



**GLIDING NEW ZEALAND INCORPORATED**

***ADVISORY CIRCULAR***  
***AC 2-03***

**PILOT EXAMINATIONS**

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## 1. Introduction

1.1 This Advisory Circular provides guidance on the following:

- Solo Pilot and Soaring Pilot Certificate and Daily Inspection Approval oral examinations.
- Cross-Country Pilot (XCP) written examinations<sup>§</sup>.

## 2. Oral Examinations

2.1 Oral examinations are used to test applicants for issue of the Solo Pilot and Soaring Pilot Certificates and Daily Inspection approvals. The examinations, and the way that they are conducted, ensure that the student has developed an acceptable level of knowledge and understanding of important issues relating to gliding and daily inspections.

2.2 The question bank and model answers for each of these examinations are to be freely available to students for study purposes. Those for the Solo Pilot and Soaring Pilot Certificates are included in this AC. Those for the Daily Inspection approval are included in AC 3-01 "Glider Daily Inspection". Both ACs are available at <http://gliding.co.nz>.

2.3 It is important that the student is able to understand the answers to ALL of the questions, not just those that the instructor selects. Therefore, before the oral examination, the instructor should:

- Ensure that the student has studied the question bank and the model answers.
- Invite the student to seek explanation or clarification on any questions and answers that they did not fully understand.

2.4 A GNZ instructor is to randomly select ten questions from each section. The student is to answer in a manner that shows understanding of the subjects questioned, in at least seven of the questions, to be eligible for a PASS in that section.

2.5 The instructor is to explain the correct answer for any question that the student has answered incorrectly or incompletely.

2.6 If the student fails to answer correctly seven questions out of 10, the instructor may continue to ask additional questions from the question bank until the instructor is satisfied that the student has demonstrated an adequate level of understanding. If the student is unable to do this, the instructor should insist that the student studies the question bank and model answers again before requesting a re-examination.

2.7 The GNZ instructor is to certify the PASS in the applicable form in use by the club for the purpose of recording students' progress. The Solo Pilot and Soaring Pilot Certificate syllabus sheets in the MOAP may be used for this purpose.

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<sup>§</sup> The XCP examination for radio & transponder procedures is covered separately in GNZ AC 2-11.

### **3. Written Examinations**

- 3.1 Written multi choice examinations are used to test applicants for the Cross-Country Pilot Certificate (XCP) and some other endorsements eg. for Motor Glider operations.
- 3.2 The question bank and answer sheets for sample (mock) examinations are to be freely available to students for study purposes. These are available at <http://training.gliding.co.nz> under “Getting to Cross Country Pilot” > “Study Course and Examinations.”
- 3.3 Chief Flying Instructors (CFIs) hold copies of the written examinations and the model answers. They are to ensure that these remain confidential. CFIs may obtain copies of the examinations and answer sheets from the National Operations Officer.
- 3.4 Form OPS 02 is an answer sheet for the student to mark the answers. It is available at <https://gliding.co.nz>.
- 3.5 Written examinations are to be conducted under “exam conditions”, ie. under the supervision of the CFI or delegated instructor and without assistance from other persons or reference to books or answers.
- 3.6 When the student has completed a written examination, the CFI should mark it immediately and explain all wrong answers to the student.
- 3.7 To achieve a PASS, the student must answer at least 70% of the questions correctly.
- 3.8 If the student fails to achieve 70% in any examination, the student is to be re-examined on that topic using a different set of examination questions if they are available.
- 3.9 The GNZ instructor is to certify the PASS in the OPS 02 answer sheet. The answer sheet is to be retained for three years.

#### 4. Oral Questions and Answers

Solo Pilot Certificate Questions and Answers on Basic Theory		
1	Why and what are you checking under “Ballast” in the Pre-Takeoff check?	To ensure the cockpit loading is within the minimum to maximum allowable weight range so that the glider is operated within its certified Centre of Gravity range. We check that if ballast weights are required, that the correct amount has been properly fitted and secured. If not required, we check that they are not fitted.
2	What happens to the glider’s stall speed in a turn?	It increases, because of the increase in effective weight due to an increase in the “G” loading.
3	What is the “Safe Speed Near the Ground” in a 10 knot breeze in your glider?	Stall speed for your glider at your weight, plus 50%, plus half the wind velocity, so for a glider that stalls at 38 knots, add 19 knots plus 5 knots and you get 62 knots as a safe speed in this example.
4	What is aileron drag, and how do you and the glider's designer compensate for it?	A down-going aileron causes an increase in induced drag, resulting in yaw away from the direction of intended turn. This is called adverse yaw. The most common fix designers use is differential ailerons that have more upward travel than downward travel. The pilot is still left with the task of ensuring sufficient rudder is applied in coordination with the aileron application when rolling into a turn.
5	Why is it important to clean the glider prior to flight?	Cleaning removes any surface irregularities like dust, bugs, dirt etc that will create unwanted airflow disturbances that reduce lift and increase drag (and increase the gliders stall speed). All of this reduces the lift/drag ratio and therefore, your glide performance.
6	What happens to the glider's stall speed with the brakes out?	It increases by 2 to 5 knots, depending on the type of glider and amount of brake extended.
7	What are the symptoms of the Basic Stall?	Slightly higher nose attitude than the normal glide, with reducing airspeed as a result; reducing control effectiveness, because of the reduced airflow over them; change in the sound of the airflow, usually getting quieter as the air flow around the cockpit reduces as speed reduces; light buffet as turbulent airflow separates from the wing and strikes the fuselage and tailplane surfaces.
8	What is the primary function of the airbrakes?	To control rate of descent, by increasing it when required such as when on approach or when needing to descend quickly.
9	How does airspeed affect control effectiveness and response?	As speed increases, control effectiveness increases. That is, for the same amount applied the response is greater, so less input is required to get the same response as that at a slower speed. The controls also feel heavier when applied at higher speed.
10	What force turns the glider?	Lift. When the glider is banked, using aileron to roll it, the lift force is tilted in the direction of the turn.

