# Principles of Helicopter Flight Syllabus

Second Edition

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# Principles of Helicopter Flight

## Syllabus

**Second Edition**

A Flight & Ground Training Course for Private Pilot Helicopter Certification

Aviation Supplies & Academics, Inc.
Newcastle, Washington

*Principles of Helicopter Flight Syllabus*
Second Edition



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**ASA-PHF-S2-PDF**

# Contents

# About this Syllabus

### Course Objective:

The objective of this syllabus is for the student to gain the necessary aeronautical skill, knowledge and experience to meet the requirements of a Private Pilot certificate with a Rotorcraft Category rating and a Helicopter class rating.

### Prerequisites:

The student must be able to read, speak and understand the English language, meet the physical standards for a third class medical certificate, and possess a valid student pilot certificate. Student must be 16 years old to solo, and 17 years old to gain certification.

### Experience Requirements for a Private Pilot Certificate Include:

35 hours of flight time (40 hours for Part 61 programs)
35 hours of ground training (no minimum time is specified for Part 61 programs)

### Private Pilot Certification Course:

The Private License is made up of 2 requirements: Aeronautical Skill and Aeronautical Knowledge. This syllabus is written to satisfy 14 CFR Part 141 requirements. With the addition of 5 hours of flight, this syllabus will be equally effective for 14 CFR Part 61 programs. The syllabus is in four stages, containing modules. Each stage must be completed in ____ days, not to exceed 90 days. Each module contains both a flight and ground lesson. This presents an integrated flight training process and will promote easier learning and a more efficient flight training program. Ideally, the ground lesson will be completed prior to the flight. Each flight lesson must include a pre- and post-flight briefing.

### Testing Procedures:

Each module contains a reading assignment associated with the ground training program. The review questions following each chapter will test the student's understanding of the material covered throughout the ground lesson, and must be answered prior to moving on to the next module. A stage exam is included with each stage, testing the student on both the ground and flight training material covered throughout the stage. This exam must be passed with a minimum score of 80%, and reconciled to 100%, in order to proceed to the next stage.

*It is essential that the objective of each module be accomplished before moving on to the next module.*

### Minimum Requirements:

The time necessary for the syllabus to qualify for 141 operations includes meeting 35 hours of both ground and flight instruction (40 hours flight training for Part 61 programs). This is a minimum time—the national average for completion of the Private certificate is 73 flight hours. Many factors play into the finishing flight time: frequency of flying, cooperative weather, helicopter and instructor scheduling, and lapses in the flight training process. It is recommended the student fly at least twice a week. This type of schedule produces the most efficient training, and cuts down on review time. If there is a lapse in between flights, it may be necessary to review maneuvers: In this case review flights should be scheduled to make sure flight skills are mastered before moving on. (This will allow the student to continue following the syllabus, which is necessary for a 141 program.) The student should feel comfortable performing each task in all previous modules before progressing to the next stage. If the

student exceeds more than ___ hours of the minimum 141 recommended time allotted per module, the chief flight instructor must be informed.

Instruction in a pilot ground trainer that meets the requirements of Part 141.41(a) may be credited for a maximum of 20% of the total flight training hour requirements. Instruction in a pilot ground trainer that meets the requirements for Part 141.41(b) may be credited for a maximum of 15% of the total flight training hour requirements. When a ground training device is used, the ideal sequence is to learn in the ground training device and practice in the helicopter.

## Required Materials for the Private Pilot Rotorcraft Course:

- *Principles of Helicopter Flight* (#ASA –PHF-2)
- *Helicopter Flying Handbook* (#FAA-H-8083-21A)
- *Pilot's Handbook of Aeronautical Knowledge* (#FAA-H-8083-25)
- FAR/AIM (#ASA-FR-AM-BK, updated annually)
- Private Pilot Rotorcraft Practical Test Standards (#FAA-S-8081-15A)

## Recommended Materials for the Private Pilot Rotorcraft Course:

- ASA *Private Pilot Test Prep* (#ASA-TP-P, updated annually)
- ASA *Helicopter Fundamentals* DVD (ASA-VTP-H)
- ASA logbook (student's choice)
- ASA flight computer (E6B or CX-2 Pathfinder)
- ASA plotter (student's choice)
- ASA flight logs for cross-country flights (#ASA-FP-2)
- ASA *Private Pilot Oral Exam Guide* (#ASA-OEG-P)
- ASA *Helicopter Oral Exam Guide* (#ASA-OEG-H)
- Sectional for local area
- Airport/Facility Directory for local area

The syllabus uses *Principles of Helicopter Flight* for the ground training program. The review following each chapter should be finished with the assigned reading. Certain ground lessons are supplemented with reading assignments from *Pilot's Handbook of Aeronautical Knowledge.* The *Rotorcraft Flying Handbook* is recommended to enhance the program. Each book contains an index that will help pinpoint the material for the subject you are working on. ASA's *Private Pilot Test Prep* is also recommended to enhance the program. Use of the Test Prep will ensure that the student is completely prepared for the FAA Knowledge Exam upon completion of the course. Instructors using this syllabus must ensure current Practical Test Standards are upheld and that *Helicopter Flying Handbook* (FAA-H-8083-21) procedures are maintained at all times.

If you have any questions on how to best use this syllabus, please call ASA directly at 1-800-ASA-2-FLY. We will be happy to provide suggestions on how to tailor this syllabus to specifically meet your training needs.

## Note to Instructors:

Answers to the Stage Exams are available to instructors by calling 1-800-ASA-2-FLY, or fax your request on letterhead to 1-425-235-0128.

# Private Pilot Minimum Course Hours
## For Part 141, Appendix B Compliance

These course hours are for student/instructor guidance only. They are a suggested time schedule which will ensure minimum flight and ground training compliance with 14 CFR Part 141.

**Note: Ground instruction should include classroom discussion, and pre- and post-flight briefings.**

| Page | | Dual Flight | Solo Flight | Dual Cross-Country | Solo Cross-Country | Dual Night | Ground Instruction |
|---|---|---|---|---|---|---|---|
| 01 | **Stage 1** | | | | | | |
| 03 | Module 1 | 1.0 | | | | | 1.5 |
| 04 | Module 2 | 1.0 | | | | | 1.0 |
| 05 | Module 3 | 1.0 | | | | | 1.5 |
| 06 | Module 4 | 1.0 | | | | | 1.5 |
| 07 | Module 5 | 1.0 | | | | | 1.5 |
| 08 | Module 6 | 1.0 | | | | | 1.5 |
| 09 | Module 7 | 1.0 | | | | | 1.5 |
| 10 | Module 8 | 1.0 | | | | | 1.5 |
| 11 | Module 9 | 1.0 | | | | | 1.5 |
| 12 | Module 10 | 1.0 | | | | | 1.0 |
| 13 | Module 11 | 1.0 | | | | | 1.5 |
| 14 | Module 12 | 1.0 | | | | | 1.5 |
| 15 | Module 13 | 0.5 | 0.5 | | | | 0.5 |
| 16 | Module 14/ Stage Check | 1.0 | | | | | 1.0 |
| 19 | **Stage 2** | | | | | | |
| 20 | Module 1 | | 1.0 | | | | |
| 21 | Module 2 | 0.5 | | | | | 1.0 |
| 22 | Module 3 | | 1.0 | | | | |
| 23 | Module 4 | 1.0 | | | | | 2.0 |
| 24 | Module 5 | | 1.0 | | | | |
| 25 | Module 6 | 1.0 | | | | | 1.0 |
| 26 | Module 7 | | 1.0 | | | | |
| 27 | Module 8/ Stage Check | 1.0 | | | | | 1.0 |
| 28 | **Stage 3** | | | | | | |
| 29 | Module 1 | 1.0 | | | | 1.0 | 1.5 |
| 30 | Module 2 | 1.5 | | 1.5 | | | 2.0 |
| 31 | Module 3 | 1.0 | | | | | 2.0 |
| 32 | Module 4 | 1.5 | | 1.5 | | 1.5 | 1.0 |
| 34 | Module 5 | | 1.5 | | 1.5 | | |
| 35 | Module 6 | | 2.0 | | 2.0 | | 0.5 |
| 36 | Module 7/ Stage Check | 1.0 | | | | | 1.0 |
| 37 | **Stage 4** | | | | | | |
| 38 | Module 1 | 1.0 | | | | 1.0 | 1.0 |
| 39 | Module 2 | 1.0 | | | | | 0.5 |
| 40 | Module 3 | 1.0 | | | | | 1.0 |
| 41 | Module 4/ Stage Check | 1.0 | | | | | |
| | **TOTALS** | **23 + 4 Stage Checks** | **8.0** | **3.0** | **3.5** | **3.5** | **35** |

# Helicopter Enrollment Certificate

This is to certify that

_____

*Student Name*

is enrolled in the Federal Aviation Administration approved **Private Pilot Helicopter Certification Course**, conducted by

_____

*School and Certificate Number*

_____ _____

*Chief Instructor* *Date of Enrollment*

# Helicopter Graduation Certificate

This is to certify that

_____

*Pilot Name and Number*

has satisfactorily completed each required stage of the approved course of training including the tests for those stages, and has received _____ hours of cross-country training.

_____ has graduated from the Federal Aviation Administration approved **Private Pilot Helicopter Certification Course** conducted by

_____

*School and Certificate Number*

_____ _____

*Chief Instructor* *Date of Graduation*

# SFAR 73 – Instruction in Robinson Helicopters

**SFAR 73 requires that specific training requirements be met for pilots of R22 and R44 helicopters.**

1. Awareness training must be given by an endorsed instructor prior to manipulating the controls. The instruction must consist of:

   - Energy management
   - Mast bumping
   - Low rotor RPM (blade stall)
   - Low G hazards
   - Rotor RPM decay

2. Pilots with less than 200 hours (50 in the R22 or R44) must meet certain requirements before acting as Pilot in Command. See SFAR 73 and the endorsement provided on page 17. (Endorsement valid for 12 months.)

   Training must include:

   - 10 dual in same model Robinson
   - Enhanced training in autorotation procedures
   - Engine rotor RPM control without the use of the governor
   - Low rotor RPM recognition and recovery
   - Effects of low G maneuvers and proper recovery procedures

3. Specific requirements must be met within 90 days prior to solo flight (for non helicopter rated pilots). See SFAR 73 and the pre-solo endorsement for Robinson pilots on page 17.

   Training must include:

   - 20 hours dual in same model Robinson
   - Enhanced training in autorotation procedures
   - Engine rotor RPM control without the use of the governor
   - Low rotor RPM recognition and recovery
   - Effects of low G maneuvers and proper recovery procedures

Instructor's note: Use the following endorsement when signing off students for awareness training:

I certify that _____ *(First name, MI, Last name)* has received the Awareness Training required by SFAR 73 2(a)(3) in a _____ *(model of Robinson)*

[date] J. Jones 654321 CFI [expiration date]

# Stage 1
# Introduction to Helicopter Flying

## Objective

The objective of Stage 1 is for the student to become proficient in, and have an understanding of the following:

### Ground Training

- Course objective
- School requirements, procedures and regulations
- Grading criteria
- Forces acting on a helicopter
- Stability and control
- Training helicopter (airframe, engine, systems, flight instruments)
- Basic flight maneuvers
- Flight information
- Basic weather theory
- Emergency and hazardous conditions
- Flight physiology
- Regulations

### Flight Training

- Flight training process
- Training helicopter
- Preflight
- "Special Emphasis Areas" (per PTS)
- Taxiing
- Four basics of flight (straight and level, turns, climbs, descents)
- Hovering
- Autorotations
- Use of sectional
- Airspace
- Collision avoidance
- Emergencies
- Steep Turns

## Completion Standards

Stage 1 is complete when the student is ready and endorsed for solo flight. Student shall score at least 80% on the Stage 1 Exam, and all deficient areas shall be reconciled to 100%. Student shall have third-class medical and student pilot certificate upon completion of this stage.

# Stage 1 / **Module 1**

**Minimum 141 Requirements:** Dual
1.0 hour flight
1.5 hours ground instruction

## Ground Training

**Objective:**
For the student to be introduced to the Private Pilot Certification program, and learn the flight school requirements, procedures, regulations, and grading criteria. Student shall also become familiar with the atmosphere and the forces acting on a helicopter.

**Content:**
____ Review of course and objectives
____ School requirements, procedures, regulations
____ Grading criteria, expectations of student
____ Review objective of Stage 1
____ Atmosphere
- _____ Atmospheric pressure
- _____ Air temperature
- _____ Combined effects
- _____ Moisture content
- _____ Standard atmosphere
- _____ Pressure altitude
- _____ Density altitude

*The forces acting on a helicopter*
____ Lift
- _____ Definitions
- _____ Lift formula
- _____ Dynamic energy
- _____ Center of pressure
- _____ Aerodynamic center

____ Drag
- _____ Drag formula
- _____ Parasite drag
- _____ Profile drag
- _____ Form drag
- _____ Skin friction
- _____ Induced drag/methods to reduce
- _____ Tip vortices
- _____ Total drag curve

____ Lift/Drag ratio
- _____ Best L/D ratio
- _____ Factors influencing L/D ratio

**Completion Standards:**
This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**
*Principles of Helicopter Flight*, 2nd Edition, Chapters 2–5

## Flight Training

**Objective:**
For the student to be introduced to and become familiar with preflight inspections, checklist operations, starting and taxi procedures and the function and use of the helicopter controls.

**Content:**
____ Preflight inspection and aircraft documents (certificates and documents, aircraft logbooks, helicopter servicing, aircraft manual)
____ Introduction to PTS and special emphasis areas
____ SFAR 73 training if applicable (see page 17)
____ Positive exchange of flight controls
____ Familiarization with helicopter
____ Starting the engine and rotor engagement
____ Checklists/system checks
____ Normal takeoff
____ Hovering
____ Hover taxi
____ Normal departure and climb
____ Effects of controls
____ Attitude and power changes—power, attitude and speed change
____ Normal approach to landing
____ Postflight procedures

**Completion Standards:**
This module is complete when the student can conduct the preflight with minimum assistance, properly use all checklists, start the helicopter, and operate the controls.

**Recommended Reading:**
*FAA-8083-21A*, Chapters 3–5

Stage 1 / **Module 1**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 2**

**Minimum 141 Requirements:** Dual
1.0 hour flight
1.0 hour ground instruction

## Ground Training

**Objective:**

To introduce the student to the aerodynamic principles of climbing, descending and turning a helicopter. Students will also get a review of basic physics in the reading.

**Content:**

____ Controls and their effects
____ Hover
_____ In and out of ground effect
_____ Factors in ground effect
_____ Over-controlling
____ Forward flight
_____ Basic aspects of horizontal flight
_____ Changing disc attitude
_____ Dissymmetry of lift
_____ Elimination of dissymmetry of lift
_____ Flapback
____ Designs that reduce flapping amplitude
____ Reverse flow
____ Translational lift
____ Transverse flow effect
____ Climbing
_____ Horsepower-available curve
_____ Rate of climb
_____ Angle of climb
_____ Effect of wind
____ Descending
_____ Angle of descent
_____ Effect of wind

**Completion Standards:**

This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**

*Principles of Helicopter Flight, 2nd Edition*, Chapters 1, 10, 11, 12, and 14

## Flight Training

**Objective:**

To gain experience with hovering and improve basic operation of the controls. The student will also be introduced to collision avoidance procedure and be made aware of mast bumping conditions.

