vehicles by authorized ultralight flight instructors.

In 2004, the FAA passed the sport pilot & light-sport aircraft regulations. One specific purpose of this new rule was to transition 2-place ultralight training vehicles to experimental light-sport aircraft. As a result, after the training exemption expires on 1/31/08 there will no longer be a way to fly a 2-place ultralight to train ultralight pilots. The FAA has said they intend ultralight pilot training to be conducted in N-numbered aircraft by FAA flight instructors.

The EAA Ultralight & Light-Sport Aircraft Council has developed this information guide for those individuals interested in ultralight flight training, FAA certified flight instructors (CFI), student ultralight pilots, or pilots transitioning to ultralights from other aircraft. This guide sets forth recommendations to students and flight instructors who wish to learn and train to fly ultralight vehicles under the rules of Part 103.

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Message to Students

Flying an ultralight is an enjoyable and rewarding experience. There is nothing quite like the freedom of flying in the open air and soaring like a bird as the countryside slowly unfolds below you. EAA highly recommends that if an enthusiast wants to fly an ultralight that he/she receives flight instruction from a competent person. Flying ultralights has proven to be a safe recreational aviation activity when done in accordance with recommended safety practices. The most important recommendation EAA can make to a new student is to find a qualified flight instructor and obtain dual flight instruction in a 2-place aircraft.

Enclosed in this booklet the student will find many recommendations to safely learn and participate in ultralight aviation. For his/her benefit and safety, please consider taking the time to become familiar with the information in this booklet and proficient to the recommended flight training standards that are enclosed.

EAA recommends that existing pilots transitioning to ultralights from heavier aircraft also would benefit from transition training. There are some significantly different flight characteristics between larger, heavier aircraft and the very lightweight, high-drag, low-inertia, slow-flying ultralight aircraft that existing pilots should become familiar with.

A valuable source of information is other ultralight pilots. Find pilots flying the same type ultralight you want to fly, ask questions, and learn. The EAA Flight Advisor program has individuals experienced in test flying homebuilt and ultralight aircraft.

Although the FAA does not require flight training to fly an ultralight, flight training is an investment in the student's knowledge and ability. Trying to fly without proper instruction could be disastrous!

Finding a Flight Instructor

One of the more important yet challenging aspects of learning to fly an ultralight is to find a flight instructor who has the desire to provide flight instruction for an ultralight student pilot. As a student, look for a flight instructor who has an aircraft available for the flight training. The aircraft should ideally have ultralight-like flight characteristics and the flight instructor should have a good understanding of ultralight vehicle flight characteristics.

Here are a few suggestions to locate a flight instructor:

- EAA's online directory of sport pilot flight instructors, *www.sportpilot.org/instructors*
- National Association of Flight Instructors (NAFI), *www.nafinet.org/directory/flight_lookup.html*
- Local EAA chapter network, *www.eaa.org/chapters/locator/*
- Ultralight manufacturer's dealer network
- Visit local airport and ask around
- Other ultralight pilots

Message to Flight Instructors

FAA certified flight instructors (CFI) are a key link in ultralight pilot flight training. EAA encourages any CFI to become familiar with the flight characteristics of ultralight vehicles and make themselves available to potential new students seeking training to safely learn to fly an ultralight vehicle.

The FAA has no ultralight pilot or vehicle certification requirements. As a result there are many ultralight pilots over the years that either trained themselves or had very minimal training. While some pilots have succeeded in this manner, EAA strongly discourages it. This guide sets forth recommendations for both students and instructors in order to assure the training and knowledge necessary for flying an ultralight safely.

EAA is recommending that ultralight pilots be trained to a standard similar to a sport pilot. However, the instructor must consider the type of ultralight the student will fly and the type of environment they will be flying in and adjust the training so it is relevant. For the convenience of the flight instructor and the student, this booklet contains a slightly modified reprint of the FAA sport pilot practical test standards. We have used these as the recommended ultralight pilot flight training standards.

The following steps will help guide the instructor through the recommended process to train an ultralight student:

- Have the student register with EAA as a ultralight student, complete the online form located at the following web site, *www.eaa.org/ultralights/forms*
- Provide relevant flight and ground training to the student
- If student wants to complete ultralight pilot registration with EAA then:
    - Ensure you have given 10 hours flight training, and the student has passed the recommend written test, oral test, and flight test.
    - Have the student complete the online pilot registration. Forms available online at: *www.eaa.org/ultralights/forms*.

Ultralight Pilot Training

EAA recommends that people who want to learn to fly an ultralight should seek qualified flight instructors teaching in aircraft that exhibit ultralight-like flight characteristics. FAA flight instructors are authorized by the FAA to provide flight instruction for FAA pilot certificates. To fly an ultralight under the rules of Part 103 no FAA pilot certificate is required. However, to safely fly an ultralight it is critical that people get the appropriate level of training from a qualified person.

EAA recommends that the student and flight instructor determine the suitability of a particular aircraft for use as a training aircraft. Further, it is important that the flight instructor be able to explain the differences in flight characteristics between the training aircraft and the ultralight vehicle to be flown. Many fixed-wing ultralights found today are conventional 3-axis designs, and many different types of 3-axis light aircraft could be suitable for dual flight training.

Flight Training Standards

EAA recommends that flight instructors train ultralight pilots in accordance with the FAA sport pilot practical test standards (PTS). A slightly modified copy of the sport pilot PTS is reprinted in this booklet. Flight instructors should tailor their flight-training program to suit the student and the type of ultralight vehicle the student will fly. For example there may be some tasks that should not be trained because it would not be relevant to the type of ultralight flying the student will do.

Ultralight pilot training standards previously published by EAA, United States Ultralight Association (USUA), and Aero Sports Connection (ASC) are also suitable standards and recommended by EAA.

The ultimate goal with the flight training should be to prepare the student to successfully and safely fly his/her ultralight vehicle. Instructors should tailor a flight-training program for each student with this ultimate goal in mind.

Flight Test

If the student wants to register as an ultralight pilot with EAA, then at the completion of the flight training program the instructor should conduct a flight test with the student. The recommended flight-training test standard in this guide should be used as the standard for conducting the test. EAA recommends that the flight instructor test only those items that are appropriate to the type of ultralight the student will fly. For example, there would be no need to test on any tasks related to the operation of a seaplane if the student was planning to fly a land plane. To register as an ultralight pilot with EAA, a flight test is required.

Oral Test
If the student wants to register as an ultralight pilot with EAA, then at the completion of the flight training program the instructor should conduct an oral test with the student. The flight instructor should use his or her own discretion on the extent and detail of the oral test. Ultralight pilot registration with EAA requires that the instructor test the student's knowledge through verbal discussion.

Written Test
If the student wants to register as an ultralight pilot with EAA, then at the completion of the flight training program the instructor should administer a written test to the student. Included in this guide is a recommended written test. The test is required for those who want to register as an EAA ultralight pilot. The test represents an assortment of questions that would be useful for an ultralight pilot to know. A passing score would be 70%.