11	What affects the landing performance of a glider?	Approach speed flown; amount of airbrake used; wind strength and direction; airfield surface condition ie. grass short or long, wet or dry, ground hard or soft; tyre inflation; wheel braking.
12	What is adverse yaw and how is it corrected?	Yaw in the opposite direction to the intended direction of turn, caused by aileron drag. It is countered by the coordinated application of rudder and aileron when rolling into a turn.
13	What is "Induced Drag" and when is it greatest?	Drag induced whenever the wing is generating lift. It is greatest when at high angles of attack, ie at low speed or when "G" loading is applied.
14	What is the significance of the "Minimum Cockpit Load" for your glider?	This is the minimum load required in the front seat to keep the glider operating within its certified C of G range. If the loading is too light, the C of G will be aft of the limit and the glider may become difficult to control. Spin recovery may also be adversely affected.
15	What is the method of checking the glider is trimmed for flight?	Set an attitude for the speed you wish to be flying at, and then gently relax your grip on the control column. If there is any tendency for the nose to pitch up or down, you are not correctly trimmed.
16	What is the secondary effect of rudder?	Roll caused by the outer wing travelling faster than the inner wing.
17	What causes the pre stall buffet warning?	Turbulent air flow striking the rear of the wing and the fuselage and tail surfaces and buffeting them.
18	On a glider fitted with an elevator trim tab, which way will the tab move if the trim lever is moved forward?	Up. See a K-13 and some Grob 103's. Forward trim means you want to fly faster, so the trim tab moves up to force the elevator downwards to provide a nose down pitching moment.
19	If the glider's wing drops at the stall, what is the correct action on the part of the pilot?	Stick forward and use only enough rudder to prevent yaw.
20	What is the ground speed of a glider flying at 60 knots into a 10 knot headwind?	50 knots.
21	What are the 3 primary flight controls and the axis of movement they operate about?	Elevators pitch about the lateral axis. Ailerons roll about the longitudinal axis. Rudder yaws about the vertical axis.
22	What is the correct recovery action from a fully developed spin?	Apply full rudder opposite to the direction of rotation, move the control column forward with ailerons neutral until the glider stops spinning, then centralise rudder and recover from the dive.
23	What action is necessary to unstall a glider?	Reduce the angle of attack of the wing below the stalling angle, usually achieved by moving the control column forward.

24	What 3 forces act on the glider in flight?	Lift, Drag and Weight.
25	What is the difference between slip and skid?	Slip is a sideways motion towards the lowered wing while skid is the sideways motion towards the higher wing. If the wings are level, any sideways motion is skid.
26	Why does the glider want to over bank when set in a turn?	The outer wing is travelling faster, therefore generating more lift which tends to roll the glider further into the turn.
27	Why does the nose of the glider pitch down at the stall?	At the point of stall and beyond the critical angle of attack, the lift force acting through the centre of pressure of the wing reduces and moves aft. This change to the balance of forces acting on the wing has a net result of creating a nose down pitching moment.
28	Why is there a Maximum Aero Tow and a Maximum Winch Launch speed?	These speeds protect the glider from forces generated by higher speeds that could overstress the release attachment structure as well as the whole glider.
29	Why is it important not to pull a glider forwards or backwards by the wing tips?	Pulling from the tips places too much strain on the wing root fittings because of the long leverage.
30	Where is it safe to push and lift a glider when maneuvering it on the ground?	Check the Flight Manual, but in general, push on the nose and the leading edge of the wing near the wing root. Avoid pushing or pulling at the wing and tail tips and on any fabric surfaces.