**Content:**

____ Preflight
____ Personal checklist—"IM SAFE"
____ Surface markings
____ Mast bumping
____ Takeoff and landing
____ Hovering
____ Hover Taxi
____ Shallow and medium banked turns
____ Scanning procedures
____ Normal approach and landing
____ Postflight procedures

**Completion Standards:**

This module is complete when the student has basic control of the aircraft in a hover and can maintain altitude within 300 feet, airspeed within 20 knots and heading within 20 degrees while performing the maneuvers of this module.

**Recommended Reading:**

*FAA-H-8083-21A*, Chapter 9 (1-10)

Stage 1 / **Module 2**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 3**

**Minimum 141 Requirements:** Dual
1.0 hour flight
1.5 hours ground instruction

## Ground Training

**Objective:**
For the student to gain an understanding of how helicopter systems function.

**Content:**
____ Engines
____ Fuel systems
____ Electrical systems
____ Hydraulics
____ Environmental systems
____ Anti-icing systems
____ Transmission
____ Main rotor gear box
____ Freewheeling unit
____ Drive shafts
____ Tail rotor gear box
____ Rotor brake
____ Clutch
____ Chip detectors
____ Swashplate
____ Rotor blades
____ Trim controls
____ Tail rotors
____ Vibrations
____ Control functions
____ Engine cooling
____ Dual tachometer instruments
____ Rotor stabilizing design systems

**Completion Standards:**
This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**
*FAA-H-8083-21*, Chapter 5
*Principles of Helicopter Flight*, 2nd Edition, Chapter 20

## Flight Training

**Objective:**
For the student to become familiar with the local area and to practice the four basics of flight: straight and level, climbs, turns, and descents.

**Content:**
____ Use of sectional
____ Preflight
____ Land and hold short operations
____ Normal takeoff and departure
____ Hover taxi
____ Hovering
____ Four basics of flight: Level flight, climbing, descending and turning
____ Sideways and backward flight
____ Transitions—leaving the hover to achieve forward flight and returning to the hover from forward flight
____ Normal approach and landing
____ Traffic patterns
____ Postflight procedures

**Completion Standards:**
This module is complete when the student can maintain flight within 250 feet altitude, 20 degrees heading and 20 knots airspeed while performing the maneuvers listed in the content of this module. Also the student must be proficient in postflight operations and be oriented to the practice area and airport.

**Recommended Reading:**
*FAA-H- 8083-21A*, Chapter 9 (11-20)

Stage 1 / **Module 3**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 4**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**
For the student to gain an understanding of the aerodynamic forces that affect helicopter flight, particularly with respect to the tail rotor.

**Content:**
____ Aerodynamic forces
- _____ Rotational forces
- _____ Blade angle and angle of attack
- _____ Induced flow
- _____ Airflow caused by velocity
- _____ Total rotor thrust
- _____ Rotor drag
- _____ Inflow angle
- _____ Forces opposing weight
- _____ Rotor thrust

____ Rotor blade airfoils
- _____ Drag
- _____ Stress
- _____ Effect of local air velocity on blade design
- _____ Blade tip speeds
- _____ Blade design

____ Rotor drag
- _____ Disc loading
- _____ Changes in gross weight
- _____ Changes in altitude
- _____ Changes in configuration
- _____ Ground effect
- _____ Translational lift

____ The Anti-Torque rotor
- _____ Anti-torque functions
- _____ Effect of the wind
- _____ Translating tendency
- _____ Tail rotor flapping
- _____ Tail rotor designs
- _____ Methods of anti-torque control
- _____ Tail rotor failure

**Completion Standards:**
This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**
*Principles of Helicopter Flight*, 2nd Edition, Chapters 6, 7, 8, and 9

## Flight Training

**Objective:**
For the student to gain proficiency in handling crosswind conditions and practice forward and rearward hovering as well as hovering turns.

**Content:**
____ Obtaining weather
____ Preflight
____ Radio communication
____ Runway incursions
____ Servicing the helicopter
____ Ground safety
____ Normal and crosswind takeoffs and landings
____ Vertical takeoff and landings
____ Hovering
____ Steep turns—30 degrees
____ Transitions from the hover to hover at low altitude
____ Traffic patterns
____ Normal approach and landing
____ Postflight procedures

**Completion Standards:**
This module is complete when the student can maintain flight within 300 feet altitude, 20 degrees heading, 20 knots airspeed while performing the maneuvers listed in the content of this module. The student must also be familiar with orientation using the sectional.

**Recommended Reading:**
*AIM*, Chapter 4—Section 2

Stage 1 / **Module 4**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 5**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**

For the student to increase his/her knowledge of the basic flight maneuvers and learn about the flight instruments.

**Content:**

____ Maneuvers and turning
- _____ Rate of turn
- _____ Radius of turn
- _____ Rate and radius interaction
- _____ The steep turn
- _____ Effect of altitude on rate and radius of turn
- _____ Effect of gross weight on rate and radius of turn
- _____ Effect of wind on rate and radius of turn
- _____ Effect of wind on Indicated airspeed and Translational lift
- _____ Effect of slingloads
- _____ Effect of slipping and skidding
- _____ Pull out from a descent

____ Flight Instruments
- _____ Pitot static instruments
- _____ Altimeter
- _____ VSI
- _____ ASI

____ Gyro instruments
- _____ Turn indicators
- _____ Inclinometer
- _____ Attitude indicator
- _____ Heading indicator

____ Compass

**Completion Standards:**

This lesson is complete when the student has successfully completed the assigned reading.

**Assignment:**

*Principles of Helicopter Flight*, 2nd Edition, Chapters 15 and 16

## Flight Training

**Objective:**

To practice and gain proficiency with hovering maneuvers and ground reference maneuvers. Student will also be introduced to mast bumping and vortex ring state conditions.

**Content:**

____ Obtaining weather
____ Preflight
____ Normal takeoff and departure
____ Stationary hover
____ Square pattern in hover
____ Vertical takeoff and landings
____ Crosswind takeoff and climb
____ Crosswind approach
____ Traffic patterns
____ Vortex ring state
____ Postflight procedures

**Completion Standards:**

The student should be able to establish a hover and maintain a hovering altitude within 50 feet, keep lateral and forward movement within 50 feet and headings within 20 degrees.

Stage 1 / **Module 5**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 6**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**

For the student to gain an understanding of the factors affecting helicopter performance. The student will also learn the effects of weight and balance and learn how to perform weight and balance computations.

**Content:**

____ Helicopter performance
____ Performance factors
- _____ Altitude
- _____ Pressure altitude
- _____ Density altitude
- _____ Moisture content of air
- _____ Aircraft gross weight
- _____ External stores
- _____ The wind

____ Power check
____ Performance graphs
- _____ Hover ceiling graph
- _____ Takeoff distance over 50-foot obstacle
- _____ Max gross weight for hovering
- _____ Climb performance
- _____ Range
- _____ Endurance

____ Weight and balance
- _____ Definitions
- _____ Weight
- _____ Balance
- _____ Center of gravity limits
- _____ Calculating center of gravity position
- _____ Effect of external loads

**Completion Standards:**

This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**

*Principles of Helicopter Flight*, 2nd Edition, Chapters 25 and 26

## Flight Training

**Objective:**

To introduce the student to low rotor rpm operations. The student will practice go-arounds as well as basic maneuvers.

**Content:**

____ Obtaining weather
____ Preflight
____ Discussion of cockpit management and ATC light signals
____ Vertical takeoff and landings
____ Crosswind takeoff to a hover
____ Normal and crosswind approach to a hover
____ Hovering/ground reference maneuvers
____ Recognition and recovery from low rotor rpm
- _____ During cruise
- _____ On takeoff
- _____ At a hover

____ Normal approach and landing
____ Go-around
____ Traffic pattern operations
____ Postflight procedures

**Completion Standards:**

This module is complete when the student can maintain traffic pattern altitude within 200 feet, heading within 20 degrees, and airspeed within 15 knots. The student must also be knowledgeable in ATC light signals and cockpit management.

Stage 1 / **Module 6**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 7**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**
For the student to gain an understanding of the hazardous flight conditions that affect helicopter flight.

**Content:**
____ Vortex ring state
_____ Development
_____ Lead up flight conditions
_____ Symptoms
_____ Recovery
_____ Tail rotor
____ Ground resonance
____ Causes of ground resonance
____ Factors—rotor head vibrations/fuselage
____ Recovery actions
____ Blade sailing
____ Dynamic rollover
____ Factors in critical angle
____ Cyclic limitations
____ Mast bumping
_____ Avoiding
_____ Recovery from low and zero G
____ Exceeding rotor rpm limits
____ Reasons for high rotor rpm limits
____ Reasons for low rotor rpm limits
____ Rotor stalls—recovery from low rotor rpm

**Completion Standards:**
This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**
*Principles of Helicopter Flight*, 2nd Edition, Chapter 19

## Flight Training

**Objective:**
For the student to be introduced to maximum performance takeoffs and steep approaches as well as the conditions for dynamic rollover and low G situations. Operational interpretation of weather data will also be stressed.

**Content:**
____ Obtaining weather (Go/no go)
____ Preflight
____ Dynamic rollover
____ Low G conditions
____ Normal/crosswind takeoff and departure
____ Hover taxi
____ Vertical takeoff and landings
____ Ground reference maneuvers
____ Pattern work
____ Maximum performance takeoff
____ Steep approach
____ Normal/crosswind approach and landing
____ Postflight procedures

**Completion Standards:**
This module is complete when the student knows the correct procedure for maximum performance takeoffs and steep approaches. The student should be able to fly the pattern within 200 feet altitude, 20 degrees heading and 15 knots airspeed. The student must also be able to enter and depart a normal traffic pattern.

Stage 1 / **Module 7**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 8**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**

For the student to become familiar with airports and airport operations—along with the tools available for obtaining flight information.

**Content:**

____ Airport operations
- _____ Types of airports/heliports
- _____ Sources for airport data
- _____ Airport/heliport markings and signs
- _____ Airport/heliport lighting
- _____ Wind direction indicators
- _____ Radio communication
- _____ ATC services and radar
- _____ Wake turbulence
- _____ Collision avoidance

____ Flight information
- _____ Airport/Facility Directory
- _____ Aeronautical Information Manual
- _____ Federal aviation regulations
- _____ Pilot/Controller Glossary
- _____ Advisory circulars

**Completion Standards:**

This lesson is complete when the student has successfully completed the assigned reading.

**Assignment:**

*FAA-H-8083-25*, Chapter 12
*AIM*, Chapter 2—Section 3
*A/FD*

## Flight Training

**Objective:**

For the student to become proficient with normal and crosswind takeoffs and landings, and to become familiar with wake turbulence procedures.

**Content:**

____ Obtaining weather
____ Preflight
____ Performance charts for takeoff
____ Airport/Heliport markings and signs
____ Air taxi
____ Surface taxi
____ Normal and crosswind takeoffs and approaches
____ Hovering
____ Pattern operations
____ Vertical takeoff and landings
____ Steep approaches
____ Emergency approaches
____ Wake turbulence procedures
____ Go-around procedures
____ Postflight procedures

**Completion Standards:**

This module is complete when the student can operate proficiently in traffic patterns and can takeoff and land being the sole manipulator of the controls. The student should have an understanding of when different taxi methods are used.

Stage 1 / **Module 8**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 9**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**
For the student to gain an understanding of aviation charts, the airspace system and NTSB reporting requirements.

**Content:**
____ Charts
- _____ Sectional charts
- _____ VFR Terminal Area charts

____ Airspace
- _____ Class A
- _____ Class B
- _____ Class C
- _____ Class D
- _____ Class E
- _____ Class G
- _____ Special use airspace
- _____ Other airspace

____ NTSB 830 (49 CFR Part 830)

**Completion Standards:**
This lesson is complete when the student has successfully completed the assigned reading.

**Assignment:**
*AIM*, Chapter 3; NTSB 830 (49 CFR Part 830)

## Flight Training

**Objective:**
To introduce the student to straight-in autorotations. This lesson will also introduce control related malfunctions.

**Content:**
____ Obtaining weather
____ Preflight
____ Radio communications
____ Hover taxi
____ Vertical takeoffs and landings
____ Normal departure and approach
____ Hovering maneuvers
____ Straight-in autorotation with power recovery
____ Control malfunctions
- _____ flight control/trim
- _____ rotor and/or antitorque
- _____ frequency vibrations and components that may be affected

____ Go-arounds
____ Traffic pattern operations
____ Postflight

**Completion Standards:**
This module is complete when the student can operate in all phases of flight within 200 feet altitude, 20 degrees heading, 15 knots airspeed.

Stage 1 / **Module 9**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 10**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.0 hour ground instruction

## Ground Training

**Objective:**

For the student to gain an understanding of the underlying principles of retreating blade stall and autorotation.

**Content:**

____ Retreating Blade Stall
- _____ Effect of increasing airspeed on stall angle
- _____ Factors affecting the advancing blade
- _____ Symptoms of retreating blade stall
- _____ Recovery
- _____ Factors influencing $V_{NE}$

____ Autorotation
- _____ Initial aircraft reaction
- _____ Lift/Drag ratio and forces involved
- _____ Autorotation and airspeed
- _____ Autorotation range and endurance
- _____ Touchdown
- _____ Loss of power at low heights
- _____ Rotor rpm decay when the engine fails
- _____ Airspeeds and heights best avoided

**Completion Standards:**

This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**

*Principles of Helicopter Flight*, 2nd Edition, Chapters 17 and 18

## Flight Training

**Objective:**

For the student to gain proficiency with emergency operations. The student will be introduced to techniques for settling with power and power failure at altitude. The student will also learn to perform rapid decelerations.

**Content:**

____ Obtaining weather
____ Preflight
____ Ground resonance
____ Wire strike avoidance
____ Surface taxi (wheels)
____ Air taxi
____ Normal takeoffs and approaches
____ Hovering patterns
____ Vertical takeoff and landings
____ Settling with power
____ Power failure at altitude
____ Straight-in autorotation with power recovery
____ Rapid deceleration
____ Go-arounds

**Completion Standards:**

This module is complete when the student is able to recognize the onset of settling with power and take appropriate action.

Stage 1 / **Module 10**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 11**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**

To introduce the student to the Federal Aviation Regulations with emphasis on how the regulations are organized and how to find information. The instructor should also identify which parts are required for Private Pilot Rotorcraft knowledge.

**Content:**

____ FAR publication
____ 14 CFR Part 1
____ 14 CFR Part 61
____ 14 CFR Part 91

**Completion Standards:**

This lesson is complete when the student completes the quiz on regulations on Appendix Page 1-1 of this book.

**Assignment:**

*14 CFR*, Parts 61 and 91

## Flight Training

**Objective:**

This lesson will focus on systems emergencies and equipment malfunctions. The student will also continue practicing previously learned emergency operations in preparation for solo flight.