EAA Ultralight Programs
The EAA Ultralight registration programs are maintained for the benefit of EAA members. EAA and FAA highly recommend voluntary participation in these programs. By participating it enhances safety for everyone involved in the sport and helps ensure the privileges of Part 103 for future ultralight enthusiasts. Registration programs include: vehicle, student, and pilot registration. Registration can be completed online at: EAA Ultralights web site, *www.eaa.org/ultralights/forms* or call EAA at 920-426-4821.

Student registration should be done at the start of any flight training. Student registration allows the student to use time flown in an ultralight vehicle to count toward a FAA-issued sport pilot certificate, in accordance with FAR 61.52.

Pilot registration can be done at the completion of the pilot training program. This shows that the student has been trained and tested to a minimum standard. To register as an ultralight pilot EAA recommends a minimum of 10 hours flight instruction, 3 hours supervised solo, and 25 takeoffs and landings and successfully pass a written, oral, and flight test. Included in this booklet are the recommended written and flight test standards. The oral test should be at the discretion of the flight instructor to determine the student's knowledge to safely fly an ultralight.

Vehicle registration should be done with all ultralight vehicles. EAA assigns a vehicle registration number that begins with the letter "E"; an example is "E001AB." Once the vehicle registration number is assigned it can be placed on the vehicle and used to show you are complying with the self-regulation intent of FAR Part 103. It also works great for radio communication purposes.

EAA Membership
EAA is a membership organization that has developed and administers ultralight self-regulation programs. EAA members include ultralight, homebuilders, light plane, warbird, vintage, flight instructors and aerobatic enthusiasts, and people who simply love aviation. If you are not already a member of EAA, we ask that you consider joining to support EAA's goals to preserve, promote, and protect recreational aviation.

EAA is pleased to furnish this information booklet and hopes that it will benefit you. EAA encourages and promotes safe and responsible ultralight flying activities.

EAA membership is $40 a year, which includes the *EAA Sport Pilot & Light Sport Aircraft* magazine. Call 1-800-JOIN-EAA to become a member.

For Additional Information:
EAA Aviation Services, PO Box 3086, Oshkosh, WI 54903, 920-426-4821, *www.eaa.org/ultralights*

FEDERAL AVIATION REGULATION PART 103
ULTRALIGHT VEHICLES

SOURCE: Docket No. 21631, 47 FR 38776, Sept. 2, 1982, unless otherwise noted.

SUBPART A - GENERAL

§103.1 Applicability.
This part prescribes rules governing the operation of ultralight vehicles in the United States. For the purposes of this part, an ultralight vehicle is a vehicle that:
(a) is used or intended to be used for manned operation in the air by a single occupant;
(b) Is used or intended to be used for recreation or sport purposes only;
(c) Does not have any U.S. or foreign airworthiness certificate; and
(d) If unpowered, weighs less than 155 pounds; or
(e) If powered:
(1) Weighs less than 254 pounds empty weight, excluding floats and safety devices which are intended for deployment in a potentially catastrophic situation;
(2) Has a fuel capacity not exceeding 5 U5. gallons;
(3) Is not capable of more than 55 knots calibrated airspeed at full power in level flight; and
(4) Has a power-off stall speed which does not exceed 24 knots calibrated airspeed.

§103.3 Inspection requirements.
(a) Any person operating an ultralight vehicle under this part shall upon request, allow the Administrator or his designee, to inspect the vehicle to determine the applicability of this part.
(b) The pilot or operator of an ultralight must, upon request of the Administrator, furnish satisfactory evidence that the vehicle is subject only to the provisions of this part.

§103.5 Waivers.
No person may conduct operations that require a deviation from this part except under a written waiver issued by the Administrator.

§103.7 Certification and registration.
(a) Notwithstanding any other section pertaining to certification of aircraft or their parts or equipment, ultralight vehicles and their component parts and equipment are not required to meet the airworthiness certification standards specified for aircraft or to have certificates of airworthiness.
(b) Notwithstanding any other section pertaining to airman certification operators of ultralight vehicles are not required to meet any aeronautical knowledge, age, or experience requirements to operate those vehicles or to have airman or medical certificates.
(c) Notwithstanding any other section pertaining to registration and marking of aircraft, ultralight vehicles are not required to be registered or to bear markings of any type.

SUBPART B - OPERATING RULES

§103.9 Hazardous operations.
(a) No person may operate any ultralight vehicle in a manner that creates a hazard to other persons or property.
(b) No person may allow an object to be dropped from an ultralight vehicle if such action creates a hazard to other persons or property.

§103.11 Daylight operations.
(a) No person may operate an ultralight vehicle except between the hours of sunrise and sunset.
(b) Notwithstanding paragraph (a) of this section, ultralight vehicles may be operated during the twilight periods 30 minutes before official sunrise and 30 minutes after official sunset or, in Alaska, during the period of civil twilight as defined in the Air Almanac, if:
(1) The vehicle is equipped with an operating anticollision light visible for at least 3 statute miles; and
(2) All operations are conducted in uncontrolled airspace.

§103.13 Operation near aircraft right-of-way rules.
(a) Each person operating an ultralight vehicle shall maintain vigilance so as to see and avoid aircraft and shall yield the right-of-way to all aircraft.
(b) No person may operate an ultralight vehicle in a manner that creates a collision hazard with respect to any aircraft.
(c) Powered ultralights shall yield the right-of-way to unpowered ultralights.

§103.15 Operations over congested areas.
No person may operate an ultralight vehicle over any congested area of a city, town or settlement, or over any open air assembly of persons.

§103.17 Operations in certain airspace.
No person may operate an ultralight vehicle within Class A, Class B, Class C, or Class D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport unless that person has prior authorization from the ATC facility having jurisdiction over that airspace.

[Doc. No 24456, 56 FR 65662, Dec. 17 1991]

§103.19 Operations in prohibited/restricted areas.
No person may operate an ultralight vehicle in prohibited or restricted areas unless that person has permission from the using or controlling agency, as appropriate.

§103.20 Flight restrictions in the proximity of certain areas designated by notice to airmen.
No person may operate an ultralight vehicle in areas designated in a Notice to Airmen under Sec.91.137, Sec.91.138, Sec.91.141, Sec.91-143 or Sec.91-145 of this chapter, unless authorized by:
(a)Air Traffic Control (ATC); or
(b)A Flight Standards Certificate of Waiver or Authorization issued for the demonstration or event.

[Doc. No. FAA-2000-8274, 66 FR 176, Sept. 11, 2001]

§103.21 Visual reference with the surface.
No person may operate an ultralight except by visual reference with the surface.