### Solo Pilot Certificate Questions and Answers on Airmanship

1	What do you do if the rope does not detach when you try to release from tow?	Operate the release again; advise the tow plane by radio if you can; otherwise fly out to the left of the tow plane and rock your wing, await acknowledgment, then return to the normal tow position; expect to be released back near the airfield, over clear land in case the rope releases when released from the tug end; try releasing again to get rid of the rope once off tow; assume you still have the rope trailing unless positively advised of it having released and plan your final approach accordingly to clear obstructions.
2	What are the cloud base and visibility requirements for flight in Visual Meteorological Conditions (VMC) at your field?	At an uncontrolled airfield: 600 ft cloud ceiling and 1500 meter visibility. At a controlled airfield: 1500 ft cloud ceiling and 5 km visibility unless granted Special VFR in which case the requirements are to remain clear of clouds with at least a 600 ft ceiling and a visibility of 1500 meters.
3	Who gives way when two gliders are approaching each other head-on or on converging headings?	Head on: both gliders turn right. Converging: the glider that has the other on its right gives way.

4	What is the "clock code" and when is it used?	Imagine an analog clock face superimposed on the glider where ahead is 12 o'clock, the right wing is at 3 o'clock, the tail is at 6 o'clock and the left wing is at 9 o'clock. Use this to describe direction relative to the glider. Another glider off your right wing is in your 3 o'clock; a town in front of you is in your 12 o'clock. Add an estimated distance and a relative height ie. high, low or same level, to help describe the position relative to your position.
5	Where should your left hand be during take-off?	Lightly grasping the release knob.
6	What should you do if you are running out of height in the circuit?	Select a new aiming point that you can reach without getting too low and modify your circuit to land safely in the best available area.
7	How should the glider be left after a flight if no one is ready to fly it next?	Electrics off; air brakes held open, and canopy closed and locked; removed off the active vector and picketed securely if windy.
8	Who should stop a launch from proceeding?	Anyone who sees a potential hazard to the launch developing.
9	On which side does a glider overtake another glider when hill-soaring and at all other times?	When ridge soaring, overtake on the downwind side between the glider and the hillside. Pass between the glider and the ridge if at the same level or well clear above and below or to the upwind side if there is insufficient room to pass on the inside. At all other times, overtake on the right.
10	When doing the HASELL check prior to stalling, what do you check under the letter "A"?	"A" is for Airframe and you check the configuration you want for the particular stall you intend doing; particularly the position of flaps, brakes and undercarriage as required. Call the limiting speeds for full control deflection $V_a$ and never-exceed speed $V_{ne}$ .
11	Who establishes the direction of turn in a thermal?	The first glider in the thermal, unless local rules specify a direction as is often the case at a contest.
12	What are the vectors on your home field?	Determine these for your home field. Eg. Omarama is 09 / 27.
13	What is the recommended minimum length of rope to be used for ground towing a glider?	Slightly more than half the glider's wingspan; to ensure it cannot strike the tow vehicle if it swings out of control of the wing walker.
14	Why should you not rely on your altimeter to judge your height in the circuit?	The altimeter measures height above a set datum; usually above sea level. It does not measure height above the ground and is therefore of limited use in circuit height planning, particularly for outlandings.
15	What precautions should you take when cleaning a glider canopy?	Use a clean, soft cloth or moistened chamois, ensuring you do not have any hard particles that could scratch the canopy.

16	Why should you not fly when you have a head cold?	Any cold is likely to be accompanied by some infection and inflammation of the Eustachian tube and inner ear tissues which could be further irritated and damaged by the pressure changes that occur with flying even at low levels. The inner ear balance organs may also be adversely affected, and this could cause the pilot to become disoriented in flight.
17	Assuming that the glider is not taking off or landing, what is the minimum height to fly over a built-up area?	1000 ft above the surface or any obstacle within a horizontal radius from the glider of 600 metres.
18	What is the pilot's first priority immediately following a launch failure on a winch launch and an aerotow launch?	Winch launch: Lower the nose to attain "Safe Speed Near the Ground". Aerotow launch at low level: Raise the nose to convert excess speed to height but never fly slower than "Safe Speed Near the Ground".
19	What is the recommended minimum time from consuming alcohol to flying a glider?	12 hours.
20	What details of your glider flights do you have to log?	As per the GNZ Logbook; date, glider's registration, duration of flight, dual or solo, type of launch.
21	How do you check the serviceability of the tow rings prior to a launch?	Inspect for cracks visually and rattle to check for a jingle/ring. Feel for any cracks or damage and visually check that the ring shape is not distorted by previous overstress. Rotate the big ring through the rope to ensure any damage is not hidden by the rope.
22	What is the caution with self-medication and flying?	Generally a no-no, as most medications are for use on the ground and are not suitable for pilots as they dull the body's sensors used for orientation. Check any medication with an aviation qualified doctor ensuring that the doctor realises you want to fly as pilot in command and not just as a passenger.
23	What is the phonetic alphabet and how is it used for giving your glider's call-sign by radio?	Alpha, Bravo, Charlie, Delta..... Yankee, Zulu. For example ZK-GNX is "Golf November Xray".
24	Describe the procedure for handing over control of the glider when in flight.	The pilot who is flying says "You have control", waits for the other to place hands and feet on the controls and when hearing the other pilot say "I have control", lets go of the controls. If a pilot wants to take control from the other pilot, they say, "I have control" as they place hands and feet on the controls; then waits for the flying pilot to release control saying "You have control".
25	What are you checking under the "Straps" part of the Pre-Landing Checks?	Straps are prone to working loose in flight, partially as a result of your "settling" in the seat and partially from your movement working against them. On longer flights, loss of body weight may also cause them to be loose. Tightening them ensures your full protection on landing.