**Content:**

____ Obtaining weather
____ Preflight
____ Vertical takeoffs and landings
____ Normal takeoff and climb
____ Normal approach
____ Straight-in autorotation with power recovery
____ Power failure at a hover
____ Partial power failure
____ Systems emergencies
    _____ Engine/oil and fuel
    _____ Power train failure
    _____ Hydraulic, if applicable
    _____ Electrical
    _____ Carburetor or induction icing
    _____ Smoke and/or fire
    _____ Pitot static/vacuum and associated flight instruments, if applicable
    _____ Abnormal vibrations
    _____ Warning lights
____ Other emergencies specific to the training helicopter
____ Postflight

**Completion Standards:**

This module is complete when the student performs the correct emergency procedures for the items listed, exhibits basic troubleshooting knowledge and executes recovery actions as needed. Flight must be maintained within 200 feet, 15 degrees and 15 knots. Autorotation airspeed should be within 10 knots.

Stage 1 / **Module 11**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 12**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**

For the student to gain an understanding of weather briefings, operational weather factors, and insight into making the go/no-go decision.

**Content:**

____ Weather theory
- _____ Nature of the atmosphere
- _____ The cause of atmospheric circulation
- _____ Atmospheric stability
- _____ Air masses
- _____ Fronts
- _____ Turbulence
- _____ Windshear
- _____ Thunderstorms
- _____ Microbursts
- _____ Obtaining a weather briefing
- _____ METARs, TAFs
- _____ Making the go/no-go decision

**Completion Standards:**

This lesson is complete when the student has successfully completed all the assigned reading.

**Assignment:**

*FAA-H-8083-25*, Chapter 10

## Flight Training

**Objective:**

For the student to review previously learned maneuvers with emphasis on weak areas. This module will prepare the student for solo flight.

**Content:**

- ____ Obtaining weather
- ____ Preflight inspection and aircraft documents
- ____ ATC light signals
- ____ Surface taxi
- ____ Hover taxi
- ____ Air taxi
- ____ Hovering patterns
- ____ Vertical takeoff and landing
- ____ Normal and crosswind takeoffs and landings
- ____ Traffic pattern
- ____ Go-arounds
- ____ Power failure at altitude
- ____ Power failure at a hover
- ____ Settling with power
- ____ Low rotor rpm recovery
- ____ Partial power failure
- ____ Postflight

**Completion Standards:**

This module is complete when the student is comfortable with all of the pre-solo maneuvers including emergencies and can conduct all with minimum assistance from the flight instructor. Flight must be maintained within 200 feet, 15 degrees and 15 knots.

Stage 1 / **Module 12**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 13**

**Minimum 141 Requirements:** Dual
0.5 hour flight,
0.5 hour solo,
0.5 hour ground instruction

## Ground Training

**Objective:**

To conduct a pre-solo briefing and complete, grade and review the pre-solo exam.

**Content:**

____ Solo limitations
____ Club rules
____ Pre-solo exam

**Completion Standards:**

This lesson is complete when the student has passed the pre-solo exam with a minimum score of 80%, and reconciled to 100%.

## Flight Training

**Objective:**

Prior to this module the student will have passed the pre-solo written test. The intent of this module is for the student to first conduct supervised solo flight and then to practice solo takeoffs and landings in the pattern.

**Content:**

*Dual flight*

____ Obtaining weather
____ Verify the requirements of SFAR 73 2(b)(3) have been met (if applicable)
____ Preflight
____ Vertical takeoffs and landings
____ Hover taxi
____ Air taxi
____ Normal and crosswind takeoffs and landings
____ Climbs and approaches
____ Go-around
____ Traffic pattern operations
____ Instructor endorsement

*Supervised solo*

____ Normal takeoff
____ Stationary hover
____ Hover taxi
____ Air taxi
____ Traffic pattern
____ Vertical takeoffs and landings
____ Climbs and approaches

**Completion standards:**

This module is complete when the student is signed off for solo work, and the student has successfully accomplished solo flight. Flight must be maintained within 150 feet, 15 degrees, 15 knots while performing the maneuvers listed in the content of this module.

Stage 1 / **Module 13**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 1 / **Module 14 and Stage Check**

**Lesson Time:** Dual 1.0 hour flight, or whatever is necessary to meet objective
1.0 hour ground instruction, or whatever is necessary to meet objective

## Flight Training

**Objective:**

For the chief flight instructor or designee to review the student's progress. If student performance is satisfactory, training can progress to stage 2 and solo operations away from the traffic pattern permitted.

**Content:**

____ Obtaining weather
____ Preflight inspection and aircraft documents
____ Cockpit management
____ Radio communication and ATC light signals
____ Pre-takeoff checks
____ Surface taxi
____ Hover taxi
____ Air taxi
____ Normal and crosswind takeoffs and landings
____ Straight and level flight; turns in both directions
____ Straight-in autorotation with power recovery
____ Climbs and climbing turns
____ Airport traffic patterns
____ Power failure
____ Settling with power
____ Low rotor rpm recovery
____ Rapid decelerations
____ Partial power failure
____ Collision avoidance, wake turbulence
____ Equipment malfunctions
____ Go-arounds
____ Postflight

**Completion Standards:**

This module is complete when the student can conduct the flight tasks competently enough to leave the pattern. Altitude should be within 150 feet, heading 15 degrees and airspeed 15 knots throughout maneuvering. During hover, altitude should be within 5 feet and ground track kept within 5 feet. Autorotation maneuvers should be stopped within 150 feet of a specified point.

Stage 1 / **Module 14**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

**Stage Exam Score:** _____

**Stage Check Successful:** _____

**Instructor Note: Follow the formats below when signing-off endorsements for your students. (From AC 61-65E)**

**1. Endorsement for pre-solo requirements in Robinson helicopters SFAR 73 2(b)(3) (valid for 90 days)**

I certify that_____ *(First name, MI, Last name)* has satisfactorily met the experience or training requirements required by SFAR 73 2(b)(3). I have determined he/she has demonstrated the proficiency required by SFAR 73 2(b)(3) and is proficient to make solo flights in a_____ *(model of Robinson)*.

[date] J. Jones 987654321 CFI [expiration date]

**2. Endorsement for Pilot in Command in Robinson helicopters for pilots with less than 200 hours: SFAR 73 2(b)(1) or (2)**

I certify that_____ *(First name, MI, Last name)* has satisfactorily met the experience or training requirements required by SFAR 73 2(b)(1) or (2). I have determined he/she has demonstrated the proficiency required by SFAR 73 2(b)(1 or (2)) and is proficient to act as Pilot in Command in a_____ *(model of Robinson)*.

[date] J. Jones 987654321 CFI [expiration date]

**3. Endorsement for pre-solo aeronautical knowledge: 14 CFR §61.87(b)**

I certify that _____ *(First name, MI, Last name)* has satisfactorily completed the pre-solo knowledge exam required by §61.87(b) for the _____ *(make and model aircraft)*.

[date] J. Jones 987654321 CFI [expiration date]

**4. Endorsement for pre-solo flight training: 14 CFR §61.87(c)**

I certify that _____ *(First name, MI, Last name)* has received the required pre-solo training in a _____ *(make and model aircraft)*. I have determined he/she has demonstrated the proficiency required by §61.87(d) and is proficient to make solo flights in _____ *(make and model aircraft)*.

[date] J. Jones 987654321 CFI [expiration date]

**5. Endorsement for solo flight (first 90 day period): 14 CFR 61.87 (n)(2)**

I certify that _____*(First name, MI, Last name)* has received the required training to qualify for solo flying. I have determined he/she meets the applicable requirements of section 61.87(n) and is proficient to make solo flights in a _____*(make and model aircraft)*

[date] J. Jones 987654321 CFI [expiration date]

**6. Endorsement for solo (each additional 90-day period): 14 CFR §61.87(p)**

I certify that _____ *(First name, MI, Last name)* has received the required training to qualify for solo flying. I have determined he/she meets the applicable requirements of §61.87(p) and is proficient to make solo flights in _____ *(make and model aircraft)*.

[date] J. Jones 987654321 CFI [expiration date]

**7. Endorsement for solo flight in the Class B airspace: 14 CFR §61.95(a)**

I certify that _____ *(First name, MI, Last name)* has received the training required by §61.95(a). I have determined he/she is proficient to conduct solo flights in _____ *(name of Class B)* airspace. *(List any applicable conditions or limitations.)*

[date] J. Jones 987654321 CFI [expiration date]

**8. Endorsement for solo flight to, from, or at an airport located within Class B airspace: 14 CFR §61.95(a) and §91.131(b)(1)**

I certify that _____ *(First name, MI, Last name)* has received the training required by §61.95(a)(1). I have determined that he/she is proficient to conduct solo flight operations at _____ *(name of airport)*. *(List any applicable conditions or limitations.)*

[date] J. Jones 987654321 CFI [expiration date]

*Reminder: Instructor will need to endorse student pilot certificate.*

# Stage 2
## Advanced Maneuvers and Solo Practice

### Objective
In this stage the student begins building on the foundation of basic skills. Stage 2 flight training focuses on advanced maneuvers with some review of primary maneuvers as necessary.

### Ground Training
- Flying for range and endurance
- Stability
- Weather reports and forecasts
- Flight Computer

### Flight Training
- Maximum performance takeoffs and landings
- Advanced technique takeoffs and landings
- Emergency conditions

### Completion Standards
Stage 2 is complete when the student achieves the objective of each lesson and can list or describe the correct process or reference for accomplishing elements, exercises and activities. Students shall score at least 80% on the Stage 2 exam with all deficient areas reconciled to 100%.

# Stage 2 / **Module 1 and Solo**

**Minimum 141 Requirements:** 1.0 hour solo

## Flight Training

**Objective:**

For the student to practice previously learned maneuvers in solo flight. The flight tasks listed represent options for the instructor to choose from in assigning maneuvers. These may vary depending upon weather, student proficiency or other factors. Instructors should review tasks that should not be practiced solo:

1. Autorotation
2. Simulated forced landings
3. Settling with power
4. Recovery from low rpm
5. Low G maneuvers

**Content:**

____ Vertical takeoffs to a hover
____ Hovering patterns
____ Stationary hover
____ Surface taxi
____ Hover taxi
____ Air taxi
____ Normal and crosswind takeoffs
____ Traffic patterns
____ Climbs and normal approaches
____ Go-around

**Completion Standards:**

This module is complete when the student has successfully completed the solo flight.

Stage 2 / **Module 1**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 2 / **Module 2**

**Minimum 141 Requirements:** Dual
0.5 hour flight,
1.0 hour ground instruction

## Ground Training

**Objective:**
For the student to gain an understanding of the factors involved in flying for range and endurance. The student will also learn the elements of specialty takeoffs and landings and learn about sloped surface operations, sling loads and stability.

**Content:**
____ Power
____ Total horsepower required curve
____ Flying for range
____ Flying for endurance
____ Stability
____ Out-of-wind takeoffs and landings
____ Different types of takeoffs and landings
_____ Downwind takeoffs and landings
_____ Running takeoff
_____ Cushion-creep takeoff
_____ Confined area takeoff
_____ Maximum performance takeoff
_____ Running landing
_____ The zero speed landing
____ Operations on sloping surfaces
____ Sling operations

**Completion Standards:**
This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**
*FAA-H-8083-21A,* Chapter 13

## Flight Training

**Objective:**
This lesson begins paving the way toward more demanding kinds of operations. The student is introduced to maximum performance takeoff and climbs, rolling and running takeoffs and shallow approaches with running/roll-on landings.

**Content:**
____ Preflight
____ Review of maneuvers as needed
____ Maximum performance takeoffs and climbs
____ Hovering autorotation
____ Steep approaches
____ Rolling and running takeoffs
____ Shallow approach and running/roll-on landings
____ Introduction to 180 degree autorotation
____ Postflight

**Completion Standards:**
This module is complete when the student understands the operational considerations for using maximum performance takeoffs and landings. The student should also have a solid understanding of the techniques used for these maneuvers.

**Recommended reading:**
*FAA-H-8083-21A*, Chapter 9 (1-9)

Stage 2 / **Module 2**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 2 / **Module 3 and Solo**

**Minimum 141 Requirements:** 1.0 hour solo

## Flight Training

**Objective:**

For the student to continue practicing Stage 1 maneuvers. The flight tasks listed represent options for the instructor to choose from in assigning the maneuvers. These may vary depending upon weather, student proficiency or other factors.

**Content:**

____ Preflight
____ Vertical takeoffs to a hover
____ Hovering patterns
____ Stationary hover
____ Surface taxi
____ Hover taxi
____ Air taxi
____ Normal and crosswind takeoffs
____ Traffic patterns
____ Climbs and normal approaches
____ Go around
____ Postflight

**Completion Standards:**

This module is complete when the student has successfully completed the solo flight.

Stage 2 / **Module 3**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 2 / **Module 4**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
2.0 hours ground instruction

## Ground Training

**Objective:**
For the student to learn how to interpret weather reports, forecasts and charts.

**Content:**
____ Observations
____ Service outlets
_____ FSS
_____ TIBS
_____ DUATS
_____ EFAS
_____ HIWAS
_____ TWEB
____ Weather briefings
____ Reports
_____ METARS
_____ PIREPS
_____ SD
____ Forecasts
_____ TAFs
_____ Area forecasts
_____ In-flight advisories
_____ AIRMET
_____ SIGMET
_____ WST
_____ FD
_____ Weather charts
_____ Surface analysis
_____ Weather depiction
_____ Radar summary
_____ Prognostic charts

**Completion Standards:**
This lesson is complete when the student has successfully completed the assigned reading.

**Assignment:**
*FAA-H-8083-25*, Chapter 11

## Flight Training

**Objective:**
For the student to learn the elements of confined area operations. Proficiency will also be increased in maximum performance takeoffs and climbs as well as steep approaches.

**Content:**
____ Preflight
____ Rolling takeoff
____ Maximum performance takeoff and climb
____ Steep approaches
____ Confined area operations — approach and departure
____ High and low reconnaissance
____ Shallow approach and running/roll-on landing
____ Retreating blade stall — Discussion
____ Autorotations
____ Recognition and recovery from low rotor rpm
____ Partial power failure
____ Traffic pattern operations
____ Postflight

**Completion Standards:**
This module is complete when the student understands the elements and techniques for conducting rolling takeoffs. The student should also have an understanding of the factors involved in confined area operations, including high and low reconnaissance. During both maneuvers rpm should be kept within normal limits.

**Recommended reading:**
*FAA-H-8083-21A*, Chapter 11 (5-9)

Stage 2 / **Module 4**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 2 / **Module 5 and Solo**

**Minimum 141 Requirements:** 1.0 hour solo

## Flight Training

**Objective:**

In this module the student will continue practicing instructor assigned maneuvers in addition to the advanced maneuvers listed. The flight tasks listed represent options for the instructor to choose from in assigning the maneuvers. These may vary depending upon weather, student proficiency or other factors.

**Content:**

____ Preflight
____ Vertical takeoffs to a hover
____ Hovering patterns
____ Hovering turns
____ Stationary hover
____ Surface taxi
____ Hover taxi
____ Air taxi
____ Normal and crosswind takeoffs
____ Traffic patterns
____ Climbs and normal approaches
____ Go-around
____ Postflight

*Advanced maneuvers for practice:*

____ Steep approaches
____ Rapid deceleration
____ Maximum performance takeoff and climb

**Completion Standards:**

This module is complete when the student has successfully completed the solo flight.

Stage 2 / **Module 5**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 2 / **Module 6**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.0 hour ground instruction

## Ground Training

**Objective:**
For the student to learn the functionality of the flight computer and practice solving time, speed, distance and fuel problems.

