

**Hang Gliding and Paragliding Association of Canada
Study Guide for the Advanced Rating Exam Rev. 2 Jan 19, 2002
Produced by the BCHPA, printed with permission.
Subject to Paragliding revisions presently underway.**

GENERAL INFORMATION

The study guide is designed to assist Hang Glider and Paraglider pilots wishing to write Advanced Rating Exam.

The Hang Gliding and Paragliding Association of Canada expects pilots to be well acquainted with the rules, procedures, privileges, limitations and aeronautical information relating to our use of Canadian Airspace.

The Advanced pilot is expected to exhibit technical knowledge background in both aerodynamics and meteorology as well as their specific applications in Hang Gliding and Paragliding.

To make sure they have the necessary information to plan cross-country flights and to ascertain that pilots have well integrated knowledge about aeronautical rules and regulations, the candidate for the Advanced ratings exam will show up at the exam in possession of the VFR chart for their region so that they can be tested orally by the examiner on five questions.

Finally, the candidate for the Advanced rating has to pass a 100 question written exam, with multiple choice answers, prepared by the Hang Gliding and Paragliding Association of Canada so as to demonstrate sufficient knowledge of the following subjects:

- 1) air regulations (25 questions)
- 2) aerodynamics, theory of flight, flight instruments (25 questions)
- 3) meteorology (25 questions)
- 4) airmanship; the practical in-flight application of the aforementioned subjects. (25 questions)

This guide provides a question bank to help out in the candidate's orientation of their studies; moreover a good part of these questions have been used in the actual creation of the exams.

The aviation world has jumped full fledged into the age of the internet. While this Study Guide does contain a wide range of information, many essential components, in particular detailed contents of individual Canadian Aviation Regulations are available free of charge on the internet, or at a time and cost factor from Canadian Government Publications departments.

Therefore, we strongly recommend those pilots without internet access to avail themselves of the opportunity at local internet cafes or at a friends house. There are many "Links" in the document that are particularly useful and interesting.

To purchase these documents, See:

Canadian Government Publications
<http://dsp-psd.pwgsc.gc.ca/publishing/index.html>

Information on Canadian Aviation Regulations PROHIBITIONS, OFFENCES AND PUNISHMENT are available at:
<http://www.tc.gc.ca/aviation/regserv/carac/CARS/aa/aa01e.htm#aa01-10>

Canadian Aviation Regulations

<http://www.tc.gc.ca/aviation/regserv/carac/OTHER/ENGLISH/formeng.htm>

Civil Aviation Publications 1-800-305-2059

http://www.tc.gc.ca/aviation/pubs/index_e.htm

A.I.P. Canada

http://www.tc.gc.ca/aviation/pubs/aip/about_aip_canada.htm

Environment Canada Publications

http://www.ec.gc.ca/pands_e.html

CANADIAN AVIATION REGULATIONS

Air Traffic Control rules and procedures.

http://www.tc.gc.ca/aviation/regserv/carac/CARS/html_e/doc/index.htm

Canadian Airspace Structure

http://www.tc.gc.ca/aviation/regserv/carac/CARS/html_e/doc/nav-1869.htm

Rules of the air

CARs 602.19 Right of Way

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_19

602.34 Cruising Altitudes and Cruising Flight Levels

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_34

- Cruising Altitudes Table:

- <http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/t60201e.htm>

602.114 Minimum Visual Meteorological Conditions for VFR Flight in Controlled Airspace

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_114

602.115 Minimum Visual Meteorological Conditions for VFR Flight in Uncontrolled Airspace

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_115

CARs 602.13 to 17 Take-offs, Approaches and Landings within Built-up Areas of Cities and Towns

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_12

CARs 602.27 Aerobatic Manoeuvres - Prohibited Areas and Flight Conditions

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_27

602.73 Flight Plan or a Flight Itinerary - Requirement to File

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_73

602.24 Formation Flight

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_24

602.144 Interception Signals, Interception of Aircraft and Instructions to Land

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_144

Oxygen Equipment

<http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/t60501e.htm>

Restrictions applicable to flights within National, Provincial and Municipal Parks

CARs 602.29 Hang Glider and Ultra-light Aeroplane Operation

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_29

Hang Gliders and AERO-Towing.