26	What are your actions if your speed is too slow on a winch launch?	Lower the nose and ask for more power on the radio. If the speed does not increase and the glider is not climbing, release.
27	What are your actions if you are, or look like, exceeding your glider's maximum launch speed on a winch launch?	Lower the nose and signal for less power, either on the radio or by yawing the glider from side to side to signal you are too fast. Release if the speed does not reduce, as long as you are at a safe altitude to do so.
28	What should you do if a vehicle drives out onto the area you had intended to land on when you are on final approach?	Close the brakes, if necessary, and re-establish an approach to a new aiming point in a clear area beyond the vehicle, then use the brakes again as required.
29	What should you do if the towplane gives you the Rudder Waggle signal?	Check your air brakes are closed; if open, close them ensuring you maintain the normal tow position.
30	What should you do before carrying out intentional stalling, spinning, or aerobatics?	Complete the Pre-Manoeuvre "HASELL" Checks; Height, Airframe, Security, Engine, Location and Lookout.

### Soaring Pilot Certificate Questions and Answers on Basic Theory

1	What is the difference between Indicated Air Speed (IAS) and Ground Speed?	Indicated Air Speed is the speed of the glider through the air as sensed and displayed by the instruments. Ground Speed is its speed relative to the ground. They are only the same in still air at sea level and at standard atmospheric conditions.
2	What happens to the rate of descent in a turn?	It increases because the increased lift required to turn raises the induced drag.
3	What is "Aspect Ratio" and why is it significant?	It is the ratio between the glider's span and the mean chord of the wing expressed as either span divided by the mean chord or more accurately, span squared divided by the wing area. High aspect ratio distinguishes glider wing design from that of power planes. It gives lower induced drag and therefore greater performance by having a smaller percentage of the wing affected by airflow leaking around the wing tip from the higher pressure below the wing to the reduced pressure above it.
4	What is "Laminar Flow"?	Laminar flow is the smooth, streamlined flow of air over the glider's surface that gives low drag characteristics compared to turbulent or separated flow that has high drag values.
5	A glider always stalls at the same what?	Angle of attack... known as the critical angle.
6	What effect will slip have on the stall speed?	Increases it as the lift generated by the wing is reduced due to the sideways component of the flow of the air making the wing less efficient on the upwind side and partially blanketed by the fuselage on the downwind side.
7	How do you recognise a spiral dive from a spin, why is it particularly dangerous, and how do you recover from a spiral dive?	In a spiral dive, speed will be increasing but in a spin it remains low; the controls will feel heavier due to the increasing speed in the spiral but in the spin, they remain light; G will be increasing in the spiral but in the spin it will remain about 1G.
8	What is "lateral damping"?	This is the tendency of the wing to resist movement in roll, caused by the increased angle of attack generating more lift on the down going wing.
9	What effect do rain drops have on a wing and what action do you take to compensate?	Rain drops disrupt laminar flow, reducing lift and increasing drag as well as increasing the glider's weight... albeit only fractionally. All this reduces the glider's performance and increases the stalling speed in all configurations. So, avoid getting wet where possible and if you get wet, fly a couple of knots faster to keep a safe margin above the stall and plan / allow for an increased rate of descent/reduced glide performance especially in the circuit.
10	How much control can you use at the placarded Manoeuvring Speed ( $V_A$ )?	Full control... but common sense says be kind to your glider and only use as much as you have to.