**Content:**
____ Introduction
____ Time, speed distance
____ Fuel consumption
____ Conversions
____ True airspeed and density altitude
____ Using the wind side
____ Sample problems

**Completion Standards:**
This lesson is complete when the student has successfully completed the sample problems in the flight computer manual.

**Assignment:**
The flight computer user manual

## Flight Training

**Objective:**
For the student to learn about emergency operations such as dynamic rollover. An instructor discussion should cover the listed topics. The student will also be introduced to pinnacle/platform and slope operations and continue to practice advanced maneuvers.

**Content:**
____ Preflight
____ Normal takeoff to a hover
____ Hovering patterns
____ Emergency conditions—discussion
_____ Dynamic rollover
_____ Ground resonance
_____ Low G conditions
_____ Low rotor rpm
_____ Anti-torque system failure
____ Slope operations
____ Maximum performance takeoff and climb
____ Pinnacle/platform operations
____ Rapid deceleration
____ Steep approach
____ 180 degree autorotation
____ Postflight

**Completion Standards:**
This module is complete when the student understands the factors involved in slope operations. The transition from slope to stabilized hover should be smooth with heading control within 15 degrees. The student should also know the recovery procedure for each emergency situation.

**Recommended reading:**
*FAA-H-8083-21A*, Chapter 10 (9-12)

Stage 2 / **Module 6**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 2 / **Module 7 and Solo**

**Minimum 141 Requirements:** 1.0 hour solo

## Flight Training

**Objective:**

For the student to practice new solo maneuvers along with what the instructor assigns. The flight tasks listed represent options for the instructor to choose from in assigning the maneuvers.

**Content:**

____ Preflight
____ Vertical takeoffs to a hover
____ Hovering patterns
____ Hovering turns
____ Stationary hover
____ Surface taxi
____ Hover taxi
____ Air taxi
____ Normal and crosswind takeoffs
____ Traffic patterns
____ Climbs and normal approaches
____ Go-around
____ Postflight

*Advanced maneuvers:*

____ Steep approaches
____ Rapid deceleration
____ Maximum performance takeoff and climb

**Completion standards:**

This module is complete when the student has successfully completed the solo flight.

Stage 2 / **Module 7**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 2 / **Module 8 and Stage Check**

**Lesson Time:** Dual 1.0 hour flight, or whatever is necessary to meet objective
1.0 hour ground instruction, or whatever is necessary to meet objective

## Flight and Ground Training

**Objective:**

For the chief flight instructor or designee to review the student's progress. If student performance is satisfactory, training can progress to Stage 3 for cross-country training.

**Content:**

____ Preflight
____ Maximum performance takeoff and climb
____ Slope operations
____ Confined area operations
____ Pinnacle/platform operations
____ Collision avoidance
____ Rolling takeoff (wheels)
____ Running takeoff
____ Steep approach
____ 180 degree autorotation
____ Shallow approach and running/roll-on landing
____ Rapid deceleration
____ Emergencies
    _____ Retreating blade stall
    _____ Dynamic rollover
    _____ Ground resonance
    _____ Low G conditions
    _____ Low rotor rpm and blade stall
____ Go-around
____ Postflight

**Completion Standards:**

This module is complete when the student performs the maneuvers using proper procedures. Straight and level maneuvering altitude should be kept within 150 feet, heading 10 degrees and airspeed 10 knots. During hover, altitude should be kept within 5 feet and ground track kept within 5 feet. The student should have a complete understanding of the listed emergency tasks and their recovery procedures.

Stage 2 / **Module 8**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

**Stage Exam Score:** _____

**Stage Check Successful:** _____

# Stage 3
## Cross-Country Flight

### Objective
The objective of Stage 3 is for the student to gain knowledge and experience in the following:

### Ground Training
- Aeromedical factors
- Night flying
- Flight planning
- Radio navigation: VOR, ADF, radar, transponder, DME, RNAV
- Enroute navigation

### Flight Training
- Pre-cross-country maneuvers (per 14 CFR §61.93)
- Cross-country flight planning
- The required dual and solo cross-country time

### Completion Standards
Stage 3 is complete when the student achieves the objective of each lesson, and can list or describe the correct process or reference for accomplishing elements, exercises and activities. Student shall score at least 80% on the Stage 3 Exam, and all deficient areas shall be reconciled to 100%.

# Stage 3 / **Module 1**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.5 hours ground instruction

## Ground Training

**Objective:**
For the student to learn about aeromedical factors as well as the elements involved in night flying.

**Content:**

____ Aeromedical factors
- _____ Medical certificates
- _____ Health factors
- _____ Hypoxia
- _____ Hyperventilation
- _____ Middle ear and sinus problems
- _____ Spatial disorientation/illusions
- _____ Motion sickness
- _____ Carbon monoxide
- _____ Stress and fatigue
- _____ Dehydration
- _____ Alcohol/drugs
- _____ Scuba diving
- _____ Vision

____ Night operations
- _____ Controlled flight into terrain
- _____ Physiology
- _____ Vision
- _____ Aircraft lighting
- _____ Visual illusions
- _____ Autokinesis
- _____ Night myopia
- _____ False horizon
- _____ Landing illusions
- _____ Night flight

**Completion Standards:**
This lesson is complete when the student has completed the assigned reading.

**Assignment:**
*FAA-H-8083-25*, Chapter 15
*FAA-H-8083-21A*, Chapter 13

## Flight Training

**Objective:**
For the student to learn about the elements involved in night flying and to gain experience with night operations.

**Content:**

____ Weather briefing
____ Night physiology
____ Night preflight inspection
____ Lighting and equipment
____ Use of charts/obstructions and minimum altitudes
____ Normal and crosswind takeoffs and approaches
____ Vertical takeoffs and landings
____ Hovering maneuvers
____ Postflight

**Completion Standards:**
This module is complete when the student understands the considerations affecting night operations and has gained experience flying at night.

Stage 3 / **Module 1**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 3 / **Module 2**

**Minimum 141 Requirements:** Dual cross-country
1.5 hours flight,
2.0 hours ground instruction

## Ground Training

**Objective:**

To introduce the student to the tools and concepts used in planning for cross-country flight.

**Content:**

____ Charts
____ Time zones
____ Variation
____ Deviation
____ Effect of wind
____ Calculations—time, speed, distance
____ Computers and plotters
____ Pilotage
____ Dead reckoning
____ Wind vectors
____ Flight planning
_____ Publications including POH
_____ Plotting a course
_____ Flight log
_____ Flight plans

**Completion Standards:**

This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**

*FAA-H-8083-25*, Chapter 14

## Flight Training

**Objective:**

For the student to learn the concepts of cross-country flying. Because there is a lot of new material, instructors may choose to conduct a 1 hour non-flying lesson to cover the necessary background information. This information is contained under the topic "cross-country discussion." In this lesson the student will become familiar with navigating by means of pilotage and dead reckoning.

**Content:**

____ Weight and balance
____ Emergency equipment and survival gear
____ Cross-country discussion
_____ Flight publications
_____ NOTAMs
_____ Flight Service
_____ Flight following and radar services
_____ Two way communications
_____ Airspace system
_____ Plotting course
_____ Flight log
_____ Weather
_____ Filing flight plan
_____ Flight computer
____ Preflight
____ Cross-country flight
____ Performance charts
____ Use of flight log
____ Flight plan
____ Pilotage
____ Dead reckoning with use of compass
____ Traffic pattern procedures including arrival, departure and approach
____ Collision avoidance
____ Emergency procedures
____ Postflight

**Completion Standards:**

This module is complete when the student is able to satisfactorily complete the pre-flight planning for cross-country flight. The student should show competent weather analysis and be able to fly a pre-planned route using pilotage and dead reckoning. Altitude should be within 250 feet, heading within 15 degrees.

Stage 3 / **Module 2**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 3 / **Module 3**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
2.0 hours ground instruction

## Ground Training

**Objective:**

For the student to gain a practical understanding of radio navigation using the VOR, ADF, DME, Transponder and GPS.

**Content:**

*Navigation aids*

____ VOR
____ VOR/DME, TACAN and VORTAC
_____ Course deviation indicator
_____ TO/FROM arrow
_____ VOR receiver check
_____ Orientation
_____ Course intercept
_____ Tracking
____ NDB and ADF
_____ ADF and heading indicator
_____ NDB range, accuracy, identification
_____ ADF control panel
_____ ADF relative bearing indicator (RBI)
_____ ADF radio magnetic indicator
_____ Orientation
_____ Course intercept
_____ Tracking
____ Radar
____ Transponder
____ DME
____ GPS
____ VHF Direction Finding

**Completion Standards:**

This lesson is complete when the student has successfully completed the assigned reading.

**Assignment:**

*FAA-H-8083-25*, Chapter 14

## Flight Training

**Objective:**

For the student to understand the principles of radio navigation using VOR, ADF and/or GPS. The student will also learn how to divert from a flight plan and how to proceed after becoming lost.

**Content:**

____ Preflight
____ VOR exercises:
_____ Plotting a course using VOR radials
_____ VOR radio operation including signal loss
_____ VOR intercept and tracking drills including station passage
____ ADF exercises:
_____ Principle of bearings and ADF display
_____ Operating the ADF
_____ ADF homing drills
____ GPS
____ Locating position
____ Lost procedures and radar services
____ Pilotage
____ Diversion procedures
_____ Alternate selection
_____ Estimate of heading, groundspeed, ETA and fuel
____ Postflight

**Completion Standards:**

This module is complete when the student understands the principles of radio navigation. The student should be able to track a VOR radial, know how to divert safely and know how to handle becoming lost. Altitude should be within 250 feet, heading within 15 degrees.

Stage 3 / **Module 3**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 3 / **Module 4**

**Minimum 141 Requirements:** Dual cross-country
1.5 hours flight,
1.0 hour ground instruction

## Ground Training

**Objective:**

For the student to gain a practical understanding of the principles involved in enroute navigation.

**Content:**

*Enroute navigation*

____ Compensating for wind effect
____ Departure from an airport
____ Cruise
_____ Chart-reading in flight
_____ Chart orientation in the airplane
_____ Log keeping
_____ Navigation techniques
_____ Ground speed checks
_____ Heading corrections
____ Diversions
_____ En-route diversions
_____ Diversions to an alternate
____ Lost procedures
____ Emergency Locator Transmitter (ELT)

**Completion Standards:**

This lesson is complete when the student has successfully completed the assigned reading.

**Assignment:**

*FAA-H-8083-25*, Chapter 14

## Flight Training

**Objective:**

To introduce the student to cross-country operations at night. In this module instructors may want to consider taking students through more diverse airspace than they are already familiar with. Flight must be over 50 NM.

**Content:**

____ Weather analysis including estimation of in-flight visibility
____ Flight publications
____ Use of aircraft performance charts pertaining to cross-country flight
____ Recognition/avoidance of hazardous terrain
____ Servicing helicopter away from home base
____ Preflight
____ Navigation
_____ Pilotage
_____ Dead reckoning
_____ Radio navigation
____ Night cross-country operations
_____ CFIT/planning
_____ Physiological factors
_____ Lighting and equipment
_____ Cockpit management
_____ Emergencies
____ Diversion to alternate
____ Steep approach
____ Rolling takeoff (wheels)
____ Running takeoff
____ Shallow approach and running/roll-on landing
____ Go-around
____ Postflight

**Completion Standards:**

This module is complete when the student is competent to fly solo cross-country. The student should be able to accurately interpret weather information, plan a trip and fly as planned. Altitude should be within 200 feet, heading 15 degrees. Arrival at checkpoints should be within 5 minutes of estimate and helicopter's position verified within 3 nautical miles of planned route. Differences in planning for fuel, heading and groundspeed should be recorded and corrected for.

Stage 3 / **Module 4**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

**Instructor Note: Follow the format below when signing-off the endorsement for your students. (From AC 61-65E)**

**1. Endorsement for initial solo cross-country flight: 14CFR §61.93 (c)(1)**

I certify that _____*(First name, MI, Last name)* has received the required solo cross-country training. I find he/she has met the applicable requirements of section 61.93, and is proficient to make solo cross-country flights in a _____*(make and model aircraft)*

[date] J. Jones 987654321 CFI [expiration date]

**2. Endorsement for each solo cross-country flight: 14 CFR §61.93(c)(2)**

I have reviewed the cross-country planning of _____ *(First name, MI, Last name)*. I find the planning and preparation to be correct to make the solo flight from _____ *(location)* to _____ *(destination)* via _____ *(route of flight)* with landings at _____ *(name the airports)* in a _____ *(make and model aircraft)* on _____ *(date)*. *(List any applicable conditions or limitations.)*

[date] J. Jones 987654321 CFI [expiration date]

# Stage 3 / **Module 5 and Solo X/C**

**Minimum 141 Requirements:** Solo cross-country
1.5 hours flight

## Flight Training

**Objective:**

For the student to gain the required experience in solo cross-country operations. Flight must be at least 50 NM.

**Content:**

____ Cross-country planning
____ Instructor endorsement
____ Preflight
____ Radio navigation
____ Pilotage
____ Dead reckoning
____ Flight log kept throughout flight
____ At least one landing more than 50 NM from departure airport
____ Postflight

**Completion Standards:**

This module is complete when the student can maintain flight within 200 feet, 15 degrees, and 10 knots, at all times. Cross-country should be flown within 3 NM of the planned route. Arrival at enroute checkpoints should be within 5 minutes of the initial or revised ETA.

Stage 3 / **Module 5**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 3 / **Module 6 and Solo X/C**

**Minimum 141 Requirements:** Cross-country
2.0 hours flight,
0.5 hour ground instruction

## Ground Training

**Objective:**

To complete the Stage 3 exam and review missed questions upon completion.

**Content:**

____ Stage 3 exam

**Completion Standards:**

Stage 3 exam must be passed with a minimum score of 80% and reconciled to 100%.

## Flight Training

**Objective:**

For the student to gain the required experience for the solo long cross-country. Flight must be at least 100 NM with landings at a minimum of three points and one segment of the flight must be more than 25 NM between takeoff and landing locations.

**Content:**

____ Cross-country planning
____ Instructor endorsement
____ Preflight
____ Radio navigation
____ Pilotage
____ Dead reckoning
____ Flight log kept throughout flight
____ At least one landing more than 25 NM from between takeoff and landing locations
____ Postflight

**Completion Standards:**

This module is complete when the student has completed the cross-country flight.

Stage 3 / **Module 6**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 3 / **Module 7 and Stage Check**

**Instructor's note:**
At the discretion of the Chief Flight Instructor, the Stage 3 check can be combined with the Stage 4 check.

**Lesson Time:** Dual 1.0 hour flight, or whatever is necessary to meet objective
1.0 hour ground instruction, or whatever is necessary to meet objective

## Flight Training

**Objective:**
To review the student's ability to adequately prepare for and fly cross-country. The evaluation should include the student's ability to properly divert to an alternate as well as handle in-flight emergencies.

**Content:**

____ Cross-country planning
- _____ Publications
- _____ Performance
- _____ Weather information and analysis
- _____ Plotting course/use of charts
- _____ Flight log
- _____ Filing flight plan
- _____ Flight computer
- _____ Weight and balance

____ Preflight
____ Cockpit management
____ Aeronautical decision making
____ Cross-country flight
- _____ Departure
- _____ Flight log use
- _____ Navigation
- _____ Radio communications
- _____ Postflight

____ Emergencies including lost communication
____ Diversion procedures
____ Lost procedures
____ Collision avoidance
____ Postflight

**Completion Standards:**
This module is complete when the student has Private Pilot proficiency at cross-country operations. Flight must be within 200 feet, 15 degrees, and 10 knots at all times. Flight must be within 5 minutes of ETA and 3 NM of route throughout.