<http://www.hpac.ca/tcl/aerotow.pdf>

See also <http://www.hpac.ca/tcl/cars.html#tow>

NOTAMs and Special Aviation Event Safety application Forms

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/603e.htm#603_02

- **Application form and process:**

- <http://www.hpac.ca/safety/notam.html>

Aeronautical Charts

Be able to decipher the information on VFR Navigation Charts (VNC) as it pertains to our use of the airspace: airways, control zones, terminal control areas, geographical features, communications et cetera.

Aeronautical Information Publication (A.I.P. Canada.)

For those interested in a more comprehensive reference, Transport Canada recommends that all pilots obtain a copy of the A.I.P. Canada. It offers, along with the listing of all the rules, an extensive amount of information on services available to and advice applicable to pilots flying in Canada

If one does not want to read the whole publication, most of the necessary information, with the exception of CARs 602.29 “Hang Glider and Ultra-light Aeroplane Operation” can be found in the chapter entitled R.A.C.

This publication also contains: general information, definitions, communications, meteorology (decoding of hourly weather reports, terminal forecasts, area forecasts and winds aloft), description of the available charts, airmanship, NOTAM’s and information circular.

The Designated Airspace Handbook is also available online now.

See; <http://ats.nrcan.gc.ca/Pdf/DAH27dec2001.pdf>

Note 4 Mb file! (Very detailed / technical information – may be useful for club safety officers.)

THEORY OF FLIGHT

The properties of the atmosphere.

Hang/para gliding reactions resulting from changes of pressure, temperature and density altitude.

Airfoils

The chord, span, aspect ratio, forms streamlining, wash-in and wash-out, dihedral angle and the angles of attack and attitude.

Forces acting upon an airfoil

The Bernoulli principle, the pressure distribution above and under the airfoil. The resultant vectors of lift and drag. Variations of lift and drag as a function of changes in the angle of attack; the stall angle and the accompanying shift of the centre of pressure.

The four basic forces acting upon a wing in flight and their equilibrium.

The different factors contributing to lift and drag of the wing: the best lift / drag ratio, wing drag, parasitic drag and induced drag. Understanding ground effect.

The speed polar.

A sound knowledge of the polar curve and the information drawn from it. Minimum sink rate, best lift / drag in still air, the effects of wind and air currents upon the best lift / drag speed.

The changes in the minimum sink speed and the best lift / drag speed as a result of changes in the load factor.

Weight

Gravity, centre of gravity, wing loading and dynamic loading. The forces acting upon the wing while manoeuvring, load factor and their effect on the stall speed.

Stability and instability.

The inter-relationship of yaw and roll; adverse yaw.

The axis and planes of rotation of the wing.
Lateral, directional and longitudinal stability.
Built-in stability, the use of dihedral angle and wash-in, wash-out.

METEOROLOGY

Basic knowledge of Canada's weather organization.

Nav Canada <http://www.flightplanning.navcanada.ca>

Environment Canada http://weatheroffice.ec.gc.ca/canada_e.html

A good understanding of surface weather charts, low altitude charts, general forecast as well as forecasted winds and temperatures at altitude.

Winds Aloft: <http://weather.uwyo.edu/upperair/sounding.html>

Ability to extract from the available information all relevant factors affecting the flight.

Properties of the atmosphere

The composition, extent and the standard units in use. The capacity of mobility.

Pressure, density and wind.

The units in use in aviation. Reactions to changes of temperature and humidity.

The differences of pressure in the horizontal plane and their respective names: high, low, ridge, et cetera.

The wind's circulation around the different pressure zones and its relation to the earth's rotation. Wind veering and backing and other local phenomena: anabatic and katabatic wind, the diurnal effect, sea breeze and land breeze, valley wind, convergence and both horizontal and vertical wind shears.

Temperature and humidity.

The different scales and their use.

Dew point and relative humidity.

Heating and cooling of the atmosphere, the heat absorption of different soils; the different changes of temperature with altitude, the lapse rate.