11	What is the significance of the gliders Minimum Sink speed?	This is the speed at which the glider's rate of descent is least so at this speed it will stay up longest for any given height started from. Usually it is a couple of knots above the stall speed and below the best L/D speed.
12	Define "Wing Loading". Why is it significant?	The glider's weight divided by the wing area. Low wing loading gives a low-speed handling advantage and good climb performance in weak conditions while high wing loading gives good high speed performance as this increases the speed for the best gliding angle. Wing loading is varied by carriage of ballast, heavier pilots or a flap system that changes wing area.
13	How does True Air Speed (TAS) differ from Indicated Air Speed (IAS)?	True Air Speed is the actual speed at which the glider is travelling through the air and this increases compared to IAS as altitude increases This is due to the reduction in temperature, pressure and density progressively reducing the pitot pressure that the ASI is sensing despite it going through the air at the same speed.
14	What kind of stability does a glider have in the yawing plane?	It has positive directional stability evidenced by it tending to return to its original heading when it is yawed.
15	How does the yaw string work?	It responds directly to the flow of air over the canopy, and this is indicative of the airflow over the wing which ideally is from leading edge directly aft and not at some angle which would indicate a slip or skid through the air, both of which reduce the glider's L/D or efficiency. If the string is deflected, it can be used as a pointer to the rudder that needs to be applied.
16	How much does the stall speed increase by in a 60 degree banked turn?	The increase is a function of the increased load factor, or "G" which for this angle of bank is 2G. Lift is proportional to the square of the speed, so in this case the stall speed is increased by the square root of 2, which is 1.414, ie an increase of around 40 %. For a basic stall speed of 38 kt, it increases to 54 kt.
17	How do the symptoms of an approaching stall with the brakes out differ from those of the basic stall?	There may well be buffet from the turbulent flow behind the brakes which could be mistakenly dismissed as being the cause of what is actually pre stall buffet as the stall is approached.
18	Where do you set the Trim when doing the Pre-Take-off checks?	Set it for the speed expected during the launch once airborne. Thereafter, trimming is a continual task to be accomplished after the desired speed is to be altered.
19	How can gusts stall the glider?	Localised gusts from turbulent air, thermals and ridge lift can increase the angle of attack of part or all of the wing, exceeding the critical angle of attack and causing it to stall.
20	What are "Speed Limiting Airbrakes"?	Speed limiting brakes will not allow a glider to exceed its maximum permitted speed. Most modern gliders are only certified as capable of achieving this in up to 45 degree dives. It is wise to consult the Flight Manual for details for your glider type.

21	What contributes to the Profile Drag of a glider?	Everything that is protruding into the airflow or that creates a disturbance to the laminar flow, such as wheels, aerals, gaps and joints, and air intakes.
22	What is "auto rotation"?	When one wing stalls before the other, it drops (or rolls) which further increases the angle of attack putting it deeper into the stall and reducing the amount of lift being produced, while the opposite is happening on the other wing... its angle of attack is reduced so it is still producing lift and aiding the roll ... hence the auto rotation... it is self-sustaining.
23	The longer a glider has been spinning, the longer it will take to recover. True or False?	True. The longer it is spinning, the more fully established or stable it has become. It is important that the full and correct recovery action is taken. If the glider is being flown outside its correct C of G range, it might not recover from a stable fully developed spin.
24	Why is rudder the first recovery control input for a spin?	Yaw is the driving force in a spin, so rudder is applied to reduce the yaw as quickly as possible. Applying it first also ensures it is not blanketed by any movement of the elevator which with some tail configurations can reduce the rudder's effectiveness.
25	How do you get reduced or negative G in a glider?	By pushing the control column forward. It commonly occurs during stall recovery and recovery from cable breaks during wire launching.
26	What are the hazards of flying with a cockpit weight above the maximum allowed?	It will mean the glider is nose heavy so you may run out of aft elevator authority which could lead to a heavy landing. It may also mean you cannot fly at the slower speeds needed to climb the glider in weak lift. Your L/D will be reduced due to the extra drag caused by having an extra downforce on the elevator to maintain the correct flying attitude.
27	How does wind gradient differ from wind shear?	Wind gradient is the gradual change of wind speed with height, caused by surface friction between the ground and the air. Wind shear is the rapid change of strength and/or wind direction with height. Combinations of the two are common in windy conditions in NZ.
28	What determines the amount of sideslip a glider is capable of?	The size of the rudder compared to the area of the fuselage and fin.
29	What is a "stabilised approach"?	This is the desired approach from which good landings are made! It is achieved when the glider is heading in the right direction to get to the aiming point and is maintaining the desired speed and rate of descent.
30	Why is it dangerous to bank steeply near the ground in windy conditions?	The wing is likely to be spanning a wind gradient so the upper wing will be in faster air than the lower wing. When turning into wind, this will cause the glider to over bank and vice versa when turning downwind. This effect could be beyond the pilot's ability to prevent, and lead to a crash.