Stage 3 / **Module 7**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

**Stage Exam Score:** _____

**Stage Check Successful:** _____

# Stage 4
## Preparation for Checkride

### Objective
The objective of Stage 4 is for the student to gain knowledge and experience in the following:

### Ground Training
- Aeronautical decision making
- Mountain flying
- Helicopter icing
- Private Practical Test Standards (PTS)
- Prep for checkride (oral)
- Take and pass the FAA Knowledge Exam

### Flight Training
- The experience and knowledge required by the Private License
- Review all Private Rotorcraft maneuvers, performed according to PTS
- Sign-off for the Private Checkride

### Completion Standards
Stage 4 is complete when the student achieves the objective of each lesson, and can list or describe the correct process or reference for accomplishing elements, exercises and activities. Student shall score at least 80% on the Stage 4 Exam, and all deficient areas shall be reconciled to 100%. Students must take and pass the FAA Private Knowledge Exam — Rotorcraft. At the completion of this stage, student is signed off to take the Private Pilot checkride.

# Stage 4 / **Module 1**

**Minimum 141 Requirements:** Dual
1.0 hour flight (night),
1.0 hour ground instruction

## Ground Training

**Objective:**

For the student to learn the elements of aeronautical decision making and to gain the knowledge necessary for mountain flying.

**Content:**

____ ADM
- _____ The decision making process
- _____ Risk management
- _____ Factors affecting decision making
- _____ Hazardous attitudes
- _____ Stress management
- _____ Use of resources
- _____ Workload
- _____ Situational awareness
- _____ Operational pitfalls

____ Mountain flying
- _____ Updrafts and downdrafts
- _____ Thermal currents
- _____ Katabatic and anabatic winds
- _____ Mechanical turbulence
- _____ Valley flying
- _____ Ridgeline flying
- _____ The standard mountain approach
- _____ General comments on mountain approaches
- _____ Survival equipment
- _____ Areas covered by snow and ice

**Completion Standards:**

This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**

*FAA-H-8083-21A*, Chapter 14
*Principles of Helicopter Flight*, 2nd Edition, Chapter 23

## Flight Training

**Objective:**

To practice flight maneuvers in preparation for the practical test. Night landings that were not accomplished in Module 3 should be conducted in this module.

**Content:**

____ Certificates and documents
____ Aircraft logbooks
____ ATC light gun signals
____ Minimum equipment list
____ Emergency equipment and survival gear
____ Preflight
____ Normal and crosswind takeoffs
____ Traffic patterns
____ Hovering maneuvers
- _____ Forward, rearward, sideward hovering
- _____ Hovering turns
- _____ Surface taxi
- _____ Hover taxi
- _____ Air taxi

____ Rapid deceleration
____ Postflight

**Completion Standards:**

This module is complete when the student can perform all the maneuvers to PTS standards. At the conclusion of this module night landings should total 10.

Stage 4 / **Module 1**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 4 / **Module 2**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
0.5 hour ground instruction

## Ground Training

**Objective:**

For the student to gain an understanding of the elements involved in helicopter icing and for the student to take the FAA Knowledge Exam.

**Content:**

____ Helicopter Icing
- _____ Ice accretion
- _____ Ice formation at different temperatures
- _____ Electrical anti-icing
- _____ Consequences of ice accretion
- _____ Engine intake icing

**Completion Standards:**

This lesson is complete when the student has successfully completed all review questions following the assigned reading.

**Assignment:**

*Principles of Helicopter Flight*, 2nd Edition, Chapter 24
Take FAA Private Pilot Rotorcraft Knowledge Exam

## Flight Training

**Objective:**

To practice flight maneuvers in preparation for the practical test.

**Content:**

____ Discussion elements
- _____ Dynamic rollover
- _____ Ground resonance
- _____ Low G conditions
- _____ Anti-torque system failure

____ Preflight
____ Review of weak areas
____ Hovering maneuvers
____ Rapid deceleration
____ Normal and crosswind approaches
____ Steep approaches
____ Autorotations
- _____ Straight-in
- _____ 180 degree
- _____ From a hover

____ System and equipment malfunctions
____ Postflight

**Completion Standards:**

This module is complete when the student can perform all the maneuvers to PTS standards.

Stage 4 / **Module 2**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 4 / **Module 3**

**Minimum 141 Requirements:** Dual
1.0 hour flight,
1.0 hour ground instruction

## Ground Training

**Objective:**
To prepare the student for the Practical Test

**Content:**
____ Review the Private Practical Test Standards (PTS)
____ Review the maintenance logs and required inspections
____ Review pilot's logbook (identify training requirements if desired)
____ Review missed questions from FAA Knowledge Exam

**Completion Standards:**
This lesson is complete when student is prepared for the end of course check and is familiar with the PTS requirements for required maneuvers.

**Assignment:**
Review the Private Practical Test Standards (PTS)

## Flight Training

**Objective:**
To practice flight maneuvers in preparation for the Practical Test.

**Content:**
____ Preflight
____ Review of weak areas
____ Maximum performance takeoff and climb
____ Vertical takeoff and landing
____ Straight-in autorotation with power recovery
____ Hovering maneuvers
____ 180 degree autorotation
____ Power failure at a hover
____ Power failure at altitude
____ Systems and equipment malfunctions
____ Settling with power
____ Low rotor rpm recovery
____ Slope operations
____ Confined area operations
____ Pinnacle/platform operations
____ Rolling takeoff (wheels)
____ Running takeoff
____ Shallow approach and running/roll-on landing
____ Postflight

**Completion Standards:**
This module is complete when the student can perform all the listed maneuvers to Practical Test Standards.

Stage 4 / **Module 3**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

# Stage 4 / **Module 4 and End of Course Check**

**Minimum 141 Requirements:** Dual 1.0 hour flight, or whatever is necessary to meet objective
1.0 hour ground instruction, or whatever is necessary to meet objective

**Objective:**
To review the applicant's readiness for the practical test. If the student shows weakness in some areas, additional instruction will be assigned as needed.

**Assignment:**
Suggested reading: review *Helicopter Oral Exam Guide*
Stage 4 Exam
FAA Private Pilot Knowledge Exam

**Content:**
____ Certificates and documents
____ Aircraft logbooks
____ ATC light gun signals
____ Minimum equipment list
____ Emergency equipment and survival gear
____ Preflight
____ Cross-country operations
____ Engine starting and rotor engagement
____ Runway incursions
____ Normal and crosswind takeoffs
____ Traffic patterns
____ Hovering maneuvers
    _____ Forward, rearward, sideward hovering
    _____ Hovering turns
    _____ Surface taxi
    _____ Hover taxi
    _____ Air taxi
____ Rapid deceleration
____ Dynamic rollover
____ Ground resonance
____ Low G conditions
____ Normal and crosswind approaches
____ Steep approaches
____ Maximum performance takeoff and climb
____ Vertical takeoff and landing
____ Straight-in autorotation with power recovery
____ 180 degree autorotation
____ Power failure at a hover
____ Power failure at altitude
____ Systems and equipment malfunctions
____ Settling with power
____ Low rotor rpm recovery
____ Slope operations
____ Confined area operations
____ Pinnacle/platform operations
____ Rolling takeoff (wheels)
____ Running takeoff
____ Shallow approach and running/roll-on landing
____ Postflight

**Completion Standards:**
This module is complete when the student performs all maneuvers to practical test standards (preferable better) and both instructors agree that the student is ready for the practical test.

Stage 4 / **Module 4**

**Date of Completion:** _____

**Signature:** _____

**Time Flown:** _____

**Stage Exam Score:** _____

**Stage Check Successful:** _____

**Private Pilot Endorsements**

**Instructor Note: Follow the formats below when signing-off endorsements for your students. (From AC 61-65E)**

**1. Aeronautical knowledge test: section 61.35(a)(1), 61.103 (d) and 61.105**

I certify that _____ *(First name, MI, Last name)* has received the required training in accordance with section 61.105. I have determined he/she is prepared for the Private Pilot Rotorcraft knowledge test.

[date] J. Jones 987654321 CFI [expiration date]

**2. Flight proficiency/practical test: section 61.103(f), 61.107(b) and 61.109**

I certify that _____ *(First name, MI, Last name)* has received the required training in accordance with section 61.107 and §61.109. I have determined he/she is prepared for the Private Pilot Rotorcraft Practical Test.

[date] J. Jones 987654321 CFI [expiration date]

## Confirm for the Checkride:

- ❑ Graded pre-solo written exam
- ❑ Current Student Pilot certificate
- ❑ Each solo cross-country endorsed
- ❑ 90-day current solo endorsement (if necessary)
- ❑ Student certificate endorsed by instructor
- ❑ Application form completely filled out
- ❑ Logbook and necessary supplies readily accessible
- ❑ Aircraft logbooks
- ❑ Materials necessary for planning a cross-country flight
- ❑ FAA Knowledge Exam results
- ❑ Identification with photo and signature
- ❑ Instructor endorsements for checkride
- ❑ Graduation certificate
- ❑ Examiner's fee
- ❑ Current Medical

U.S. Department
of Transportation
**Federal Aviation**
**Administration**

# FAA Form 8710-1, Airman Certificate and/or Rating Application Supplemental Information and Instructions

## Paperwork Reduction Act Statement:

The information collected on this form is necessary to determine applicant eligibility for airman ratings. We estimate it will take 15 minutes to complete this form. The information collected is required to obtain a benefit and becomes part of the Privacy Act system of records DOT/FAA 847, General Air Transportation Records on Individuals. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection is 2120-0021.

## Privacy Act

The information on the accompanying form is solicited under authority of Title 14 of the Code of Federal Regulations (14 CFR), Part 61. The purpose of this data is to be used to identify and evaluate your qualifications and eligibility for the issuance of an airman certificate and/or rating. Submission of all requested data is mandatory, except for the Social Security Number (SSN) which is voluntary. Failure to provide all the required information would result in you not being issued a certificate and/or rating. The information would become part of the Privacy Act system of records DOT/FAA 847, General Air Transportation Records on Individuals. The information collected on this form would be subject to the published routine uses of DOT/FAA 847. Those routine uses are: (a) To provide basic airmen certification and qualification information to the public upon request. (b) To disclose information to the national Transportation Safety Board (NTSB) in connection with its investigation responsibilities. (c) To provide information about airmen to Federal, state, and local law enforcement agencies when engaged in the investigation and apprehension of drug violators. (d) To provide information about enforcement actions arising out of violations of the Federal Aviation regulations to government agencies, the aviation industry, and the public upon request. (e) To disclose information to another Federal agency, or to a court or an administrative tribunal, when the Government or one of its agencies is a party to a judicial proceeding before the court or involved in administrative proceedings before the tribunal.

Submission of your Social Security Number is voluntary. Disclosure of your SSN will facilitate maintenance of your records which are maintained in alphabetical order and cross-referenced with your SSN and airman certificate number to provide prompt access. In the event of nondisclosure, a unique number will be assigned to your file.

**See Privacy Act Information above. Detach this part before submitting form.**

Instructions for completing this form (FAA 8710-1) are on the reverse.

If an electronic form is not printed on a duplex printer, the applicant's name, date of birth, and certificate number (if applicable) must be furnished on the reverse side of the application. This information is required for identification purposes. The telephone number and E-mail address are optional.

Tear off this cover sheet before submitting this form.

**FAA Form 8710-1 (4-00) Supersedes Previous Edition** **NSN: 0052-00-682-5007**

# AIRMAN CERTIFICATE AND/OR RATING APPLICATION
# INSTRUCTIONS FOR COMPLETING FAA FORM 8710-1

**I. APPLICATION INFORMATION.** *Check appropriate blocks(s).*

**Block A. Name.** Enter legal name. Use no more than one middle name for record purposes. Do not change the name on subsequent applications unless it is done in accordance with 14 CFR Section 61.25. If you do not have a middle name, enter "NMN". If you have a middle initial only, indicate "Initial only." If you are a Jr., or a II, or III, so indicate. If you have an FAA certificate, the name on the application should be the same as the name on the certificate unless you have had it changed in accordance with 14 CFR Section 61.25.

**Block B. Social Security Number.** Optional: See supplemental Information Privacy Act. Do not leave blank: Use only **US Social Security Number**. Enter either "SSN" or the words "Do not Use" or "None." SSN's are not shown on certificates.

**Block C. Date of Birth.** Check for accuracy. Enter eight digits; Use numeric characters, i.e., 07-09-1925 instead of July 9, 1925. Check to see that DOB is the same as it is on the medical certificate.

**Block D. Place of Birth.** If you were born in the USA, enter the city and state where you were born. If the city is unknown, enter the county and state. If you were born outside the USA, enter the name of the city and country where you were born.

**Block E. Permanent Mailing Address.** Enter residence number and street, P.O. Box or rural route number in the top part of the block above the line. The City, State, and ZIP code go in the bottom part of the block below the line. Check for accuracy. Make sure the numbers are not transposed. FAA policy requires that you use your permanent mailing address. **Justification must be provided on a separate sheet of paper signed and submitted with the application when a PO Box or rural route number is used in place of your permanent physical address. A map or directions must be provided if a physical address is unavailable.**

**Block F. Citizenship.** Check USA if applicable. If not, enter the country where you are a citizen.

**Block G. Do you read, speak, write and understand the English language?** Check yes or no.

**Block H. Height.** Enter your height in inches. Example: 5'8" would be entered as 68 in. No fractions, use whole inches only.

**Block I. Weight.** Enter your weight in pounds. No fractions, use whole pounds only.

**Block J. Hair.** Spell out the color of your hair. If bald, enter "Bald." Color should be listed as black, red, brown, blond, or gray. If you wear a wig or toupee, enter the color of your hair under the wig or toupee.

**Block K. Eyes.** Spell out the color of your eyes. The color should be listed as blue, brown, black, hazel, green, or gray.

**Block L. Sex.** Check male or female.

**Block M. Do You Now Hold or Have You Ever Held An FAA Pilot Certificate?** Check yes or no. (NOTE: A student pilot certificate is a "Pilot Certificate.")

**Block N. Grade of Pilot Certificate.** Enter the grade of pilot certificate (i.e., Student, Recreational, Private, Commercial, or ATP). Do NOT enter flight instructor certificate information.

**Block O. Certificate Number.** Enter the number as it appears on your pilot certificate.

**Block P. Date Issued.** Enter the date your pilot certificate was issued.

**Block Q. Do You Now Hold A Medical Certificate?** Check yes or no. If yes, complete Blocks R, S, and T.

**Block R. Class of Certificate.** Enter the class as shown on the medical certificate, i.e., 1st, 2nd, or 3rd class.

**Block S. Date Issued.** Enter the date your medical certificate was issued.

**Block T. Name of Examiner.** Enter the name as shown on medical certificate.

**Block U. Narcotics, Drugs**. Check appropriate block. Only check "Yes" if you have actually been convicted. If you have been charged with a violation which has not been adjudicated, check ."No".