§103.23 Flight visibility and cloud clearance requirements.
No person may operate an ultralight vehicle when the flight visibility or distance from clouds is less than that in the table found below. All operations in Class A, Class B, Class C, and Class D airspace or Class E airspace designated for an airport must receive prior ATC authorization as required in §103.17 of this part.

Airspace	Flight Visibility	Distance from Clouds
Class A	Not Applicable	Not Applicable
Class B	3 statute miles	Clear of Clouds
Class C	3 statute miles	500 feet below 1,000 feet above 2,000 feet horiz.
Class D	3 statute miles	500 feet below 1,000 feet above 2,000 feet horiz.
Class E		
Less than 10,000 feet MSL:	3 statute miles	500 feet below 1,000 feet above 2,000 feet horiz.
At or above 10,000 feet MSL:	5 statute miles	1,000 feet below 1,000 feet above 1 sm. horizontal
Class G		
1,200 feet or less above the surface:	1 statute mile	Clear of clouds
More than 1,200 feet above the surface but less than 10,000 feet MSL:	1 statute mile	500 feet below 1,000 feet above 2,000 feet horiz.
More than 1,200 feet above the surface and at or above 10,000 feet MSL:	5 statute miles	1,000 feet below 1,000 feet above 1 sm. Horizontal

[Amdt. 103-17, 56 FR 65662, Dec. 17, 1991]

RECOMMENDED FIXED-WING ULTRALIGHT PILOT FLIGHT TRAINING STANDARDS

I. PREFLIGHT PREPARATION

A. TASK: CERTIFICATES AND DOCUMENTS

Objective. To determine that the applicant exhibits knowledge of the elements related to certificates and documents by:

1. Explaining-
a. ultralight pilot privileges, limitations.
b. pilot logbook or flight records.
2. Locating and explaining-
a. ultralight vehicle registration program.
b. operating limitations, placards, instrument markings, and flight training supplement.
c. weight and balance data.

B. TASK: AIRWORTHINESS REQUIREMENTS

Objective. To determine that the applicant exhibits knowledge of the elements related to airworthiness requirements by:

1. Explaining-
a. required instruments and equipment for ultralight pilot privileges.
b. procedures and limitations for determining if an aircraft, with inoperative instruments and or equipment, is in a condition for safe operation.
2. Explaining-
a. airworthiness directives/safety directives.
b. maintenance/inspection requirements and appropriate record keeping.

C. TASK: WEATHER INFORMATION

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to real time weather information appropriate to the specific category/class aircraft by consulting the weather reports, charts, and forecasts from aeronautical weather reporting sources.
2. Makes a competent "go/no-go" decision based on available weather information.
3. Describes the importance of avoiding adverse weather and inadvertent entry into instrument meteorological conditions (IMC).
4. Explains courses of action to safely exit from an inadvertent IMC encounter.

D. TASK: CROSS-COUNTRY FLIGHT PLANNING

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to cross-country flight planning appropriate to the category/class aircraft.
2. Uses appropriate and current aeronautical charts.
3. Properly identifies airspace, obstructions, and terrain features.
4. Selects easily identifiable en route checkpoints, as appropriate.
5. Selects most favorable altitudes considering weather conditions and equipment capabilities.
6. Computes headings, flight time, and fuel requirements.
7. Selects appropriate navigation system/facilities and communication frequencies, if so equipped.
8. Applies pertinent information from NOTAMs, A/FD, and other flight publications, TFR's.

E. TASK: NATIONAL AIRSPACE SYSTEM

Objective. To determine that the applicant exhibits knowledge of the elements related to the National Airspace System by explaining:

1. Ultralight pilot privileges applicable to the following classes of airspace:
a. Class B.
b. Class C.
c. Class D.
d. Class E.
e. Class G.
2. Special use and other airspace areas.
3. Temporary flight restrictions (TFRs).

F. TASK: OPERATION OF SYSTEMS

Objective. To determine that the applicant exhibits knowledge of the elements related to the operation of systems on the light-sport aircraft provided for the flight test by explaining at least three (3) of the following systems, if applicable:

1. Primary flight controls and trim.
2. Flaps and lift-enhancing devices.
3. Water rudders.
4. Powerplant and propeller.
5. Landing gear, brakes, and steering.
6. Fuel, oil, and hydraulic.

7. Electrical.
8. Avionics.
9. Pitot-static, vacuum/pressure, and associated flight instruments.

G. TASK: AEROMEDICAL FACTORS
Objective. To determine that the applicant exhibits knowledge of the elements related to aeromedical factors by explaining:
1. The effects of alcohol, drugs, and over-the-counter medications.
2. The symptoms, causes, effects, and corrective actions of at least three (3) of the following-
a. hypoxia.
b. hyperventilation.
c. middle ear and sinus problems.
d. spatial disorientation.
e. motion sickness.
f. carbon monoxide poisoning.
g. stress and fatigue.
h. dehydration.
i. hypothermia.

H. TASK: WATER AND SEAPLANE CHARACTERISTICS
Objective. To determine that the applicant exhibits knowledge of the elements related to water and seaplane characteristics by explaining:
1. The characteristics of a water surface as affected by features, such as-
a. size and location.
b. protected and unprotected areas.
c. surface wind.
d. direction and strength of water current.
e. floating and partially submerged debris.
f. sandbars, islands, and shoals.
g. vessel traffic and wakes.
h. other features peculiar to the area.
2. Float and hull construction, and their effect on seaplane performance, as applicable.
3. Causes of porpoising and skipping, and the pilot action required to prevent or correct these occurrences.

I. TASK: SEAPLANE BASES, MARITIME RULES, AND AIDS TO MARINE NAVIGATION
Objective. To determine that the applicant exhibits knowledge of the elements related to seaplane bases, maritime rules, and aids to marine navigation by explaining:
1. How to locate and identify seaplane bases on charts or in directories.
2. Operating restrictions at seaplane bases, if applicable.
3. Right-of-way, steering, and sailing rules pertinent to seaplane operation.
4. Marine navigation aids, such as buoys, beacons, lights, and sound signals.

J. TASK: PERFORMANCE AND LIMITATIONS
Objective. To determine the applicant:
1. Exhibits knowledge of the elements related to performance and limitations by explaining the use of charts, tables, and data if appropriate, to determine performance and the adverse effects of exceeding limitations.
2. Exhibits knowledge of the principles of weight and balance by explaining weight and balance terms and the effect of weight and balance on airplane performance.
3. Determines if weight and center of gravity will remain within limits during all phases of flight.
4. Describes the effects of atmospheric conditions on the airplane's performance.
5. Determines whether the computed performance is within the airplane's capabilities and operating limitations.

K. TASK: PRINCIPLES OF FLIGHT
Objective. To determine the applicant exhibits knowledge of basic aerodynamics and principles of flight including:
1. Forces acting on an airplane in various flight maneuvers.
2. Airplane stability and controllability.
3. Torque effect.
4. Wingtip vortices and precautions to be taken.
5. Loads and load factors.
6. Angle of attack, stalls and stall recovery, including flight situations in which unintentional stalls may occur.
7. Effects and use of primary and secondary flight controls including the purpose of each control and proper technique for use.