Stability and instability.

The relation between stability and lapse rate. How stability is modified and the different characteristics associated to stability and instability.

Lift

Thermals: birth, behaviour, general knowledge, temperature-humidity-lapse rate relations and effects.

Dynamic: Lapse rate-stability relations and effects.

Wave: Wind strength-stability-areography relations and effects.

Air masses.

Basic notions and the formation, classification and weather conditions of the different air masses affecting North America.

Fronts.

Notions on the structure of fronts: warm, cold, stationary and occluded as well as the factors bearing upon fronts by the general observation of clouds, temperature and wind.

Clouds, precipitation and fog.

Classification, nomenclature and identification of clouds.

<http://vortex.plymouth.edu/clouds.html>

How clouds are formed.

<http://www.cloudman.com/chart/chart.html>

or http://www.msc.ec.gc.ca/education/documents/07_clouds_intro.pdf

The relation between clouds and the different types of precipitation, turbulence, lift and sink.

A better than average knowledge of the formation of cumulus and the identification of their associated areas of lift and sink.

Finally a general awareness of the destructive forces of the atmosphere: thunderstorms and the associated turbulence, strong wind and the associated mechanical turbulence.

http://www.msc-smc.ec.gc.ca/severe_weather/

AIRMANSHIP

Flying in strong wind and the effects of wind gradient.

Flight in different types of turbulence: mechanical, vortices and mountain.

Theoretical knowledge, breakdown and coordination of the different flight manoeuvres: the different types of stalls; spin, spiral, side slip, take-off and landing. Additionally for Paragliding: Big-Ears, Collapses, Horseshoes

Appraising distance and obstacle clearance using the stationary point method. <http://www.hpac.ca/safety/articles/spot.pdf>

Structure.

The identification, location and the materials used in the different parts of a hang glider or paraglider: tubes, sail, battens (ribs) reflex bridles, cables, lines, brakes, the main and safety suspension loops.

The distribution of compression and tension loads.

Proper maintenance and trimming of a hang/para glider.

Safety procedures: pre-flight inspection, hang check, take-off, aerobatic maneuvers and landing.

Safety equipment: parachute, hang loop, harness and helmet.

In flight use of the information extracted from the speed polar.

In flight use of the knowledge of weather conditions.

Basic knowledge of tandem flying.

Finding the wind's direction and speed using clues in the natural environment.

Pilot physiology:

Hypoxia, fatigue, alcohol, medication and drugs.

Other Suggested reading

Hang Gliding

Cheney - HG for Beginner Pilots

Pagen - Hang Gliding Training Manual

Paragliding

Dennis Pagen - The Art of Paragliding

Dennis Pagen - Paragliding Flight

Wills Wing Paragliding Manual

Bi-Wingual

Dennis Pagen - Performance Flying

Dennis Pagen - Understanding the Sky

Dennis Pagen - Towing Aloft

Sport Aviation Publications <mailto:pagenbks@lazerlink.com>

PO Box 43, Spring Mills PA 16875 - USA

Tel: 814-422-0589 <http://users.lazerlink.com/~pagenbks/>

Aviation Weather

Transport Canada, Weather Ways, Ottawa Ontario Canada

Transport Canada, Aviation Weather, Ottawa Ontario Canada

US Federal Aviation Agency Aviation Weather

⬅ Need a list of PG Texts recommended French & English ⬅=

Other Suggested reading – French

Delta

Le manuel du vol libre. 4ieme edition Edition retine par hubert aupetit.

Parapente

Paragliding Flight <http://users.lazerlink.com/~pagenbks/>

Bi-Wingual References.

La boutique Fédération Française de Vol Libre

http://www.ffvl.fr/Espace_pratique/Boutique/boutique_livres.html

QUESTION BANK – HG & PG

Define “Controlled Airspace”

You leave, on a downwind cross-country flight, a ridge where the wind was 240. While flying at an altitude higher than 3000’ ASL, at which altitudes could you expect to encounter aircraft in cruise flying towards you?

<http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/t60201e.htm>

What is a “Controlled Area?”