31	Is the full load carried by the wing during a winch launch felt as G by the pilot?	No... and this is the danger of going too fast and pulling too hard, because the pilot does not feel the extra load but the wings sure do!
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<b>Soaring Pilot Certificate Questions and Answers on Airmanship</b>		
1	Who has priority, a glider taking off or a powered aircraft landing?	The powered aircraft landing. Any aircraft landing has priority over an aircraft taking off.
2	If you have a choice, on what side of the airfield would you do your circuit in a strong crosswind. Why?	Circuit on the downwind side because this makes your base and final turn more into wind. You will have a slower groundspeed on base and are less likely to overshoot on the base and final turn, thereby avoiding an undesirably steep turn onto finals.
3	Shortly after takeoff, the towplane rocks its wings. What do you do?	Release immediately.
4	What is "sling-shooting off tow"? Why is it so dangerous?	Sling shooting describes the manoeuvre where the glider uses the towplane, much like a water skier uses a boat, to accelerate and gain height at the release point. It is highly dangerous because it can cause a towplane upset.
5	What is "thermalling etiquette"?	Rules of the air, courtesy and common-sense advice on how to fly with others when thermalling in the same area of sky. It includes things like keep a good look out, circle in the same direction, avoid flying in another glider's blind spot, try to have the same centre of turn, overtake safely, avoid abrupt changes in pitch and direction, don't be aggressive.
6	You decide to abandon the launch because you have not turned the barograph on. What do you do first?	Pull the tow release before doing anything else.
7	Who is responsible for checking the tail dolly has been removed prior to launching?	The pilot in command. This is best checked when walking out to the glider. It should also be checked by the wing runner prior to giving the "take up slack" signal.
8	What are common causes of checks being missed prior to take-off?	Distraction and interruption. If you have been distracted or interrupted, do the checks again. Always say them out loud so that everyone knows you are doing them and that they should not interrupt or distract you.
9	How long should you wait before flying after donating blood?	24 hours is the recommended recovery time.
10	Above what altitude must oxygen be carried and used?	Oxygen must be available for use when operating above 10,000 ft above mean sea level. You may fly up to 13,000 ft AMSL for 30 minutes without using oxygen if it is available, but you must use it if you are between 10,000ft and 13,000 ft for more than 30 minutes, and at all times you are above 13,000 ft.

11	Who has right of way: a glider on finals or a glider about to launch?	The glider on finals. Landing aircraft have right of way over aircraft taking off. However, if the launch can be accomplished without hindering the approach of the glider, then it is safe for it to proceed and in many instances may well free up more options for the landing glider. This is a matter of judgment for the wing runner.
12	Who do you report a gliding accident to?	CAA must be notified via phone to the 24-hour number 0508 ACCIDENT. The Police need to be advised of any injury or property damage. The club CFI and President need to know for insurance purposes and any further action required by club rules and the GNZ MOAP.
13	Who can give permission to shift or recover a damaged glider?	CAA
14	What is the "break-off point"?	This is the point at which upper air exercises or searching for lift are terminated and full commitment is made to joining the circuit for the approach and landing.
15	What cautions are necessary when thermalling downwind of the airfield?	Be careful not to drift too far downwind and preclude your ability to do a full circuit to your intended landing place.
16	How much height do you think will be lost if you stall and do one turn of a spin in your glider?	Most gliders will lose between 300 ft and 500 ft in one turn of a spin. This is often masked when practiced at altitude because of a lack of close reference and the lag in the altimeter, which does not accurately show how low you went during the recovery prior to converting speed back to height. If you spin off your turn onto finals, you will hit the ground before you can recover height!
17	Above what height above ground must all intentional stalling be completed?	1000 ft. Note that intentional spinning must be conducted so that the lowest point in recovery is at least 1000 feet above the ground.
18	What is required before conducting solo aerobatics?	Completion of a ground and a flight-training course and demonstrated competency in aerobatics through the issue of an aerobatic rating.
19	What should you do if you find the airbrakes jam open when in the circuit?	Modify your circuit by turning in early to ensure the steeper approach will still reach a safe point on the landing area and maintain a higher approach speed to ensure you have energy to flare the glider prior to touch down.
20	How close can you fly to the ground when ridge soaring?	You may legally fly below 500 ft above ground so long as it does not hazard persons or property on the ground. Common sense says you must have sufficient height to manoeuvre clear of terrain and also a safety margin for any unexpected gusts and down draughts that may cause a sudden loss of height.

21	Outside controlled airspace, at 2000 ft, how close to cloud can you legally fly?	VFR rules require you to remain clear of cloud and in sight of ground or water and have an inflight visibility of 5 km.
22	If you see a potentially dangerous practice while gliding, what should you do about it?	Advise those concerned or if you feel this is not going to be effective, the CFI or another similarly responsible club official. To do or say nothing merely condones it.
23	What are the dangers of tail sliding in a glider? When can it occur?	A tail slide occurs when the glider flies backwards through the air. This can happen if the glider is zoomed up to near the vertical and held there until it stalls and drops. The airflow from behind then strikes the wing and control surfaces from their trailing edges and this causes them to rapidly deflect to their stops unless tightly restrained by the pilot. Damage to controls is common when this manoeuvre is done unintentionally.
24	What should you do if the canopy comes open during your launch?	Keep flying the glider... it will fly with the canopy open... even if it is a bit breezy! If just airborne, release and land ahead. If later in the launch, continue to a safe height then release. Whatever you do, don't let go of the stick when on tow. Once off tow, try and close the canopy. A bit of rudder to skid towards the canopy may help the airflow assist with closing it. If you can't close it, allow for the increased drag and subsequent increase in stall speed when planning your circuit and landing. Be mindful of possible damage to the tail area if the canopy comes off and strikes this area. Consider jettisoning the canopy if you think this will reduce any danger posed by having it open and flailing around.
25	Who is responsibility for deciding whether to launch; the glider pilot or the tow pilot?	The tow pilot is responsible for the combination of glider and tug. If they say it is not suitable to launch, respect their judgment and stay on the ground. Nevertheless, the glider pilot is responsible for aborting the launch by operating the tow release at any time they believe a launch should be aborted.
26	Where do you find out how to rig and de-rig your glider?	In the glider's Flight Manual. It is unwise to rely only on the advice of other people.
27	What precautions do you take if flying in rain?	Rain drops disrupt laminar flow, reducing lift and increasing drag as well as increasing the glider's weight... albeit only fractionally. All this reduces the glider's performance and increases the stalling speed in all configurations. Water may also get into the pitot-static system so be alert for instrument failures. So, avoid getting wet where possible and if you get wet, fly a couple of knots faster to keep a safe margin above the stall and plan / allow for an increased rate of descent and reduced glide performance especially in the circuit.
28	What should you do if you consider you are high in the circuit?	Adjust the circuit pattern by turning wider downwind; use airbrake to descend back on to the correct circuit profile; delay the turn on to base leg but do not go too far downwind; fly a longer base leg;