II. PREFLIGHT PROCEDURES

A. TASK: PREFLIGHT INSPECTION

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to preflight inspection. This shall include which items must be inspected, the reasons for checking each item, and how to detect possible defects.
2. Inspects the airplane with reference to an appropriate checklist.
3. Verifies the airplane is in condition for safe flight.

B. TASK: COCKPIT MANAGEMENT

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to efficient cockpit management procedures, and related safety factors.
2. Organizes and arranges material and equipment in a manner that makes the items readily available.
3. Briefs occupant on the use of safety belts, shoulder harnesses, and any other required safety equipment, doors, and emergency procedures.

C. TASK: ENGINE STARTING

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to recommended engine starting procedures. This shall include pull starting, hand propping safety, and starting under various atmospheric conditions, if applicable.
2. Demonstrates awareness of other persons and property during start.
3. Positions the airplane properly considering structures, surface conditions, other aircraft, and the safety of nearby persons and property.
4. Accomplishes the correct starting procedure.
5. Completes the appropriate checklist.

D. TASK: TAXIING

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to safe taxi procedures.
2. Performs a brake check if applicable, immediately after the airplane begins moving.
3. Positions the flight controls properly for the existing wind conditions.
4. Safely controls airplane direction and speed.
5. Complies with airport markings, signals, clearances, and instructions.
6. Taxis so as to avoid other aircraft and hazards.

E. TASK: TAXIING AND SAILING

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to water taxiing and sailing procedures.
2. Positions the flight controls properly for the existing wind conditions.
3. Plans and follows the most favorable course while taxiing or sailing, considering wind, water current, water conditions, and maritime regulations.
4. Uses the appropriate idle, plow, or step taxi technique.
5. Uses flight controls, flaps, doors, water rudder, and power correctly so as to follow the desired course while sailing.
6. Prevents and corrects for porpoising and skipping.
7. Avoids other aircraft, vessels, and hazards.
8. Complies with seaplane base signs, signals, and clearances.

F. TASK: BEFORE TAKEOFF CHECK

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to the before takeoff check, including the reasons for checking each item and how to detect malfunctions.
2. Positions the airplane properly considering other aircraft/vessels, wind, and surface conditions.
3. Divides attention inside and outside the cockpit.
4. Accomplishes the before takeoff checklist and ensures the airplane is in safe operating condition.
5. Reviews takeoff performance, such as airspeeds, takeoff distances, departure, and emergency procedures.
6. Avoids runway incursions and/or ensures no conflict with traffic prior to taxiing into takeoff position.
7. Completes the appropriate checklist.

III. AIRPORT AND SEAPLANE BASE OPERATIONS

A. TASK: RADIO COMMUNICATIONS

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to radio communications at airports without operating control towers.
2. Selects appropriate frequencies.
3. Transmits using recommended phraseology.
4. Acknowledges radio communications.

B. TASK: TRAFFIC PATTERNS
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to traffic patterns and shall include procedures at airports with CTAF, prevention of runway incursions, collision avoidance, wake turbulence avoidance, and wind shear.
2. Complies with proper local traffic pattern procedures.
3. Maintains proper spacing from other aircraft.
4. Corrects for wind drift to maintain the proper ground track.
5. Maintains orientation with the runway/landing area in use.
6. Maintains traffic pattern altitude, ±100 feet, and the appropriate airspeed, ±10 knots, if applicable.

C. TASK: AIRPORT/SEAPLANE BASE, RUNWAY, AND TAXIWAY SIGNS, MARKINGS AND LIGHTING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to airport/seaplane base, runway, and taxiway operations with emphasis on runway incursion avoidance.
2. Properly identifies and interprets airport/seaplane base runway, and taxiway signs, markings and lighting.

IV. TAKEOFFS, LANDINGS, AND GO-AROUNDS

A. TASK: NORMAL AND CROSSWIND TAKEOFF AND CLIMB
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to a normal/ crosswind takeoff and climb and rejected takeoff procedures.
2. Clears the area and positions the flight controls appropriately for the existing wind conditions.
3. Retracts the water rudders as appropriate, and establishes and maintains the most efficient planing/lift-off attitude, and corrects for porpoising and skipping.
4. Lifts off at the recommended airspeed and/or attitude, and climbs at that airspeed/climb attitude (+10/-5 knots).
5. Retracts flaps after a positive rate of climb is established and maintains takeoff power to a safe maneuvering altitude.
6. Maintains directional control and proper wind-drift correction throughout the takeoff and climb.

B. TASK: NORMAL AND CROSSWIND APPROACH AND LANDING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to a normal and crosswind approach and landing.
2. Adequately surveys the intended landing area.
3. Considers the wind conditions, landing surface, obstructions, and selects a suitable touchdown point.
4. Establishes the recommended approach and landing configuration and approach airspeed/attitude, adjusting pitch attitude and power as required.
5. Maintains a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 VSO, +10/-5 knots, and/or appropriate approach attitude, with wind gust factor applied.
6. Contacts the water at the proper pitch attitude.
7. Touches down smoothly at approximate stalling speed/attitude.
8. Touches down at or within 400 feet beyond a specified point, with no drift, and with the airplane's longitudinal axis aligned with and over the runway center/landing path.
9. Maintains crosswind correction and directional control throughout the approach and landing sequence.

C. TASK: SOFT-FIELD TAKEOFF AND CLIMB
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to a soft-field takeoff and climb.
2. Positions the flight controls for existing wind conditions and to maximize lift as quickly as possible.

3. Clears the area; taxis onto the takeoff surface at a speed consistent with safety without stopping while advancing the throttle smoothly to takeoff power.
4. Establishes and maintains a pitch attitude that will transfer the weight of the airplane from the wheels to the wings as rapidly as possible.
5. Lifts off at the lowest possible airspeed and remains in ground effect while accelerating to Vx or Vy, as appropriate.
6. Establishes a pitch attitude for Vx or Vy,as appropriate and maintains selected airspeed +10/-5 knots, during the climb.
7. Retracts flaps, if appropriate, after clear of any obstacles or as recommended by the manufacturer.
8. Maintains takeoff power to a safe maneuvering altitude.
9. Maintains directional control and proper wind-drift correction throughout the takeoff and climb.

D. TASK: SOFT-FIELD APPROACH AND LANDING

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to a soft-field approach and landing.
2. Considers the wind conditions, landing surface, and obstructions, and selects the most suitable touchdown area.
3. Establishes the recommended approach and landing configuration, and airspeed/attitude; adjusts pitch attitude and power as required.
4. Maintains a stabilized approach and recommended airspeed, or in its absence, not more than 1.3 Vso, +10/-5 knots, and/or appropriate approach attitude.
5. Touches down softly.
6. Maintains crosswind correction and directional control throughout the approach and landing sequence.
7. Maintains proper position of the flight controls and sufficient speed to taxi on the soft surface.