What is the initial width of a low-level VHF Airway?

Define a “Control Zone”

What is the lower limit of high level airspace?

Is an ATC clearance required to undertake a VFR flight in Class B airspace?

What is the lower limit of low-level airways?

A Terminal Control Area (TCA) Controlled by an Area Control Centre (ACC) belongs to what type of airspace?

What type of airspace frequently changes Class?

Name two types of Class F airspace.

What is the designation of the airspace above 18,000’ ASL

What are the restrictions pertaining to aerobatic flying over populated areas?

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_27

What is the minimum altitude to overfly an aerodrome where no landing is intended?

Under what arrangement may formation flying be undertaken outside of controlled airspace?

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_24

When two aircraft follow converging routes at the same altitude, which of the two has to give way to the other?

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_19

What is an aerodrome?

When an airplane and a hang/para glider follow converging routes at the same altitude, which one has to give way to the other?

Under which condition is a pilot responsible for collision avoidance with other aircraft?

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_21

When two aircraft are meeting head-on, and there exists a risk of collision, what is the prescribed maneuver to be followed by both?

At what altitude may an aircraft overfly a built-up area or a gathering of spectators out in the open.

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_12

What is the closest an aircraft can fly to a city before being considered as overflying a built-up area?

What is the lowest visibility permitted while flying VFR in controlled airspace?

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_114

What is the lowest visibility permitted while flying VFR in uncontrolled airspace?

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_115

What is the lowest visibility permitted while flying VFR on a low-level airway?

What are the minimum cloud clearances permitted while flying VFR in uncontrolled airspace above 700’ AGL?

What are the minimum cloud clearances permitted while flying VFR in controlled airspace?

Under which conditions may an aircraft proceed in Class C airspace without contact by two-way radio?

Above what altitude can't a hang/paraglider pilot fly without adequate oxygen equipment?

<http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/t60501e.htm>

What is the minimum duration of oxygen to be carried when under-taking a flight requiring its use?

How is the "day" defined in Canadian Aviation Regulations?

How is night flying regulated for hang/paragliding?

Who has the right of way if, while approaching to land, you find yourself in a conflicting position with a motorized ultra-light?

http://www.tc.gc.ca/aviation/regserv/carac/CARS/cars/602e.htm#602_19

If, while flying minimum sink rate speed, you slow down gradually, what happens to the lift and drag forces as the wing approaches the stall?

Define inherent stability (positive stability); whether in yaw, roll or pitch.

What is induced drag?

In calm air, how do wing tip vortices behave as they leave the wing?

What is the equation for aspect ratio?

Explain the different stall characteristics, in relation to angle of attack and speed, of two identical gliders with different wing loadings.

When does a hang/paraglider stall?

If, while flying just above stall speed, you speed up slightly, what will be the effect on your sink rate?

What effect on best glide ratio and sink rate, will a higher aspect ratio have?

If, while flying at best L/D ratio speed, you slow down slightly, what will be the effect on your sink rate?

Define wingspan.

Explain the differences in terms of lift and drag of the outside wing, compared to the inside wing, during a coordinated steep turn.

During a coordinated turn, what happens to the stall speed when the angle of bank is increased from 30 to 45 degrees?

By what percentage (to the nearest 5%) is the stall speed increased during a 60 degree banked turn?

By what percentage (to the nearest 5%) is the stall speed increased during a 45 degree banked turn?

How are the best L/D ratio and sink rate influenced by increasing the wing loading?

When you initiate a roll movement to the left, (lean to the left) why does the wing start turning left?

What vector opposes the weight vector in straight gliding flight?

What effect does an increase in drag have on the glide angle?

Explain the differences in preparing for a high wind approach compared to a no wind approach.

If you double your airspeed, by how much are the aerodynamic forces increased on your glider?

Define best L/D ratio

What happens to your sink rate if you slow down from minimum sink rate speed without nevertheless reaching the stall speed?

While proceeding downwind, at what speed should you fly to cover the greatest distance?

To maximize performance when flying in thermal conditions what speed should be flown in sinking air?

What is your sink rate, if during straight flight, lift equals your total weight?