**Block V. Date of Final Conviction.** If block "U" was checked "Yes" give the date of final conviction.

**II. CERTIFICATE OR RATING APPLIED FOR ON BASIS OF:**

**Block A. Completion of Required Test.**

1. AIRCRAFT TO BE USED. (If flight test required) – Enter the make and model of each aircraft used. If simulator or FTD, indicate.
2. TOTAL TIME IN THIS AIRCRAFT (Hrs.) – (a) Enter the total Flight Time in each make and model. (b) Pilot-In-Command Flight Time - In each make and model.

**Block B. Military Competence Obtained In.** Enter your branch of service, date rated as a military pilot, your rank, or grade and service number. In block 4a or 4b, enter the make and model of each military aircraft used to qualify (as appropriate).

**Block C. Graduate of Approved Course.**

1. NAME AND LOCATION OF TRAINING AGENCY/CENTER. As shown on the graduation certificate. Be sure the location is entered.
2. AGENCY SCHOOL/CENTER CERTIFICATION NUMBER. As shown on the graduation certificate. Indicate if 142 training center.
3. CURRICULUM FROM WHICH GRADUATED. As shown on the graduation certificate.
4. DATE. Date of graduation from indicated course. Approved course graduate must also complete Block "A" COMPLETION OF REQUIRED TEST.

**Block D. Holder of Foreign License Issued By.**

1. COUNTRY. Country which issued the license.
2. GRADE OF LICENSE. Grade of license issued, i.e., private, commercial, etc.
3. NUMBER. Number which appears on the license.
4. RATINGS. All ratings that appear on the license.

**Block E. Completion of Air Carrier's Approved Training Program.**

1. Name of Air Carrier.
2. Date program was completed.
3. Identify the Training Curriculum.

**III. RECORD OF PILOT TIME.** The minimum pilot experience required by the appropriate regulation must be entered. It is recommended, however, that ALL pilot time be entered. If decimal points are used, be sure they are legible. Night flying must be entered when required. You should fill in the blocks that apply and ignore the blocks that do not. Second In Command "SIC" time used may be entered in the appropriate blocks. Flight Simulator, Flight Training Device and PCATD time may be entered in the boxes provided. Total, Instruction received, and Instrument Time should be entered in the top, middle, or bottom of the boxes provided as appropriate.

**IV. HAVE YOU FAILED A TEST FOR THIS CERTIFICATE OR RATING?** Check appropriate block.

**V. APPLICANT'S CERTIFICATION.**

A. SIGNATURE. The way you normally sign your name.
B. DATE. The date you sign the application.

FAA Form 8710-1 (4-00) Supersedes Previous Edition NSN: 0052-00-682-5007

TYPE OR PRINT ALL ENTRIES IN INK

Form Approved OMB No: 2120-0021

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

# Airman Certificate and/or Rating Application

**I Application Information** ☐ Student ☐ Recreational ☐ Private ☐ Commercial ☐ Airline Transport ☐ Instrument
☐ Additional Rating ☐ Airplane Single-Engine ☐ Airplane Multiengine ☐ Rotorcraft ☐ Balloon ☐ Airship ☐ Glider ☐ Powered-Lift
☐ Flight Instructor ____ Initial ____ Renewal ____ Reinstatement ☐ Additional Instructor Rating ☐ Ground Instructor
☐ Medical Flight Test ☐ Reexamination ☐ Reissuance of _____ certificate ☐ Other _____

| A. Name (Last, First, Middle) | B. SSN (US Only) | C. Date of Birth Month Day Year | D. Place of Birth |
|---|---|---|---|
| | | | |

| E. Address | F. Citizenship ☐ USA ☐ Other Specify | G. Do you read, speak, write, & understand the English language? ☐ Yes ☐ No |
|---|---|---|
| | | |

| City, State, Zip Code | H. Height | I. Weight | J. Hair | K. Eyes | L. Sex ☐ Male ☐ Female |
|---|---|---|---|---|---|
| | | | | | |

| M. Do you now hold, or have you ever held an FAA Pilot Certificate? ☐ Yes ☐ No | N. Grade Pilot Certificate | O. Certificate Number | P. Date Issued |
|---|---|---|---|
| | | | |

| Q. Do you hold a Medical Certificate? ☐ Yes ☐ No | R. Class of Certificate | S. Date Issued | T. Name of Examiner |
|---|---|---|---|
| | | | |

| U. Have you ever been convicted for violation of any Federal or State statutes relating to narcotic drugs, marijuana, or depressant or stimulant drugs or substances? ☐ Yes ☐ No | V. Date of Final Conviction |
|---|---|
| | |

**II. Certificate or Rating Applied For on Basis of:**

| | | | |
|---|---|---|---|
| ☐ A. Completion of Required Test | 1. Aircraft to be used (if flight test required) | 2a. Total time in this aircraft / SIM / FTD hours | 2b. Pilot in command hours |
| ☐ B. Military Competence Obtained In | 1. Service | 2. Date Rated | 3. Rank or Grade and Service Number |
| | 4a. Flown 10 hours PIC in last 12 months in the following Military Aircraft. | 4b. US Military PIC & Instrument check in last 12 months (List Aircraft) | |
| ☐ C. Graduate of Approved Course | 1. Name and Location of Training Agency or Training Center | | 1a. Certification Number |
| | 2. Curriculum From Which Graduated | | 3. Date |
| ☐ D. Holder of Foreign License Issued By | 1. Country | 2. Grade of License | 3. Number |
| | 4. Ratings | | |
| ☐ E. Completion of Air Carrier's Approved Training Program | 1. Name of Air Carrier | 2. Date | 3. Which Curriculum ☐ Initial ☐ Upgrade ☐ Transition |

**III RECORD OF PILOT TIME (Do not write in the shaded areas.)**

| | Total | Instruction Received | Solo | Pilot in Command (PIC) | Cross Country Instruction Received | Cross Country Solo | Cross Country PIC | Instrument | Night Instruction Received | Night Take-off/ Landings | Night PIC | Night Take-Off/ Landing PIC | Number of Flights | Number of Aero-Tows | Number of Ground Launches | Number of Powered Launches |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Airplanes | | | | PIC / SIC | | | PIC / SIC | | | | PIC / SIC | PIC / SIC | | | | |
| Rotor-craft | | | | PIC / SIC | | | PIC / SIC | | | | PIC / SIC | PIC / SIC | | | | |
| Powered Lift | | | | PIC / SIC | | | PIC / SIC | | | | PIC / SIC | PIC / SIC | | | | |
| Gliders | | | | | | | | | | | | | | | | |
| Lighter Than Air | | | | | | | | | | | | | | | | |
| Simulator | | | | | | | | | | | | | | | | |
| Training Device | | | | | | | | | | | | | | | | |
| PCATD | | | | | | | | | | | | | | | | |

IV. Have you failed a test for this certificate or rating? ☐ Yes ☐ No

**V. Applicants's Certification -- I certify that all statements and answers provided by me on this application form are complete and true to the best of my knowledge and I agree that they are to be considered as part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.**

| Signature of Applicant | Date |
|---|---|
| | |

FAA Form 8710-1 (4-00) Supersedes Previous Edition

NSN: 0052-00-682-5007

## Instructor's Recommendation

I have personally instructed the applicant and consider this person ready to take the test.

| Date | Instructor's Signature (Print Name & Sign) | Certificate No: | Certificate Expires |
|---|---|---|---|
| | | | |

## Air Agency's Recommendation

The applicant has successfully completed our _____ course, and is recommended for certification or rating without further _____ test.

| Date | Agency Name and Number | Officials Signature / Title |
|---|---|---|
| | | |

## Designated Examiner or Airman Certification Representative Report

- ☐ Student Pilot Certificate Issued (Copy attached)
- ☐ I have personally reviewed this applicant's pilot logbook and/or training record, and certify that the individual meets the pertinent requirements of 14 CFR Part 61 for the certificate or rating sought.
- ☐ I have personally reviewed this applicant's graduation certificate, and found it to be appropriate and in order, and have returned the certificate.
- ☐ I have personally tested and/or verified this applicant in accordance with pertinent procedures and standards with the result indicated below.
  - ☐ Approved -- Temporary Certificate Issued (Original Attached)
  - ☐ Disapproved -- Disapproval Notice Issued (Original Attached)

| Location of Test (Facility, City, State) | Duration of Test: Ground | Simulator/FTD | Flight |
|---|---|---|---|
| | | | |

| Certificate or Rating for Which Tested | Type(s) of Aircraft Used | Registration No.(s) |
|---|---|---|
| | | |

| Date | Examiner's Signature (Print Name & Sign) | Certificate No. | Designation No. | Designation Expires |
|---|---|---|---|---|
| | | | | |

## Evaluator's Record (Use For ATP Certificate and/or Type Ratings)

| | Inspector | Examiner | Signature and Certificate Number | Date |
|---|---|---|---|---|
| Oral | ☐ | ☐ | | |
| Approved Simulator/Training Device Check | ☐ | ☐ | | |
| Aircraft Flight Check | ☐ | ☐ | | |
| Advanced Qualification Program | ☐ | ☐ | | |

## Aviation Safety Inspector or Technician Report

I have personally tested this applicant in accordance with or have otherwise verified that this applicant complies with pertinent procedures, standards, policies, and or necessary requirements with the result indicated below.

☐ Approved -- Temporary Certificate Issued (Original Attached) ☐ Disapproved -- Disapproval Notice Issued (Original Attached)

| Location of Test (Facility, City, State) | Duration of Test: Ground | Simulator/FTD | Flight |
|---|---|---|---|
| | | | |

| Certificate or Rating for Which Tested | Type(s) of Aircraft Used | Registration No.(s) |
|---|---|---|
| | | |

- ☐ Student Pilot Certificate Issued
- ☐ Examiner's Recommendation
  - ☐ Accepted ☐ Rejected
- ☐ Reissue or Exchange of Pilot Certificate
- ☐ Special Medical test conducted -- report forwarded to Aeromedical Certification Branch, AAM-330
- ☐ Certificate or Rating Based on
  - ☐ Military Competence
  - ☐ Foreign License
  - ☐ Approved Course Graduate
  - ☐ Other Approved FAA Qualification Criteria
- ☐ Flight Instructor ☐ Ground Instructor
  - ☐ Renewal
  - ☐ Reinstatement

Instructor Renewal Based on

- ☐ Activity ☐ Training Course
- ☐ Test ☐ Duties and Responsibilities

| Training Course (FIRC) Name | Graduation Certificate No. | Date |
|---|---|---|
| | | |

| Date | Inspector's Signature (Print Name & Sign) | Certificate No. | FAA District Office |
|---|---|---|---|
| | | | |

Attachments:

- ☐ Student Pilot Certificate (Copy)
- ☐ Knowledge Test Report
- ☐ Temporary Airman Certificate
- ☐ Notice of Disapproval
- ☐ Superseded Airman Certificate

☐ Airman's Identification (ID)

_____ Form of ID

_____ Number

_____ Expiration Date

_____ Telephone Number

ID:

Name: _____

Date of Birth: _____

Certificate Number: _____

E-Mail Address _____

FAA Form 8710-1 (4-00) Supersedes Previous Edition NSN: 0052-00-682-5007

# Stage 1 / **Module 11 Quiz** Regulations

**Name:** _____

**Grade:** _____ **Date:** _____

**Instructor:** _____

**1.** The definition of nighttime is

A — sunset to sunrise.
B — one hour after sunset to one hour before sunrise.
C — the time between the end of evening civil twilight and the beginning of morning civil twilight.

**2.** A Third-Class Medical Certificate is issued to a 36-year-old pilot on August 10, this year. To exercise the privileges of a Private Pilot Certificate, the medical certificate will be valid until midnight on

A — August 10, 2 years later.
B — August 31, 3 years later.
C — August 31, 2 years later.

**3.** Under what conditions may objects be dropped from an aircraft?

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 received from the Federal Aviation Administration.

**4.** Where may an aircraft's operating limitations be found?

A — On the airworthiness certificate.
B — In the current FAA approved flight manual, approved manual material, markings and placards, or combination thereof.
C — In the aircraft engine and airframe logbooks.

**5.** Which preflight action is specifically required of the pilot prior to each flight?

A — Check the aircraft logbooks for appropriate entries.
B — Become familiar with all available information concerning the flight.
C — Review wake turbulence procedures.

**6.** With certain exceptions, safety belts are required to be secured about passengers during

A — taxi, takeoff and landings.
B — all flight conditions.
C — flight in turbulent air.

**7.** What exception, if any, permits a private pilot to act as pilot in command of an aircraft carrying passengers who pay for the flight?

A — If the passengers pay all the operating expenses.
B — If a donation is made to a charitable organization for the flight.
C — There is no exception.

**8.** No person may begin a flight in a rotorcraft under VFR unless there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed, to fly thereafter for at least

A — 20 minutes.
B — 30 minutes.
C — 1 hour.

**9.** During operations within controlled airspace at altitudes of less than 1,200 feet AGL, the minimum horizontal distance from clouds requirement for VFR flight is

A — 1,000 feet.
B — 2,000 feet.
C — 1,500 feet.

**10.** What ATC facility should the pilot contact to receive a special VFR departure clearance in Class D airspace?

A — Automated Flight Service Station.
B — Air Traffic Control Tower.
C — Air Route Traffic Control Center.

# Stage 1 Exam
## Pre-Solo Written

**Name:** _____

**Grade:** _____ **Date:** _____

**Instructor:** _____

*Choose the most correct answer choice.*

**1.** How many hours are required for completion of the Private Pilot Certificate, following a Part 141 program?

A—35 hours of flight training, 35 hours of ground training.
B—40 hours of flight training, 35 hours of ground training.
C—73 hours of flight training, 40 hours of ground training.

**2.** Safety belts are required to be properly secured about which persons in an aircraft and when?

A—Pilots only, during takeoffs and landings.
B—Passengers, during taxi, takeoffs, and landings only.
C—Each person on board the aircraft during the entire flight.

**3.** The angle between the chord line of an airfoil and the relative wind is known as the angle of _____

A—lift.
B—attack.
C—incidence.

**4.** What is ground effect?

A—The result of interference of the Earth with airflow patterns around the helicopter.
B—The result of alteration of airflow patterns increasing induced drag around the rotor blades.
C—The result of disruption of airflow patterns about the blades of a rotor to the point where the rotor no longer supports the weight of the helicopter in flight.

**5.** The wind condition that requires maximum caution when avoiding wake turbulence on landing is a _____

A—light, quartering headwind.
B—light, quartering tailwind.
C—strong headwind.

**6.** The altitude deviation allowed by the PTS for operations in the pattern is ____

A—100 ft.
B—150 ft.
C—200 ft.

**7.** Which is appropriate for a helicopter approaching an airport for landing?

A—Remain below the airplane traffic pattern.
B—Avoid the flow of fixed wing traffic.
C—Fly right hand traffic.

**8.** Which is the correct traffic pattern departure procedure to use at a noncontrolled airport?

A—Depart in any direction consistent with safety after crossing the airport boundary.
B—Make all turns to the left.
C—Comply with the FAA traffic pattern procedures for the airport.

**9.** When the speed of a helicopter increases from 20 knots to 60 knots, parasite drag increases by a factor of _____

A—three.
B—six.
C—nine.

**10.** The most effective method of scanning for other aircraft for collision avoidance during daylight hours is to use

A—regularly spaced concentration on the 3-, 9-, and 12-o'clock positions.
B—a series of short, regularly spaced eye movements to search each 10-degree sector.
C—peripheral vision by scanning small sectors and utilizing off-center viewing.