E. TASK: SHORT-FIELD TAKEOFF AND MAXIMUM PERFORMANCE CLIMB

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to a short-field takeoff and maximum performance climb.
2. Positions the flight controls for the existing wind conditions; sets the flaps, if applicable, as recommended.
3. Clears the area; taxis into takeoff position utilizing maximum available takeoff area and aligns the airplane on the runway center/takeoff path.
4. Selects an appropriate take-off path for the existing conditions.
5. Applies brakes (if appropriate) while advancing the throttle.
6. Establishes and maintains the most efficient planing/lift-off attitude and corrects for porpoising and skipping.
7. Lifts off at the recommended airspeed/attitude, and accelerates to the recommended obstacle clearance airspeed/attitude or Vx
.8. Establishes a pitch attitude that will maintain the recommended obstacle clearance airspeed, or Vx +10/-5 knots, until the obstacle is cleared, or until the airplane is 50 feet above the surface.
9. After clearing the obstacle, establishes the pitch attitude for Vy accelerates to Vy, and maintains Vy, +10/-5 knots, during the climb.
10. Retracts the flaps after clear of any obstacles or as recommended by manufacturer.
11. Maintains takeoff power to a safe maneuvering altitude.
12. Maintains directional control and proper wind-drift correction throughout the takeoff and climb.

F. TASK: SHORT-FIELD APPROACH AND LANDING

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to a short-field approach and landing.
2. Adequately surveys the intended landing area.
3. Considers the wind conditions, landing surface, obstructions, and selects the most suitable touchdown point.
4. Establishes the recommended approach and landing configuration and airspeed/attitude; adjusts pitch attitude and power as required.
5. Maintains a stabilized approach and the recommended approach airspeed/attitude, or in its absence not more than 1.3 Vso, +10/-5 knots.

6. Selects the proper landing path, contacts the water at the minimum safe airspeed with the proper pitch attitude for the surface conditions.
7. Touches down smoothly at minimum control airspeed.
8. Touches down at or within 200 feet beyond a specified point.
9. Maintains crosswind correction and directional control throughout the approach and landing sequence.
10. Applies brakes if equipped, or elevator control as necessary, to stop in the shortest distance consistent with safety.

G. TASK: GLASSY WATER TAKEOFF AND CLIMB

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to glassy water takeoff and climb.
2. Positions the flight controls and flaps for the existing conditions.
3. Clears the area; selects an appropriate takeoff path considering surface hazards and/or vessels and surface conditions.
4. Retracts the water rudders as appropriate; advances the throttle smoothly to takeoff power.
5. Establishes and maintains an appropriate planing attitude, directional control, and corrects for porpoising, skipping, and increases in water drag.
6. Utilizes appropriate techniques to lift seaplane from the water considering surface conditions.
7. Establishes proper attitude/airspeed and accelerates to Vy, +10/-5 knots during the climb.
8. Retracts the flaps after a positive rate of climb is established.
9. Maintains takeoff power to a safe maneuvering altitude.
10. Maintains directional control and proper wind-drift correction throughout takeoff and climb.

H. TASK: GLASSY WATER APPROACH AND LANDING

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to glassy water approach and landing.
2. Adequately surveys the intended landing area.
3. Considers the wind conditions, water depth, hazards, surrounding terrain, and other watercraft.
4. Selects the most suitable approach path and touchdown area.
5. Establishes the recommended approach and landing configuration, airspeed/attitude, and adjusts pitch attitude and power as required.
6. Maintains a stabilized approach and the recommended approach airspeed, +10/-5 knots and/or attitude and maintains a touchdown pitch attitude and descent rate from the last altitude reference until touchdown.
7. Makes smooth, timely, and correct power and control adjustments to maintain proper pitch attitude and rate of descent to touchdown.
8. Contacts the water in the proper pitch attitude and slows to idle taxi speed.
9. Maintains crosswind correction and directional control throughout the approach and landing sequence.

I. TASK: ROUGH WATER TAKEOFF AND CLIMB

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to rough water takeoff and climb.
2. Positions the flight controls and flaps for the existing conditions.
3. Clears the area; selects an appropriate takeoff path considering wind, swells, surface hazards, and/or vessels.
4. Retracts the water rudders as appropriate; advances the throttle smoothly to takeoff power.
5. Establishes and maintains an appropriate planing attitude, directional control, and corrects for porpoising, skipping, or excessive bouncing.
6. Lifts off at minimum airspeed and accelerates to Vy, +10/-5 knots before leaving ground effect.
7. Retracts the flaps after a positive rate of climb is established
8. Maintains takeoff power to a safe maneuvering altitude.
9. Maintains directional control and proper wind-drift correction throughout takeoff and climb.

J. TASK: ROUGH WATER APPROACH AND LANDING

Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to rough water approach and landing.
2. Adequately surveys the intended landing area.

3. Considers the wind conditions, water, depth, hazards, surrounding terrain, and other watercraft.
4. Selects the most suitable approach path and touchdown area.
5. Establishes the recommended approach and landing configuration and airspeed/attitude, and adjusts pitch attitude and power as required.
6. Maintains a stabilized approach and the recommended approach airspeed and/or attitude, or in its absence not more than 1.3 Vso +10/-5 knots with wind gust factor applied.
7. Makes smooth, timely, and correct power and control inputs during the roundout and touch down.
8. Contacts the water in the proper pitch attitude and at the proper airspeed, considering the type of rough water.
9. Maintains crosswind correction and directional control throughout the approach and landing sequence.

K. TASK: FORWARD SLIP TO A LANDING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to forward slip to a landing.
2. Considers the wind conditions, landing surface, obstructions, and selects the most suitable touchdown point.
3. Establishes the slipping attitude at the point from which a landing can be made using the recommended approach and landing configuration and airspeed; adjusts pitch attitude and power as required.
4. Maintains a ground track aligned with the runway center/landing path and an airspeed/attitude, which results in minimum float during the roundout.
5. Makes smooth, timely, and correct control application during the recovery from the slip, the roundout, and the touchdown.
6. Touches down smoothly at the approximate stalling speed, at or within 400 feet beyond a specified point.
7. Maintains crosswind correction and directional control throughout the approach and landing sequence.

L. TASK: GO-AROUND/REJECTED LANDING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to a go-around/rejected landing.
2. Makes a timely decision to discontinue the approach to landing.
3. Applies takeoff power immediately and transitions to climb pitch attitude for Vy, and maintains Vy +10/-5 knots and/or the appropriate pitch attitude.
4. Retracts the flaps as appropriate.
5. Maneuvers to the side of the runway/landing area to clear and avoid conflicting traffic, if appropriate.
6. Maintains takeoff power to a safe maneuvering altitude.
7. Maintains directional control and proper wind-drift correction throughout the climb.