In what proportion does the stall speed vary when the weight of the pilot and his equipment are increased?

If, during a tandem flight you carry a passenger weighing the same as you, by approximately what factor will the stall speed be increased?

Define the chord of a wing

How is "G" loading calculated?

The greater the best L/D ratio, the more the glide angle is: Shallow or Steep?

What happens to the glide angle when the speed is increased above the best L/D ratio speed?

Will an airspeed indicator indicate the correct airspeed if mounted slightly in front of the pilot?

Will an airspeed indicator indicate the correct airspeed if mounted above the wing?

Define angle of attack

Define angle of attitude.

Name the point at which all the lifting forces of a wing meet.

How is lift created by the different pressures exerted on an airfoil?

The lift vector forms a right angle to what forces?

Explain the changes in wing tip vortices during acceleration as the angle of attack is decreased.

In what conditions does density - altitude affect hang/paragliders most negatively?

Given two identical gliders with the same wing loading and speed, one at 10,000' ASL, the other at 1,000' ASL:

1) compare the two sink rates

2) compare their respective best L/D ratio.

What mathematical relationship exists between lift and speed?

Over what kind of terrain is wind gradient most pronounced?

Near an obstruction, where is turbulence the strongest?

Describe the action of a thermal, given a constant lapse rate.

Describe the distribution of the rising forces in a thermal.

How much stronger is a 50 km/hr wind compared to a 25 km/h one?

What size of rotor is most dangerous for a glider?

In what kind of meteorological conditions are rotors found leeward of rounded, regular mountains.

What type of ground cover generates the best thermals?

Describe the daily behavior of valley winds.

What is the main characteristic of "blue thermals"?

What is the greatest danger associated with a vertical wind shear?

When is an air mass unstable?

How is a thermal generated?

What kind of cloud denotes thermal activity?

Describe the temperature lapse rate.

Describe the daily progression of a sea breeze.

What characterizes a high pressure system?

What indicates the approach of a cold front?

What type of cloud denotes wave lift?

Why should you avoid flying near thunderstorms and cumulonimbus clouds?

What determines the altitude of cumulus cloud base?

What humidity conditions are more conducive to unstable air?

What type of cloud would you predict in a high pressure system, in a cold air mass with a good lapse rate and sufficient humidity?

Which kind of front moves faster?

What characterized wave lift?

What part of the atmosphere most concerns meteorology?

What causes the wind?

Concerning veering and backing, what will be the wind changes during a descent from 3,000' AGL to the ground?

What characteristics differentiate air masses?

At what time of day is thermal activity at its peak?

What term is used to describe an air mass that continues rising after an initial input?

Why does the warm air in a warm air mass form clouds during the passage of a cold front?

Define dew point.

Define temperature inversion.

What visibility and degree of turbulence would you expect while flying in a cold air mass which just replaced a warm one?

Under normal conditions, what is the average temperature drop per 1,000' ?

Is the lapse rate greater in saturated or unsaturated air?

Define convergence zone.

In relation to its associated cumulus cloud, where is the thermal's lift the strongest?

What units are used to measure wind speed and direction?

How do you recognize a cumulus forming due to thermal activity?

Define anabatic wind.

Regarding thermal activity, what kind of day are you likely to find if the lapse rate is weaker than the saturated adiabatic lapse rate?

In straight flight, what part of a hang glider or paraglider stalls first?

In a stall, which wing stalls first?

Using standard stall recover techniques, under what aerological conditions will altitude loss be the greatest?

What is the stationary point method used for?

<http://www.hpac.ca/safety/articles/spot.pdf>

In ridge lift, when two gliders meet at the same altitude, which has the right of way?

What is the correct procedure to be used when overtaking another glider in ridge lift?

While searching for thermals, two pilots approach head-on, what must they do?

Who has the right of way in ridge lift if a lower glider is out climbing a higher glider?

Upon entering a thermal occupied by other pilots, what determines the direction of your turns?

When flying in traffic in thermal lift, how is the right of way determined?

What is the best speed to fly in turbulence?

How should you react when strong turbulence lowers the nose of your glider into a diving attitude?