**11.** What are the six primary instruments involved in the instrument scan?

A—Airspeed indicator, heading indicator, altimeter, VOR, vertical speed indicator, attitude indicator.
B—Heading indicator, tachometer, VOR, airspeed indicator, altimeter, turn coordinator.
C—Heading indicator, altimeter, vertical speed indicator, turn coordinator, attitude indicator, airspeed indicator.

**12.** As VFR pilots, it is most crucial for the pilot-in-command to perform the instrument scan,

A—equally dividing his/her time between the 6 primary instruments and the engine instruments.
B—while maintaining collision avoidance by dividing his/her time between inside and outside the cockpit.
C—keeping his/her head inside the cockpit at all times.

**13.** Current charts must be used at all times. Sectional charts are revised

A—every 56 days.
B—no more than once a year.
C—every 6 months.

**14.** Information concerning parachute jumping sites may be found in the_____

A—NOTAMs.
B—Airport/Facility directory.
C—graphic notices and supplementary data.

**15.** Most midair collision accidents occur during

A—hazy days.
B—clear days.
C—cloudy nights.

**16.** Students must uphold at all times

A—FAA regulations.
B—school requirements and procedures.
C—both A and B.

**17.** The four forces acting on a helicopter in flight are

A—lift, weight, thrust, and drag.
B—lift, weight, gravity, and thrust.
C—lift, gravity, power, and friction.

**18.** Who is responsible for making the go/no-go decision for each flight?

A—Pilot-in-command.
B—Certified flight instructor.
C—Chief flight instructor.

**19.** When you fly solo, you are pilot-in-command, and you are required to have in your personal possession a

A—pilot certificate and logbook.
B—pilot certificate, photo ID, and medical certificate.
C—CFI solo endorsement, and copy of the FAR/AIM.

**20.** During forward cruising flight at constant airspeed and altitude, the individual rotor blades, when compared to each other, are operating

A—with increasing lift on the retreating blade.
B—with decreasing angle of attack on the advancing blade.
C—at unequal airspeed, unequal angles of attack and equal lift moment.

**21.** Name the four strokes of a piston engine:

A—Intake, induction, power, expansion.
B—Intake, compression, power, exhaust.
C—Intake, compression, power, expansion.

**22.** 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—Between 32°F and 50°F and low humidity.
C—Between 20°F and 70°F and high humidity.

**23.** Clouds, fog, or dew will always form when

A—water vapor condenses.
B—water vapor is present.
C—relative humidity reaches 100%.

**24.** What instrument(s) will be affected if the pitot tube becomes clogged, but the static vents remain clear?

A—Airspeed indicator.
B—Vertical speed indicator.
C—Both A and B.

**25.** In steady straight-and-level flight

A—lift is greater than drag and thrust equals weight.
B—weight equals lift and drag equals thrust.
C—lift equals weight and thrust is greater than drag.

**26.** The lift differential that exists between the advancing main rotor blade and the retreating main rotor blade is known as

A—transverse flow effect.
B—dissymmetry of lift.
C—hunting tendency.

**27.** Who is responsible for determining if an aircraft is in condition for safe flight?

A—A certificated aircraft mechanic.
B—The pilot-in-command.
C—The owner or operator.

**28.** If the outside air temperature (OAT) at a given altitude is warmer than standard, the density altitude is

A—equal to pressure altitude.
B—lower than pressure altitude.
C—higher than pressure altitude.

**29.** Which combination of atmospheric conditions will reduce aircraft takeoff and climb performance?

A—Low temperature, low relative humidity, and low density altitude.
B—High temperature, low relative humidity, and low density altitude.
C—High temperature, high relative humidity, and high density altitude.

**30.** If the temperature/dew point spread is small and decreasing, and the temperature is 62°F, what type of weather is most likely to develop?

A—Freezing precipitation.
B—Thunderstorms.
C—Fog or low clouds.

**31.** What conditions are necessary for the formation of thunderstorms?

A—High humidity, lifting force, and unstable conditions.
B—High humidity, high temperature, and cumulus clouds.
C—Lifting force, moist air, and extensive cloud cover.

**32.** Two-way radio communication must be established with the Air Traffic Control facility having jurisdiction over the area prior to entering which class airspace?

A—Class C.
B—Class E.
C—Class G.

**33.** An airport's rotating beacon operated during daylight hours indicates

A—that weather at the airport located in Class D airspace is below basic VFR weather minimums.
B—there are obstructions on the airport.
C—the Air Traffic Control tower is not in operation.

**34.** The numbers 9 and 27 on a runway indicate that the runway is oriented approximately

A—009° and 027° true.
B—090° and 270° true.
C—090° and 270° magnetic.

**35.** If two-way communication fails at an airport with a tower and cannot be restored, the recommended procedure is to

A—make an off-airport landing.
B—turn on your landing light, enter the airport area on final approach, and land as soon as possible.
C—observe traffic flow, enter the traffic pattern on the downwind, look for light signals from the tower, and squawk 7600 on your transponder.

**36.** In an in-flight emergency requiring emergency action, the pilot-in-command

A—may deviate from any rule of 14 CFR Part 91 to the extent required to meet that emergency.
B—must not deviate from any rule of 14 CFR Part 91.
C—may deviate from any rule of 14 CFR Part 91 but only after receiving prior permission from ATC.

**37.** Student pilots are responsible for all information, rules, and regulations in Parts

A—61, and 91.
B—91, and 121.
C—1, and 67.

**38.** A person may not act as a crewmember of a civil aircraft if alcoholic beverages have been consumed by that person within the preceding

A—8 hours.
B—12 hours.
C—24 hours.

**39.** List the grade and capacity of the fuel and oil to be used in the training aircraft used for solo flight:

| | Grade | Capacity |
|---|---|---|
| Fuel | _____ | _____ |
| Oil | _____ | _____ |

**40.** What do each of the following ATC light signals mean?

| | in flight | on the ground |
|---|---|---|
| Steady green | _____ | _____ |
| Flashing green | _____ | _____ |
| Steady red | _____ | _____ |
| Flashing red | _____ | _____ |
| Flashing white | _____ | _____ |
| Alternating red and green | _____ | _____ |

# Stage 2 Exam
## Advanced Maneuvers

**Name:** _____

**Grade:** _____ **Date:** _____

**Instructor:** _____

**1.** The purpose of the lead-lag (drag) hinge in a three-bladed, fully articulated helicopter rotor system is to compensate for

A — Coriolis effect.
B — coning.
C — geometric unbalance.

**2.** High airspeeds, particularly in turbulent air, should be avoided primarily because of the possibility of

A — an abrupt pitch up.
B — retreating blade stall.
C — a low frequency vibration developing.

**3.** The maximum forward speed of a helicopter is limited by

A — retreating blade stall.
B — rotor RPM red line.
C — solidity ration.

**4.** Ground resonance is most likely to develop when

A — on the ground and harmonic vibrations develop between the main and tail rotors.
B — a series of shocks causes the rotor system to become unbalanced.
C — there is a combination of a decrease in the angle of attack on the advancing blade and an increase in the angle of attack on the retreating blade.

**5.** If the pilot experiences ground resonance, and the rotor RPM is not sufficient for flight,

A — open the throttle full and liftoff.
B — apply the rotor brake and stop the rotor as soon as possible.
C — attempt to takeoff at that power setting.

**6.** If the pilot were to make a near-vertical power approach into a confined area with the airspeed near zero, what hazardous condition may develop?

A — Ground resonance when ground contact is made.
B — A settling-with-power condition.
C — Blade stall vibration could develop.

**7.** If anti-torque failure occurred during the landing touchdown, what could be done to help straighten out a left yaw prior to touchdown?

A — A flare to zero airspeed and vertical descent to touchdown should be made.
B — Apply available throttle to help swing the nose to the right just prior to touchdown.
C — A normal running landing should be made.

**8.** The upward bending of the rotor blades resulting from the combined forces of lift and centrifugal force is known as:

A — coning.
B — blade slapping.
C — inertia.

**9.** Which is a precaution to be observed during an autorotative descent?

A — Normally, the airspeed is controlled with the collective pitch.
B — Normally, only the cyclic control is used to make turns.
C — Do not allow the rate of descent to get too low at zero airspeed.

**10.** What is the procedure for a slope landing?

A — When the downslope skid is on the ground, hold the collective pitch at the same position.
B — Minimum rpm shall be held until the full weight of the helicopter is on the skid.
C — When parallel to the slope, slowly lower the upslope skid to the ground prior to lowering the downslope skid.

**11.** Which action would be appropriate for confined area operations?

A — Takeoff and landings must be made into the wind.
B — Plan the flightpath over areas suitable for a forced landing.
C — a very steep angle of descent should be used to land on the selected spot.

**12.** The principal reason the shaded area of a Height vs. Velocity Chart should be avoided is

A — turbulence near the surface can dephase the blade dampers.
B — rotor rpm may decay before ground contact is made if an engine failure should occur.
C — insufficient airspeed would be available to ensure a safe landing in case of an engine failure.

**13.** Takeoff from a slope is normally accomplished by

A — moving the cyclic in a direction away from the slope.
B — bringing the helicopter to a level attitude before completely leaving the ground.
C — moving the cyclic stick to a full up position as the helicopter nears a level attitude.

**14.** Which is a correct general rule for pinnacle and ridgeline operations?

A — Gaining altitude on takeoff is more important than gaining airspeed.
B — The approach path to a ridgeline is usually perpendicular to the ridge.
C — A climb to a pinnacle or ridgeline should be performed on the upwind side.

**15.** Before beginning a confined area or pinnacle landing, the pilot should first

A — execute a high reconnaissance.
B — execute a low reconnaissance.
C — fly around the area to discover areas of turbulence.

**16.** Under what condition should a helicopter pilot consider using a running takeoff?

A — When gross weight or density altitude prevents a sustained hover at normal hovering altitude.
B — When normal climb speed is assured between 10 and 20 feet.
C — When the additional airspeed can be quickly converted to altitude.

**17.** If possible, when departing a confined area, what type of takeoff is preferred?

A — A normal takeoff from a hover.
B — A vertical takeoff.
C — A normal takeoff from the surface.

**18.** The proper action to initiate a quick stop is to apply

A — forward cyclic and lower the collective pitch.
B — aft cyclic and raise the collective pitch.
C — aft cyclic and lower the collective pitch.

**19.** Which flight technique is recommended for use during hot weather?

A — Use minimum allowable rpm and maximum allowable manifold pressure during all phases of flight.
B — During hovering flight, maintain minimum engine rpm during left pedals turns and maximum engine rpm during right pedal turns.
C — During takeoff accelerate slowly into forward flight.

**20.** What action should the pilot take if engine failure occurs at altitude?

A — Open the throttle as the collective pitch is raised.
B — Reduce cyclic back stick pressure during turns.
C — Lower the collective pitch control as necessary, to maintain rotor rpm.

# Stage 3 Exam
## Cross-Country Flight

**Name:** _____

**Grade:** _____ **Date:** _____

**Instructor:** _____

*Choose the most correct answer choice.*

**1.** The planned course is 165°, and the forecast wind is 330° at 15 knots. If the expected TAS is 145 knots, what is the required heading and groundspeed?

A—173° and 143 knots.
B—167° and 159 knots.
C—154° and 165 knots.

**2.** If you burn 7 gallons in 35 minutes, what is your rate of fuel consumption, and how long would it take to burn 10 gallons?

A—11.2 gallons/hour, and 68 minutes.
B—12.5 gallons/hour, and 38 minutes.
C—12 gallons/hour, and 50 minutes.

**3.** Which items are included in the empty weight of an aircraft?

A—Unusable fuel and undrainable oil.
B—Only the airframe, powerplant, and optional equipment.
C—Full fuel tanks and engine oil to capacity.

**4.** GIVEN:

| | Weight (lb) | Arm (in) | Moment (lb-in) |
|---|---|---|---|
| Empty weight | 1,495.0 | 101.4 | 151,593.0 |
| Pilot & Pax | 380.0 | 64.0 | — |
| Fuel (30 gal) | — | 96.0 | — |

The CG is located how far aft of datum?

A—CG 92.44.
B—CG 94.01.
C—CG 119.8.

**5.** Which combination of atmospheric conditions will reduce aircraft takeoff and climb performance?

A—Low temperature, low relative humidity, and low density altitude.
B—High temperature, low relative humidity, and low density altitude.
C—High temperature, high relative humidity, and high density altitude.

**6.** 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.

**7.** How many Global Positioning System (GPS) satellites are required to yield a three dimensional position (latitude, longitude, and altitude) and time solution?

A—5
B—6
C—4

**8.** What is the time en route for the following flight?

Distance 65 miles, true course 060° T, wind 270° T at 12 knots, TAS 110 knots. Add 2 minutes for climb-out.

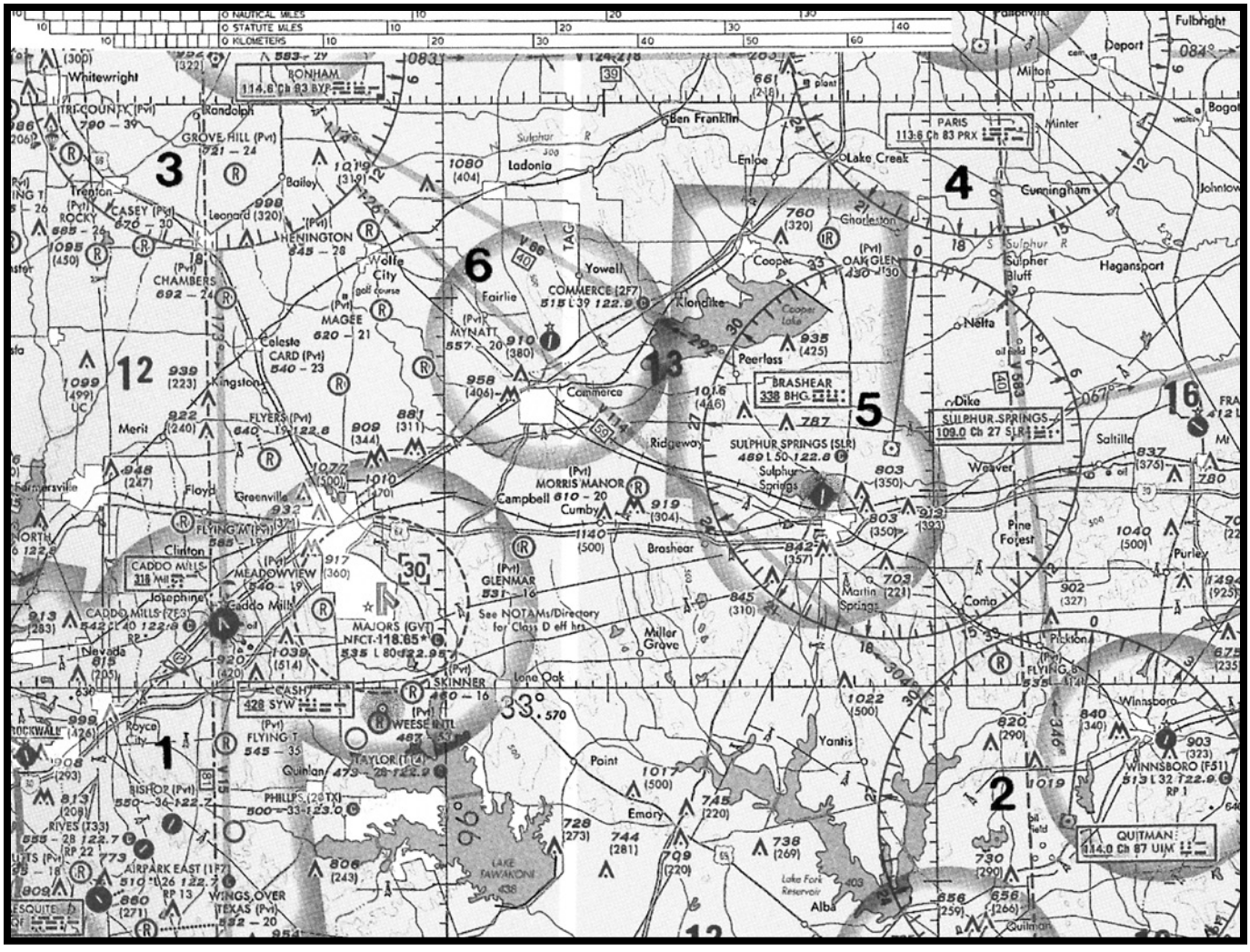
A—34 minutes.
B—28 minutes.
C—40 minutes.