V. PERFORMANCE MANEUVER

A. TASK: STEEP TURNS
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to steep turns.
2. Establishes the manufacturer's recommended airspeed or if one is not stated, a safe airspeed not to exceed VA.
3. Rolls into a coordinated 360° turn; maintains a 45° bank.
4. Performs the task in the opposite direction, as specified by the examiner.
5. Divides attention between airplane control and orientation.
6. Maintains the entry altitude, ±100 feet, airspeed, ±10 knots, bank, ±5°; and rolls out on the entry heading, ±10°.

VI. GROUND REFERENCE MANEUVERS

A. TASK: RECTANGULAR COURSE
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to a rectangular course.
2. Selects a suitable reference area and emergency landing area.
3. Plans the maneuver so as to not descend below a minimum altitude of 600 feet above the ground at an appropriate distance from the

selected reference area, 45° to the downwind leg.
4. Applies adequate wind-drift correction during straight-and-turning flight to maintain a constant ground track around the rectangular reference area.
5. Divides attention between airplane control and the ground track while maintaining coordinated flight.
6. Maintains altitude, ±100 feet; maintains airspeed, ±10 knots.

B. TASK: S-TURNS
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to S-turns.
2. Selects a suitable ground reference line and emergency landing area.
3. Plans the maneuver so as to not descend below a minimum altitude of 600 feet above the ground perpendicular to the selected reference line.
4. Applies adequate wind-drift correction to track a constant radius turn on each side of the selected reference line.
5. Reverses the direction of turn directly over the selected reference line.
6. Divides attention between airplane control, orientation and the ground track while maintaining coordinated flight.
7. Maintains altitude, ±100 feet; maintains airspeed, ±10 knots.

C. TASK: TURNS AROUND A POINT
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to turns around a point.
2. Selects an appropriate reference point based on wind direction and emergency landing areas.
3. Plans the maneuver so as not to descend below a minimum altitude off 600 feet above ground level at an appropriate distance from the reference point.
4. Applies adequate wind-drift correction to track a constant radius turn around the selected reference point.
5. Divides attention between airplane control and the ground track while maintaining coordinated flight.
6. Exits at the point of entry heading + 15°.
7. Maintains altitude, ±100 feet; maintains airspeed, ±10 knots.

VII. NAVIGATION

A. TASK: PILOTAGE AND DEAD RECKONING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to pilotage and dead reckoning, as appropriate.
2. Follows the preplanned course by reference to landmarks.
3. Identifies landmarks by relating surface features to chart symbols.
4. Verifies the airplane's position within 3 nautical miles of the flight-planned route.
5. Determines there is sufficient fuel to complete the flight. If not, develops an alternate plan.
6. Maintains the appropriate altitude, ±200 feet and headings, ±15°.

B. TASK: DIVERSION
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to diversion.
2. Selects an appropriate alternate airport, or landing area and route.
3. Determines there is sufficient fuel to fly to the alternate airport or landing area.
4. Maintains the appropriate altitude, ±200 feet and headings, ±15°.

C. TASK: LOST PROCEDURES
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to lost procedures.
2. Selects an appropriate course of action.
3. Maintains an appropriate heading and climbs, if necessary.
4. Identifies prominent landmarks.
5. Uses navigation systems/facilities and or contacts an ATC facility for assistance, as appropriate.

VIII. SLOW FLIGHT AND STALLS

A. TASK: MANEUVERING DURING SLOW FLIGHT
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to maneuvering during slow flight.

2. Selects an entry altitude consistent with safety, which allows the TASK to be completed no lower than 1,000 feet AGL.
3. Establishes and maintains an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in an immediate stall.
4. Accomplishes coordinated straight-and-level flight, turns, climbs, and descents with landing gear extended and retracted as appropriate, and various flap configurations, if appropriate, specified by the examiner.
5. Divides attention between airplane control and orientation.
6. Maintains the specified altitude, ±100 feet; specified heading, ±10°; airspeed, +10/-0 knots and specified angle of bank, ±10°.

B. TASK: POWER-OFF STALLS
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to power-off stalls.
2. Selects an entry altitude consistent with safety, which allows the TASK to be completed no lower than 1,000 feet AGL.
3. Establishes a stabilized descent in the approach or landing configuration, as specified by the examiner.
4. Transitions smoothly from the approach or landing attitude to a pitch attitude that will induce a stall.
5. Maintains a specified heading, ±10°, in straight flight; maintains a specified angle of bank not to exceed 20°, ±10°; in turning flight, while inducing the stall.
6. Recognizes and recovers promptly after the stall occurs by simultaneously reducing the angle of attack, increasing power to maximum allowable, and leveling the wings to return to a straight-and-level flight attitude with a minimum loss of altitude appropriate for the airplane.
7. Retracts the flaps to the recommended setting, after a positive rate-of-climb is established.
8. Accelerates to Vx or Vy speed and/or the appropriate pitch attitude before the final flap retraction; returns to the altitude, heading, and airspeed/appropriate pitch attitude specified by the examiner.

C. TASK: POWER-ON STALLS
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to power-on stalls.
2. Selects an entry altitude consistent with safety, which allows the TASK to be completed no lower than 1,000 feet AGL.
3. Establishes the takeoff or departure configuration. Sets power to no less than 65 percent available power.
4. Transitions smoothly from the takeoff or departure attitude to the pitch attitude that will induce a stall.
5. Maintains a specified heading, ±10°, in straight flight; maintains a specified angle of bank not to exceed 20°, ±10°, in turning flight, while inducing the stall.
6. Recognizes and recovers promptly after the stall occurs by simultaneously reducing the angle of attack, increasing power as appropriate, and leveling the wings to return to a straight-and-level flight attitude with a minimum loss of altitude appropriate for the airplane.
7. Retracts the flaps to the recommended setting; after a positive rate of climb is established.
8. Accelerates to Vx or Vy speed and/or the appropriate pitch attitude before the final flap retraction; returns to the altitude, heading, and airspeed/pitch attitude specified by the examiner.

D. TASK: SPIN AWARENESS (Oral Only)
Objective. To determine that the applicant exhibits knowledge of the elements related to spin awareness by explaining:
1. Aerodynamic factors that cause spins.
2. Flight situations where unintentional spins may occur.
3. Procedures for avoidance and recovery from unintentional spins.

IX. EMERGENCY OPERATIONS

A. TASK: EMERGENCY APPROACH AND LANDING (SIMULATED)
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to emergency approach and landing procedures.
2. Analyzes the situation and selects an appropriate course of action.
3. Establishes and maintains the recommended best-glide airspeed ±10 knots /pitch attitude.
4. Selects a suitable landing area.

5. Plans and follows a flight pattern to the selected landing area considering altitude, wind, terrain, and obstructions.
6. Prepares for landing or go-around, as specified by the examiner.