How often should a parachute be repacked?

What causes a spin?

How do you get out of a spin?

In a no wind condition, how long should one wait before taking off after another hang/para glider?

While flying in a headwind, which speed should one fly at, so as to cover the greatest horizontal ground distance?

Given that the true stall speed increases with altitude, how will this affect high altitude launches?

What determines the right of way between two gliders on landing?

What factors should be considered before attempting aerobatics?

Why is it important not to fly near microwave transmitters?

What maneuver causes the greatest loss of altitude?

During a brace (PG) wire assisted (HG) launch, who is responsible for the proper coordination?

What speed should be flown to maximize altitude gain in a thermal?

In sinking air, what speed should be flown to cover the greatest horizontal ground distance?

What factors determine a coordinated turn?

What is the greatest danger to avoid when landing in strong wind?

How do you determine wind direction on landing with only a small body of water as an indicator?

When over-flying a valley at day's end, why is there more lifting air as one of the valley's sides loses sunlight?

What are the early signs of hypoxia?

What happens to the airflow at a breach along a ridge?

Why should extra precautions be taken when landing in a valley?

What geographical formation will generate the greatest dynamic lift in a perpendicular wind?

What geographical formation will generate the greatest dynamic lift in a 30 degree cross-wind?

In what direction should you expect to land at the mouth of a valley at day's end?

On a map scaled 1:500,000 what distance will one centimetre represent?

What name is given to the angular difference between true north and magnetic north?

After a cross-country flight in which you noticed a strong drift, you notice during your approach to land in almost calm wind: what phenomenon should you expect on final approach?

Why is it dangerous to fly very close to the ridge even if the wind is steady?

A high altitude launch will require a longer run in what conditions of temperature and humidity?

While flying in dynamic lift with the ridge on your left, you meet a glider; what manoeuvre will he expect you to perform?

During a steep turn at low speed, which wing will stall first?

During a shallow turn you notice an increase in airspeed, how would you correct?

What ground conditions (altitude and humidity) will most likely generate the best thermals?

While flying in dynamic lift you notice that a constant speed and crab angle keeps you parallel to the ridge: what should you do to stay parallel if the wind increases?

What is the major cause of hang gliding and paragliding accidents?

While executing a 180 degree turn, from tail wind to headwind, how will roll response be affected?

When approaching to land, what precautions are necessary while flying the downwind leg?

Answer the following by TRUE or FALSE

It is not necessary to establish a two-way radio communication to cross a Class C Control Zone.

Helmets are not required to fly hang/para gliders!

Aircraft always use a left hand circuit at airports!

An ATC controller picks you up on radar as you are flying outside of his airspace and he notices that you are dangerously converging with an airplane: if the weather conditions are conducive to VFR flying, it becomes his responsibility to avoid the mid-air by notifying the airplane!

- Answer the previous question given that the airplane is flying IFR in VFR weather conditions!

All aircraft flying in controlled airspace are subject to ATC control!

While in flight down tubes and crossbars are under compression!

While in flight the kingpost is always under compression!

Adverse yaw allows the outside to move ahead in a turn!

Adverse yaw diminishes pitch stability during steep turns!

Indicated stall speed increases with altitude!

Sink rate is greater at all speeds other than minimum sink!

Sink rate is directly proportional to airspeed!

Sink rate is constant over a large speed range!

Relative wind can be equated with airspeed!

Magnetic heading increase during right turns!

Flying on a heading of 300 degrees, your direction is WSW!

Millibars are units of altitude!

A wind direction of 040 degrees is approximately NE!

In the northern hemisphere wind blows from low pressure systems towards high pressure systems!

In the northern hemisphere wind circulates around high pressures in a clockwise direction!

After the passage of a warm front, conditions for XC flying improve!

A wet sail stalls at a higher speed!

When the overnight inversion layer is thick, the usable convection for hang/para gliding will begin early in the morning!

Viewed from behind, wing tip vortices turn counter clockwise around the left wingtip and clockwise around the right wingtip!

A front is the dividing line between two air masses of different instability and wind direction!