		overfly the final turn position and then turn back to the final point; use S turns both down wind and on base leg; shift your aim point up the field... or any combination of these. The earlier you fix the problem the better.
29	By what distances should you clear obstructions and other aircraft when landing?	Common sense says at least 50 ft over the top of a parked glider or obstruction and a wingspan to the side if passing them on the ground.
30	What are the errors of the ASI?	The errors of the ASI are minimal and generally insignificant in normal flight. It may suffer a small error at low speeds due to the position of the static ports. There is a small degree of lag due to instrument error (friction within the mechanism) but the apparent lag in the reading is due mainly to the inertia of the glider and the fact that it takes time to accelerate when the attitude is changed. At altitude, the instrument fails to compensate for changes in temperature, pressure and air density so it under-reads the true air speed of the glider through the air. For each 6500ft of altitude, the error is about 10%. So at 6500ft, a 60 kt ASI reading is a 66kt true airspeed.

#### **Soaring Pilot Certificate Questions and Answers on Airworthiness**

1	Why is it necessary to report any landing suspected of being heavier than normal?	You may have damaged the structure without realising it. An engineer is trained to look for signs of damage that may be progressive in nature, ie. set to fail at a later stage if not rectified.
2	Where should you look to find the glider's maximum weak link strength?	In the glider's Flight Manual. It should be placarded in the cockpit and is sometimes also placarded by the release hook.
3	Why is loose tape on a control surface dangerous?	Loose tape will disturb the airflow behind it and make the control surface less effective. In extreme cases, it has caused control blanketing with associated handling problems. It can also work into a position where it can restrict or jam a control. It may also set up an unnerving vibration through the controls and a high-pitched whistling sound.
4	What effect does a deflated tyre have on the glider's performance?	None once airborne... but it will slow take off acceleration and delay lift off, thereby lengthening the takeoff distance. On landing, it will slow the glider quicker but reduce the vertical energy absorption that an inflated wheel provides. When braking, it is more prone to tube rotation and subsequent tyre assembly damage.
5	Why is a weak link fitted to a winch cable?	The weak link is designed to protect the glider's structure from excessive loads during the launch.
6	On aero tow, which end of the rope has the weak link?	The tow plane end.



7	What happens if the static vents are blocked?	The instruments that use a static pressure reading will be in error. They are the ASI, Altimeter and the Varios.
8	Why must a duplicate check be performed after rigging a glider?	To ensure that the glider is correctly rigged and that all controls are connected and functioning correctly. Fatal accidents can result from incorrect rigging and control connection.
9	How do you check that the controls of a glider are correctly connected?	Have someone hold the control surface gently and then apply a control movement in both directions to the full travel of the control, ensuring the response at the control surface is appropriate to the stick input.
10	When checking a back release, at approximately what downward angle should the rope or cable automatically release?	It should release when it is at right angles to the fuselage. It should not have to be pulled aft. If it needs to be pulled aft or is excessively tight, there may be something wrong with the release mechanism.
11	Why is it important not to pull gliders forwards or backwards by the wing tips?	Pulling from the tips places too much strain on the wing root fittings because of the long leverage. This can cause damage.
12	Why are loose articles on the storage shelf of a glider dangerous?	Any loose articles in a glider are a hazard, particularly in turbulence or in sudden decelerations. In both cases, even small objects may be accelerated and strike the glider's structure or the pilot with serious consequences. Pilots have been killed by batteries coming loose and striking them in the head during accidents.
13	What is FOD and why is it dangerous?	Foreign Object Damage; a term that describes damage from any undesirable loose article in an aircraft that subsequently causes damage either directly or indirectly. An example of indirect damage is something like a coin or a small tool that is left in a glider that works its way into the control mechanism and jams the flight controls, leading to a crash. We all need to do our bit in ensuring that foreign objects are not left in the gliders we fix or fly.
14	How do you check rudder cables for serviceability?	Slowly run your fingers along a cable; if there is any fraying, you will be pricked in the finger! Ouch!! Be sure to check around the likely fray zones; where cables run through holes or around pulleys, or where they exit from the "S tubes" at the rudder pedals.
15	Why does the glider have a maximum rough air speed (bottom of the yellow arc on the ASI)?	Up to $V_{RA}$ a strong gust will stall the glider before it over stresses it; beyond it, you risk structural overload and failure.
16	What is the minimum recommended length for an aerotow tow rope?	Fifty meters is the recommended minimum. This is a length that reduces the chance of tow upsets while maintaining ease of handling on tow. By starting with a longer rope, you can cut it and still be over 50 m in the event of a knot being impossible to undo. In specific situations when retrieving gliders, it is an acceptable