B. TASK: SYSTEMS AND EQUIPMENT MALFUNCTIONS
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to system and equipment malfunctions appropriate to the airplane provided for the practical test.
2. Evaluates the situation and takes appropriate action for simulated emergencies appropriate to the airplane provided for the practical test for at least three (3) of the following-
a. partial or complete power loss.
b. engine roughness or overheat.
c. carburetor or induction icing.
d. loss of oil pressure.
e. fuel starvation.
f. electrical malfunction.
g. vacuum/pressure and associated flight instrument malfunctions.
h. pitot/static.
i. flap malfunction.
j. inoperative trim.
k. inadvertent door or window opening.
l. smoke/fire/engine compartment fire.
m. flight control malfunction.
n. ballistic recovery system malfunction, if applicable.
o. any other emergency appropriate to the airplane.
3. Follows the appropriate checklist or procedure.

C. TASK: EMERGENCY EQUIPMENT AND SURVIVAL GEAR
Objective. To determine that the applicant exhibits knowledge of the elements related to emergency equipment appropriate to the following environmental conditions:
1. mountain terrain.
2. large bodies of water.
3. desert conditions.
4. extreme temperature changes.

X. POSTFLIGHT PROCEDURES

A. TASK: AFTER LANDING, PARKING, AND SECURING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to after landing, parking, and securing procedures.
2. Maintains directional control after touchdown while decelerating to an appropriate speed.
3. Observes runway hold lines and other surface control markings.
4. Parks in an appropriate area, considering the safety of nearby persons and property.
5. Follows the appropriate procedure for engine shutdown.
6. Completes the appropriate checklist.
7. Conducts an appropriate postflight inspection and secures the aircraft.

B. TASK: ANCHORING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to anchoring.
2. Selects a suitable area for anchoring, considering seaplane movement, water depth, tide, wind, and weather changes.
3. Uses an adequate number of anchors and lines of sufficient strength and length to ensure the seaplane's security.

C. TASK: DOCKING AND MOORING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to docking and mooring.
2. Approaches the dock or mooring buoy in the proper direction considering speed, hazards, wind, and water current.
3. Ensures seaplane security.

D. TASK: RAMPING/BEACHING
Objective. To determine that the applicant:
1. Exhibits knowledge of the elements related to ramping/beaching.
2. Approaches the ramp/beach, considering persons and property in the proper attitude and direction, at a safe speed, considering water depth, tide, current, and wind.
3. Ramps/beaches and secures the seaplane in a manner that will protect it from the harmful effect of wind, waves, and changes in water level.

RECOMMENDED FIXED-WING ULTRALIGHT PILOT WRITTEN TEST

1. The final authority as to the operation of an ultralight is the
- A FAA.
- B Manufacturer.
- C Pilot in-command.

2. Who is responsible for determining if a vehicle is in condition for safe flight?
- A The owner or operator.
- B The pilot in command.
- C A certified aircraft mechanic.

3. True airspeed is
- A the speed of the wind over the ground.
- B the speed of the aircraft over the ground.
- C the speed of the aircraft through the air.

4. Motion of the air affects the speed with which airplanes move
- A over the earth's surface.
- B through the air.
- C in a turn.

5. The four forces acting on an aircraft in flight are
- A lift, weight, thrust, and drag.
- B lift, weight, gravity, and thrust.
- C lift, gravity, power, and friction.

6. When are the four forces acting on an aircraft in equilibrium?
- A During unaccelerated flight.
- B When the aircraft is accelerating.
- C When the aircraft is at rest on the ground.

7. The angle of attack is defined as the angle between the chord line of an airfoil and the
- A direction of the relative wind.
- B pitch angle of an airfoil.
- C rotor plane of rotation.

8. The angle of attack at which an aircraft wing stalls will
- A increase if the CG is moved forward.
- B change with an increase in gross weight.
- C remain same regardless of gross weight.

9. How does frost on the wing affect takeoff performance?
- A Frost will disrupt the smooth flow of air over the wing, adversely affecting its lifting capability.
- B Frost will change the camber of the wing, increasing its lift.
- C Frost will cause the airplane to become airborne with a higher angle of attack, decreasing the stall speed.

10. What is ground effect?
- A The result of the disruption of the airflow patterns about the wing to the point where the wing will no longer support the airplane in flight.
- B A condition of improved performance when an airplane is operated very close to the ground.
- C The result of the disruption of the airflow pattern about the wing of an airplane increasing induced drag about the wings.

11. A powered ultralight must give right of way to
- A all other aircraft.
- B unpowered vehicles.
- C all of the above.

12. What effect, if any, does high humidity have on ultralight vehicle performance?
- A It increases performance.
- B It decreases performance.
- C It has no effect on performance.

13. What is the one common factor which affects most preventable accidents?
- A Structural failure.
- B Mechanical malfunction.
- C Human error.

14. A Flight Service weather briefing can be obtained any place in the U.S. by
- A calling 1-800-WXBRIEF.
- B calling the local FAA office.
- C checking the local news stations.

15. Ground effect is most likely to result in which problem?
- A Settling to the surface abruptly during landing.
- B Becoming airborne before reaching recommended takeoff speed.
- C Inability to get airborne even though airspeed is sufficient for normal takeoff needs.

16. The amount of excess load that can be imposed on the wing of an airplane depends upon the
- A position of the CG.
- B speed of the aircraft.
- C abruptness at which the load is applied.

17. Which basic flight maneuver will increase the load factor on an aircraft as compared to straight and level flight?
- A Climbs.
- B Turns.
- C Stalls.

18. During flight, when are the indications of a magnetic compass accurate?
- A Only in straight and level unaccelerated flight.
- B As long as the airspeed is constant.
- C During turns if the bank does not exceed 18 degrees.

19. What does the red line on an airspeed indicator represent?
- A Maneuvering speed.
- B Turbulent or rough-air speed.
- C Never-exceed speed.

20. What is absolute altitude?
- A The altitude read directly from the altimeter.
- B The vertical distance of the aircraft above the surface (AGL).
- C The height above the standard datum plane.

21. What is true altitude?
- A The vertical distance of the aircraft above sea level (MSL).
- B The vertical distance of the aircraft above the surface.
- C The height above the standard datum plane.

22. Notices to Airmen (NOTAMS) must
- A inform pilots of fuel prices.
- B be complied with by ultralight pilots.
- C inform aircraft owners of ultralight vehicle safety directives.

23. What is pressure altitude?
- A The indicated altitude corrected for position and installation error.
- B The altitude indicated when the barometric pressure scale is set to 29.92".
- C The indicated altitude corrected for nonstandard temperature and pressure.

24. Excessively high engine temperatures will
- A cause damage to heat conducting hoses and to the cooling fins.
- B cause loss of power and possible permanent internal engine damage.
- C not affect an aircraft engine.