**9.** (Refer to Exam Figure 1.) What is the approximate position of the aircraft if the VOR receivers indicate the 245° radial of Sulphur Springs VOR-DME (area 5) and the 140° radial of Bonham VORTAC (area 3)?

A—Meadowview airport.
B—Glenmar airport.
C—Majors airport.

**10.** (Refer to Exam Figure 1.) On what course should the VOR receiver (OBS) be set in order to navigate direct from Majors Airport (area 1) to Quitman VORTAC (area 2)?

A—101
B—208
C—281




**Exam Figure 1.** Sectional chart excerpt.

**11.** Which VFR cruising altitude is acceptable for a flight on a Victor Airway with a magnetic course of 175°? The terrain is lower than 1,000 feet.

A—4,500 feet.
B—5,000 feet.
C—5,500 feet.

**12.** Cloud bases in Terminal Aerodrome Forecasts are given

A—MSL.
B—AGL.
C—ASL.

**13.** You are flying MH 080, with the OBS selected to 080, CDI needle showing 2 dots right, and the FROM flag showing. Desired course is the 080 radial outbound. The desired course is

A—out to your left.
B—out to your right.
C—directly behind you.

**14.** (Refer to Exam Figure 2, illustration 1.) The VOR receiver has the indications shown. What is the aircraft's position relative to the station?

A—North
B—East
C—South

**15.** If Air Traffic Control advises that radar service is terminated when the pilot is departing Class C airspace, the transponder should be set to code

A—0000.
B—1200.
C—4096.

**16.** If you are 3 NM off-course to the right in 20 NM, what is your tracking error?

A—9° left.
B—9° right.
C—12° right.

**17.** An ATC radar facility issues the following advisory to a pilot flying on a heading of 090°: "Traffic 3 o'clock, 2 miles, Westbound." Where should the pilot look for this traffic?

A—East
B—South
C—West

**18.** In addition to other preflight action for a VFR cross-country flight, regulations specifically require the pilot-in-command to

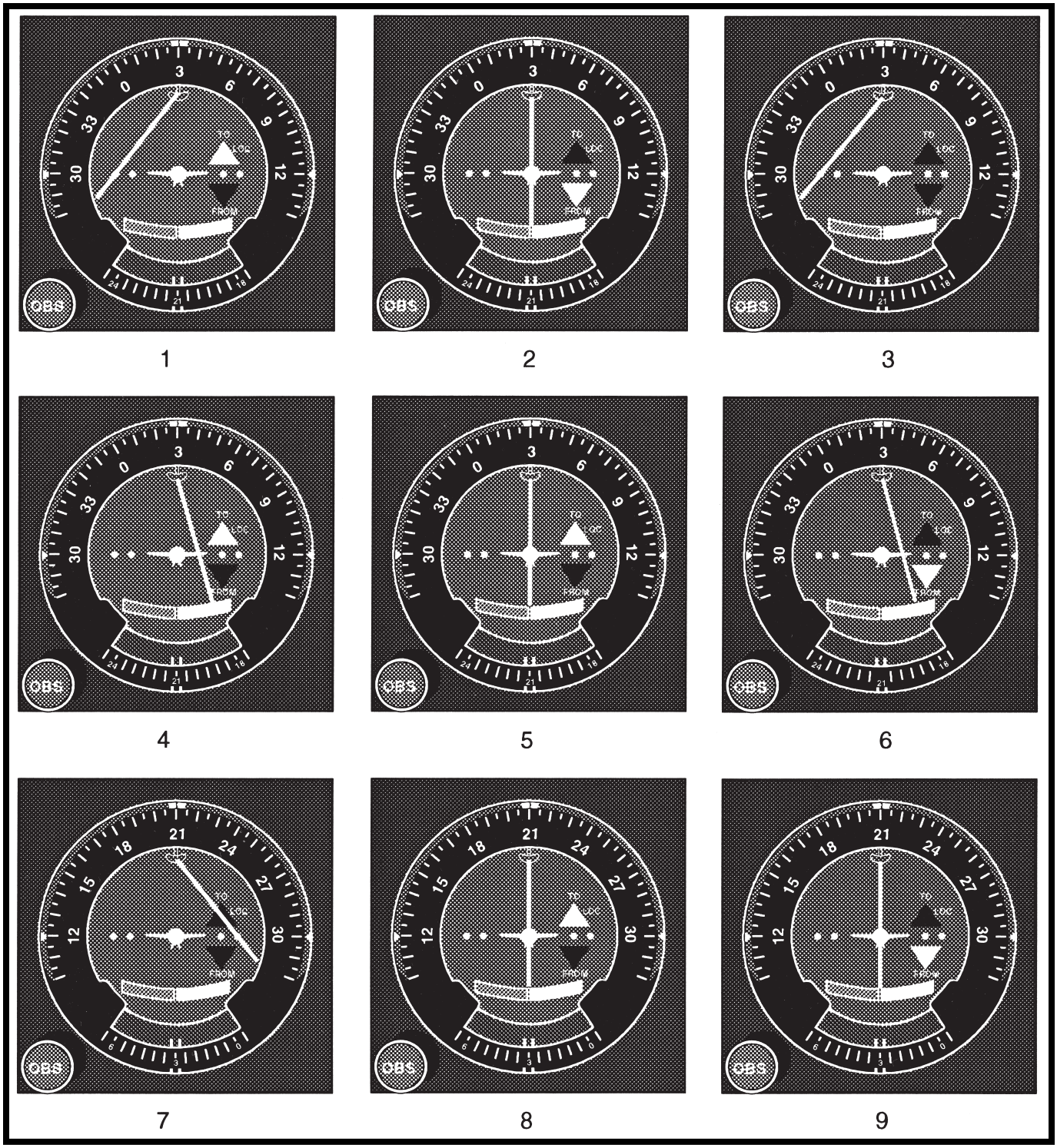
A—determine runway length at the airports of intended use.
B—check each fuel tank visually to ensure that it is always filled to capacity.
C—file a flight plan for the proposed flight.

**19.** (Refer to Exam Figure 2, illustration 8.) The VOR receiver has the indications shown. What radial is the aircraft crossing?

A—030
B—210
C—300

**20.** What procedure is recommended when climbing or descending VFR on an airway?

A—Execute gentle banks left and right for continuous visual scanning of the airspace.
B—Advise the nearest FCC of the altitude changes.
C—Fly away from the centerline of the airway before changing altitude.




**Exam Figure 2.** VOR.

# Stage 4 Final Exam
## Prep for Checkride

**Name:** _____

**Grade:** _____ **Date:** _____

**Instructor:** _____

*Choose the most correct answer choice.*

**1.** What type of fuel can be substituted in an aircraft if the recommended octane is not available?

A — The next higher octane aviation gas.
B — The next lower octane aviation gas.
C — Unleaded automotive gas of the same octane rating.

**2.** If recency of experience requirements for night flight are not met and official sunset is 1830, the latest time passengers may be carried is

A — 1829.
B — 1859.
C — 1929.

**3.** The wind at 5,000 feet AGL is southwesterly while the surface wind is southerly. This difference in direction is primarily due to

A — stronger pressure gradient at higher altitudes.
B — friction between the wind and the surface.
C — stronger Coriolis force at the surface.

**4.** Except when necessary for takeoff or landing, what is the minimum safe altitude for a pilot to operate an aircraft anywhere?

A — An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.
B — An altitude of 500 feet above the surface and no closer than 500 feet to any person, vessel, vehicle or structure.
C — An altitude of 500 feet above the highest obstacle within a horizontal radius of 1,000 feet.

**5.** During a night flight, you observe steady red and green lights ahead and at the same altitude. What is the general direction of movement of the other aircraft?

A — The other aircraft is crossing to the left.
B — The other aircraft is flying away from you.
C — The other aircraft is approaching head on.

**6.** When changing from autorotation for maximum endurance to one for maximum range, the airspeed must be _____ and the rate of descent will _____.

A — increase, decrease.
B — decrease, increase.
C — increase, increase.

**7.** One weather phenomenon which will always occur when flying across a front is a change in the

A — wind direction.
B — type of precipitation.
C — stability of the air mass.

**8.** What are characteristics of a moist, unstable air mass?

A — Cumuliform clouds and showery precipitation.
B — Poor visibility and smooth air.
C — Stratiform clouds and showery precipitation.

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METAR KBOI 121854Z 13004KT 30SM SCT150 17/6 A3015
METAR KLAX 121852Z 25004KT 6SM BR SCT007 SCT250 16/15 A2991
SPECI KMDW 121856Z 32005KT 1 1/2SM RA OVC007 17/16 A2980 RMK RAB35
SPECI KJFK 121853Z 18004KT 1/2SM FG R04/2200 OVC005 20/18 A3006

**Exam Figure 3.**

**9.** (Refer to Exam Figure 3.) What are the current conditions depicted for Chicago Midway Airport (KMDW)?

A—Sky 700 feet overcast, visibility 1-1/2 SM, rain.
B—Sky 7000 feet overcast, visibility 1-1/2 SM, heavy rain.
C—Sky 700 feet overcast, visibility 11, occasionally 2 SM, with rain.

**10.** From which primary source should information be obtained regarding expected weather at the estimated time of arrival if your destination has no Terminal Aerodrome Forecast?

A—Low-level Prognostic Chart.
B—Weather Depiction Chart.
C—Aviation Area Forecast.

**11.** Offset flapping hinges_____ assist in keeping the fuselage parallel with the rotor disc and they allow a ____ range of center of gravity position.

A—do/narrower
B—do not/wider
C—do/wider

**12.** A 10-knot wind at 45° to the runway direction will cause a crosswind component of

A—7 knots.
B—10 knots.
C—4 knots.

**13.** According to the Private Rotorcraft Practical Test Standards, during a straight in autorotation a student is required to come to a hover within _____feet of a designated point.

A—200
B—100
C—300

**14.** According to the Private Rotorcraft Practical Test Standards, a student must maintain what accuracy standards during navigation tasks

A—+/- 100 feet altitude, +/- 10 degrees heading.
B—+/- 200 feet altitue, +/- 10 degrees heading.
C—+/- 200 feet altitude, +/- 15 degrees heading.

**15.** Which light signal from the control tower clears a pilot to taxi?

A—Flashing green.
B—Steady green.
C—Flashing white.

**16.** How should contact be established with an En Route Flight Advisory Service (EFAS) station, and what service would be expected?

A—Call EFAS on 122.2 for routine weather, current reports on hazardous weather, and altimeter settings.
B—Call EFAS on 122.5 for advisory service pertaining to severe weather.
C—Call EFAS on 122.0 for information regarding actual weather and thunderstorm activity along proposed route.

**17.** If you have to land on a high level landing site surrounded by irregular features you should aim to complete the approach

A—short of the site.
B—over the site.
C—on the site.

**18.** If there is an inversion above your planned cold mountain landing site, you should anticipate that translational lift will _____ as you descend through the inversion.

A—increase
B—decrease
C—remain the same

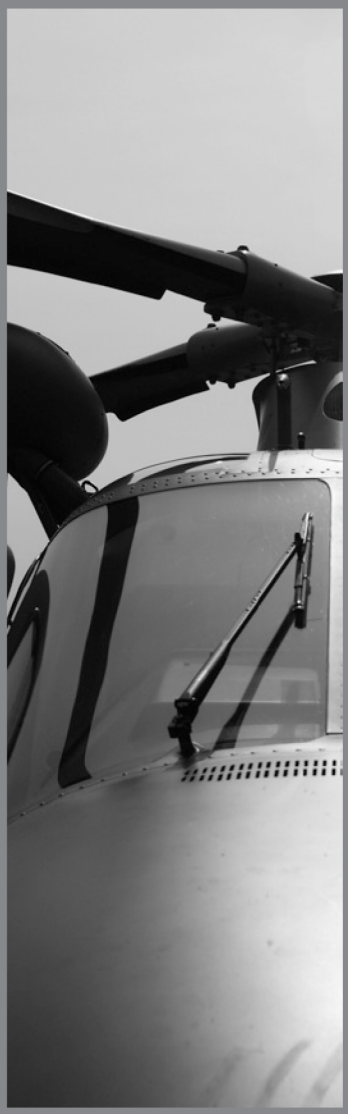
**19.** Generally ice accretion is _____ on sharp objects.

A—faster
B—slower
C—the same

**20.** A major risk of rotor blade icing is the resulting unbalancing of blades which can cause _____ on landing.

A—recirculation
B—ground resonance
C—asymmetric loading

# Principles of Helicopter Flight Syllabus



## Second Edition

*Principles of Helicopter Flight*, by Walter J. Wagtendonk, explains the complexities of helicopter flight in clear, easy-to-understand terms. The worldwide helicopter industry has waited a long time to see a manual of this caliber.

Helicopter pilots need to thoroughly understand the consequences of their actions, and base them upon sound technical knowledge. This textbook provides the background knowledge explaining why the helicopter flies and, more importantly, why it sometimes doesn't. It examines the aerodynamic factors associated with rotor stalls, mast bumping, wind effect, as well as the maneuvering flight to include the hover, forward flight, the flare, autorotation. Helicopter design and components, performance, and weight and balance is covered, along with special techniques such as different types of takeoffs and landings, operating on sloping surfaces, sling operations, mountain flying, and helicopter icing. Technical knowledge and sound handling are the ingredients that make a pilot safe.

For the student learning to fly helicopters in the 21st century, this book is one of the essential keys to flight.

"Wal" Wagtendonk served in the Royal New Zealand Air Force, retiring as an A-2 instructor in 1960. After working with the Nelson Aero Flight Club as Manager and Chief Flight Instructor, Wal, with his wife Ann, formed the Nelson Aviation College in Motueka, which blossomed into one of New Zealand's best known theory and flight training establishments. Nelson Aviation College became the first "approved" school to conduct both fixed-wing and helicopter courses, and many experienced helicopter pilots currently flying all over the world started their basic training under Wal's careful instruction.

Wal was born in The Netherlands, and emigrated to New Zealand at age 20. Having retired in 1990, Wal and Ann now reside in the Bay of Plenty on New Zealand's North Island.

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