		practice to deliberately knot the rope of a very long rope to reduce its length, thereby increasing the takeoff run available to the tow plane.
17	What causes gelcoat cracking on fibreglass gliders?	The gelcoat is a protective layer of coloured polyester resin on the surface of the fibreglass cloth and epoxy resin. Polyester is more brittle and has a different coefficient of expansion to the material underneath it so suffers different stresses to the main structure. The small cracks appear around localised stress points during routine flight loads but are accelerated by extremes of temperature and in-flight loads and combinations of the two.
18	Is it okay to land with the gear up to shorten the landing roll in a short paddock?	No. The manufacturer intends the glider to be landed gear down, and the safety of the cockpit structure and its role in protecting the pilot from injury during even normal landing loads is lost with the gear up. With the gear down and the wheel brake operational, there should be ample braking available.
19	Where is it safe to push and lift a glider when maneuvering it on the ground?	Check the Flight Manual but in general, push on the nose and the leading edge of the wing near the wing root using the flat of the open hand rather than the finger tips. Avoid pushing or pulling at the wing and tail tips and on any fabric surfaces.
20	Why is it important to seal the joint between the wing and fuselage with tape?	Sealing of joints prevents air spilling from the fuselage out over the wing and from below the wing to the top of the wing... all of which would increase drag.
21	How does the canopy jettison system work in your glider?	Check your Flight Manual and know how many handles or levers need to be operated, where they are located, and their sequence of operation. Can you do it with your eyes closed?
22	What is "control bonding" and why is it done?	A small strip of braided cable is commonly attached between the metal components of control systems to allow complete electrical bonding. This helps prevent electrical potential differences within the aircraft and damage in the event of a lightning strike.
23	What do you need to check when looking at a glider's documents?	Check that all documents are for the glider they are in. There must be a DI Book & Tech-Log with Certificate of Release to Service (blue page); an Airworthiness Certificate; and a Flight Manual with CAA Form 2129 Radio Station Approval and CAA Form 2173 Weight and Balance Data. (However, if all of the placards necessary for safe operation are visible to you in the cockpit then the Flight Manual need not be carried.) Before each day's flying, the Tech-Log and Release to Service must be checked to ensure that no inspections are overdue and a daily

		inspection (DI) carried out and certified by a person so authorised in accordance with the MOAP and AC 3-01.
24	Does the compass need to be serviceable for flight?	Yes. It is legally required even for VFR flight.
25	What should you do if you find a small hole in the fabric, or a star craze impact mark in the gelcoat, or a dent or tear in the metal skin cladding behind the main wheel?	Contact an engineer and have it checked. It may be repaired with a temporary patch, but this needs to be authorised by an engineer.
26	What might cause one wing to stall before another?	Of course, in a turn, the inner wing will stall first due to it flying slower than the outer wing. But if this tends to happen on your glider in straight and level stalls, it could indicate damage to the wing surface, a dirty wing surface, one wing rigged at a different angle of incidence to the other, or one wing heavier than the other. All these conditions will require some aileron input to achieve a wings level stall.
27	Is it acceptable to do an aerotow launch using a towrope that has a knot in it?	Normally NO, as the rope is weakened by any knot. However, in specific situations when retrieving gliders from paddocks with long ropes, it is an acceptable practice to deliberately knot the rope to reduce its length, thereby increasing the takeoff run available to the tow plane.
28	What is a Deviation Card and how do you use it?	Deviation is a measure of the error in the compass between the real magnetic heading of the glider and compass heading during flight with all normal instruments and radio equipment turned on. The Cardinal headings are recorded on a card alongside the compass heading to fly to achieve them. The card is required to be fitted in the cockpit within view of the pilot.
29	What loads act on the main spar rigging pins in flight?	Shear loads.
30	What is a pitot tube? What does it do?	The pitot tube is a metal tube open directly into the airflow, which provides the instruments with a source of direct pressure caused by airflow. This tube may be mounted in the nose or projecting forward from the vertical tail fin. It can be recognised from the static or venturi tubes by having a single clear hole facing forward.