25. What action can a pilot take to aid in cooling an engine that is overheating during a climb?
- A Reduce the rate of climb and increase airspeed.
- B Reduce climb speed and increase rpm.
- C Increase climb speed and increase rpm.

26. One purpose of the dual ignition system on an ultralight engine is to provide for
- A improved engine reliability.
- B uniform heat distribution.
- C balanced cylinder head pressure.

27. Which condition is most favorable to the development of carburetor icing?
- A Any temperature below freezing and a relative humidity of less than 50%.
- B Temperature between 32 and 50 degrees F and a low humidity.
- C Temperature between 20 and 70 degrees F and high humidity.

28. The possibility of carburetor icing exists even when the ambient air temperature is as
- A high as 70 degrees F and the relative humidity is high.
- B high as 95 degrees F and there is visible moisture.
- C low as 0 degrees F and the relative humidity is high.

29. If the grade of fuel used in an aircraft engine is lower than specified for the engine, it will most likely cause
- A a mixture of fuel and air that is not uniform in all cylinders.
- B lower cylinder head temperatures.
- C detonation.

30. The uncontrolled firing of the fuel/air charge in advance of normal spark ignition is known as
- A combustion.
- B pre-ignition.
- C detonation.

31. Filling the fuel tanks after the last flight of the day is considered good operating procedure because this will
- A force any existing water to the top of the tank and away from the fuel lines.
- B prevent expansion of the fuel by eliminating airspace in the tanks.
- C prevent moisture condensation by eliminating airspace in the tanks.

32. Every physical process of weather is accompanied by, or is the result of, a
- A movement of air.
- B pressure differential.
- C heat exchange.

33. What should be the first action after starting an aircraft engine?
- A Adjust for proper RPM and check for desired indications on the engine gauges.
- B Place the ignition switch momentarily in the OFF position to check grounding.
- C Test the brakes.

34. Flight over congested areas by ultralight vehicles is only allowed if
- A written waiver is obtained from FAA.
- B great care is exercised.
- C it is between the hours of 0800 and 1100.

35. The numbers 9 and 27 on a runway indicate that the runway is oriented approximately
- A 009 degrees and 027 degrees true.
- B 090 degrees and 270 degrees true.
- C 090 degrees and 270 degrees magnetic.

36. If an airport's rotating beacon is operating during daylight hours it indicates
- A there are obstructions on the airport.
- B the weather is below basic VFR weather minimums.
- C the Air Traffic Control tower is not in operation.

37. Which is the correct traffic pattern departure procedure to use at a noncontrolled airport?
- A Depart in any direction after crossing the airport boundary.
- B Make all turns to the left.
- C Comply with any FAA traffic pattern established for the airport.

38. Wingtip vortices (turbulence) are created only when an aircraft is
- A operating at high airspeeds.
- B heavily loaded.
- C developing lift.

39. How can you determine if another aircraft is on a collision course with your aircraft?
- A The other aircraft will always appear to get larger and closer at a rapid rate.
- B The nose of each aircraft is pointed at the same point in space.
- C There will be no apparent relative motion between your aircraft and the other aircraft.

40. Prior to starting each maneuver, pilots should
- A check altitude, airspeed, and heading indications.
- B visually scan the entire area for collision avoidance.
- C announce their intentions on the nearest CTAF.

41. The responsibility for collision avoidance rests with
- A the other pilot.
- B the controlling agency.
- C all pilots.

42. A blue segmented circle on a Sectional Chart depicts which class airspace?
- A Class D.
- B Class E.
- C Class C.

43. Unless otherwise authorized, two-way radio communications with ATC are required for landings or takeoffs
- A at all tower controlled airports regardless of weather conditions.
- B at all tower controlled airports only when the weather is below VFR .
- C only at Class D airports when the weather is below VFR.

44. An ATC clearance provides
- A priority over all other traffic.
- B adequate separation from all other traffic.
- C authorization to proceed under specified traffic conditions in controlled airspace.

45. Which would provide the greatest gain in altitude in the shortest distance during climb after takeoff?
- A The Best Angle of Climb airspeed.
- B The Best Rate of Climb airspeed.
- C Stalling speed.

46. Which airspeed would the pilot use to gain the most altitude in a given period of time?
- A The Best Angle of Climb airspeed.
- B Stalling speed.
- C The Best Rate of Climb airspeed.

47. What is the maximum allowable empty weight for a powered ultralight?
- A No more than 250 pounds.
- B No more than 350 pounds.
- C Less than 254 pounds.

48. If an ultralight is equipped with an anti-collision light visible for 3 nm
- A you can fly in Class D airspace.
- B you can fly at night.
- C you can fly 30 minutes before sunrise and 30 minutes after sunset.

49. Ultralight vehicles are not allowed operation in Class D airspace unless
- A prior authorization is obtained from the controlling facility.
- B great care is exercised to avoid other traffic.
- C you have strobe lights on your vehicle.

50. Under what conditions can objects be dropped from an ultralight vehicle?
- A Only in an emergency.
- B If precautions are taken to avoid injury or damage to persons or property on the surface.
- C If prior permission is obtained from the FAA.

Additional References

The Ultralight Pilots Flight Training Manual by Curtis Hughes. Available from EAA, product number F51248

The Ultralight Aviation Training System Pilot Training Program Instructor Guide by Curtis Hughes. Available from EAA, product number F13028

A Professional Approach to Ultralights by Carol & Brian Carpenter, available from EAA, product number F03745

Flying Ultralights Instructional Briefings by Doug Chipman. Available from EAA, product number F12988

First Flight in your Ultralight video. Available from EAA, product number F10289

Hamilton Flight Training Systems by Paul Hamilton, available at *www.ap-store.com/ultraining.html*

Airplane Flying Handbook, published by FAA, item FAA-H-8083-3A, available online *www.faa.gov*

Pilots Handbook of Aeronautical Knowledge, published by FAA, item FAA-H-8083-25, available online *www.faa.gov*

EAA Ultralights web site, *www.eaa.org/ultralights*

EAA Ultralight Pilot Logbook. Available from EAA, product number E00385

Experimenter Magazine April 1997, article titled Traveling Light, A Primer on the Transition to the Light end of Aviation, by Dan Johnson. Available online at: *www.eaa.org/ultralights*

Amateur-Built Aircraft & Ultralight Flight Testing Handbook, item AC 90-89A, published by FAA, available online at, *www.faa.gov*

Pilot Written Test Answers

1. C	9. A	17. B	25. A	33. A	41. C	49. A
2. B	10. B	18. A	26. A	34. A	42. A	50. B
3. C	11. C	19. C	27. C	35. C	43. A	
4. A	12. B	20. B	28. A	36. B	44. C	
5. A	13. C	21. A	29. C	37. C	45. A	
6. A	14. A	22. B	30. B	38. C	46. C	
7. A	15. B	23. B	31. C	39. C	47. C	
8. C	16. B	24. B	32. B	40. B	48. C	

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