The change in temperature with altitude helps us to recognize the strength of thermals!

All energy causing the circulation of air and, consequently, generating all meteorological systems comes from the heating of the earth's surface by the sun!

Air flows from low pressure systems to high pressure systems!

Profile drag increases as the speed increases!

HANG GLIDING SPECIFIC QUESTIONS.

List the following Hang Gliding manoeuvres to answer the next questions:

- 1) Pull in the control bar
- 2) Pull in the control bar quickly and all the way
- 3) Push out the control bar
- 4) Push out the control bar quickly and all the way
- 5) Shift the weight towards the lower wing
- 6) Shift the weight towards the higher wing
- 7) Shift the weight towards the middle of the control bar
- 8) Fly at the best L/D ratio speed

- a) Indicate the correct sequence to come out of a spin.
 - b) Indicate the correct sequence to reverse a turn of 45 to 45
 - c) Indicate the correct sequence to recover from a high angle of attack and low air speed.
 - d) Indicate the correct sequence to recover from a spiral dive
-

An 85 kg pilot lends you (at 65 kg) his glider, what should be the performance differences in

- 1) Best l/D ratio?
- 2) Sink rate for the same indicated airspeed?
- 3) Indicted airspeed to achieve the best L/D ration is calm air?
- 4) Sink rate while flying at the minimum sink rate speed?

PARAGLIDING SPECIFIC QUESTIONS.

List the following Paraliding manoeuvres to answer the next questions:

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)

- a) Indicate the correct sequence to come out of a spin.
 - b) Indicate the correct sequence to reverse a turn of 45 to 45
 - c) Indicate the correct sequence to recover from a high angle of attack and low air speed. (in hg – BELOW stall (Mush) speed!)
 - d) Indicate the correct sequence to recover from a spiral dive
-

An 85 kg pilot lends you (at 65 kg) his Paraglider, what should be the performance differences in

- 1) Best l/D ratio?
- 2) Sink rate for the same indicated airspeed?
- 3) Indicted airspeed to achieve the best L/D ration is calm air?
- 4) Sink rate while flying at the minimum sink rate speed?

HANG GLIDING SPECIFIC QUESTIONS.. Cont...

In straight flight, while at best L/D ratio speed, should your Hang Glider's reflex bridle be tight?

During the pre-flight inspection you notice a broken thread on a lower side wire (flying wire); what do you do? One implies, here, a wire made out of seven strands each in turn comprising seven threads, i.e. 7 x 7.

Explain the changes in load factor and stall speed during a coordinated steep turn, control bar pushed out.

How would you qualify the stability of a hang glider that offers no bar pressure at any speed?

Where, on a hang glider, is it the least dangerous to use a tube just a little damaged, slightly bent for example?

During the pre-flight inspection you notice a tear in the trailing edge near a batten close to the root of the glider; what do you do?

During the pre-flight inspection you notice a 5 cm (two inch) tear on the leading edge less than a meter from the nose plate: what do you do?

If you wanted to modify your hang glider so as to fly seated or supine, how would you adjust the control bar?

What disadvantage is caused by tightening the sail and reducing twist?

What are the benefits of tightening the sail and reducing twist?

What is meant by "increasing the dihedral of a hang glider" ?

What phenomenon should you watch for as you approach uphill at a sloping landing field?

Given the aforementioned sloping landing field, would you prefer to land downhill with a slight headwind, or uphill with a light tail wind?

Given a glider of 150 square feet weighing 75 lbs with a wind loading of 1.5: what will be the apparent load on the harness straps during a 70 degree bank turn generating "3 G's" ?

Which pitch corrections are involved while reversing a 45 bank turn?

What causes a side slip in an unstalled turn?

Describe two ways to correct side slip in a turn.

Define washout in a hang glider.

What are the advantages of washout in hang glider design?

Calculate the wing loading of a 60 Lb hang glider, whose area is 175 square feet with a 150 pound pilot.

Positive dihedral enhances what flight characteristics?

Explain the increased lift caused by ground effect.

Describe the shifting of the centre of pressure at the exact moment of stall.

At what altitude does ground effect become noticeable?