Self-Test Questions and Answers for Instructor Candidates

Instructing is a serious task, which demands a high level of knowledge, skill and personal integrity. It is not for everyone, but for those who choose to do it, instructing is very satisfying and rewarding.

Skill as a soaring pilot does not necessarily translate into skill as a gliding instructor. Some people have the good fortune to be skilled in both areas, but for most of us it is a struggle to balance the two in such a way as to enjoy our sport at the same time as imparting knowledge to others who wish to learn.

The practical skill aspect of an instructor is imparted and honed during the pre-flight, airborne and post-flight training sessions. This attribute is of paramount importance.

To complement this development of practical instructional skill, a reasonable theoretical knowledge also has to be assured. The instructor candidate's own initiative is relied upon to do the necessary study and this self-test questionnaire is designed to assist to this end.

As practical instructor-training progresses, work through this questionnaire at your own pace. Do it on an "open book" basis, as the objective is to ensure a good standard of knowledge, not to conduct a strictly supervised academic examination.

Reference documents you will need for this questionnaire are as follows :-

- GFA Operations Manual, October, 1994 issue.
- GFA Instructor's Handbook. April 1993, edition, and the associated Flight Reference Cards.
- Basic Gliding Knowledge, fourth (1996) edition.
- Daily Inspector's Handbook, January 1994 or May 1996 editions.
- Airspace and Radio Procedures for Glider Pilots, May 1996 edition.
- FAI Sporting Code, Section 3, Class D (gliders) and DM (powered sailplanes).

The above publications are available from the GFA Secretariat or GFA Sales.

The questions start by revisiting some basic areas of air legislation, basic theory, meteorology, navigation, sporting and airworthiness. However, pilots working through this questionnaire are aiming to become Level 1 instructors, in other words entering the world of instructing for the first time. Therefore the main emphasis will be on the differences between being a pilot and becoming an instructor.

The answers to the questions are included here. Wherever possible, the appropriate reference in the above-listed publications is provided in brackets after the answer, or in some cases the answer refers the candidate directly back to the appropriate publication.

As a quality-assurance check, new instructors may be asked some of these questions by a Level 3 Instructor during the final rating test. Holders of current instructor ratings may also be questioned on some of them by their CFI during biennial revalidation. However, it is stressed that the main point of setting the questionnaire is to ensure that the student pilot who will eventually be using your services as an instructor will be well served by a pilot who has a good balance of practical ability and theoretical knowledge.

FLIGHT RULES AND PROCEDURES
FLIGHT RULES AND PROCEDURES - ANSWERS
BASIC THEORY

BASIC THEORY - ANSWERS
METEOROLOGY
METEOROLOGY - ANSWERS
NAVIGATION
NAVIGATION - ANSWERS
AIRWORTHINESS
AIRWORTHINESS - ANSWERS
SPORTING CODE REQUIREMENTS
SPORTING CODE REQUIREMENTS - ANSWERS
INSTRUCTING THEORY AND PRACTICE
INSTRUCTING THEORY AND PRACTICE - ANSWERS

---

1. What in-flight visibility is required to maintain legal flight under the Visual Flight Rules (a) below 10,000 ft, (b) above 10,000 ft?
2. Who has right of way on a shared runway, a glider taking off or a powered aircraft landing?
3. Is it legal for a glider not fitted with a radio to operate in a Common Traffic Advisory Frequency (CTAF) area?
4. If a glider is fitted with a serviceable radio and the pilot wishes to operate in a CTAF area, is it legal to switch off the radio and operate as a non-radio aircraft?
5. (a) What radio call would a glider pilot make on entry to a Mandatory Broadcast Zone (MBZ)?
   (b) Can a glider enter such a zone if it does not carry a radio?
6. Is it legal to carry out thermalling turns below 1,500 ft on the active side of the circuit at a licensed aerodrome?
7. If a glider pilot on a cross-country flight approaches within 5NM of an uncontrolled licensed aerodrome which is known to be serviced by Regular Public Transport aircraft, what action is the glider pilot expected to take?
8. If two gliders are approaching each other head on, what action does each pilot take?
9. On which charts are gliding sites shown? How are they depicted?
10. What is the document in which the exemptions against certain Civil Aviation Regulations granted to glider pilots are listed?
11. When joining the circuit, what is the minimum number of legs of a circuit which are required to be carried out to comply with the Civil Aviation Regulations and GFA Operational Regulations.
12. What is the difference between the expressions "height", "altitude" and "flight level"?
13. What setting should be on the altimeter sub-scale when a glider flies above 10,000 ft?
14. What is the international VHF distress frequency?
15. What action is a Duty Instructor expected to take if one of the club's gliders has not returned from a cross-country flight and its whereabouts are unknown?
16. Is an instructor automatically allowed to act as pilot-in-command of a charter flight without holding a Charter Rating?
17. Is there a lower height restriction for hill-soaring? If so, what is it?
18. What is the minimum "badge" qualification for Independent Operator authorisation? Can this be waived?
19. Define the terms "accident" and "incident".
20. How soon after its occurrence must an accident be reported to the Bureau of Air Safety Investigation (BASI)? Who else needs to be notified as well as BASI?
21. Who is the pilot-in-command of a glider/tug combination?
22. What is the minimum height above ground for completing aerobatic manoeuvres (including spins)?
23. Is a Level 1 Instructor authorised to take charge of a day's gliding operations?
24. What are the biennial revalidation requirements to retain a Level 1 Instructor rating?

25. Who is authorised to carry out training and examining of pilots for a GFA Radio Operator's authorisation and to make the appropriate logbook endorsement?
26. Is it necessary to hold the above logbook endorsement for using the gliding frequencies?
27. What are the medical requirements for (a) solo pilots, (b) instructors, (c) charter pilots?
28. What are the pilot experience requirements for upgrading from Level 1 Instructor to Level 2 Instructor?
29. Which seat should be occupied by the command pilot on a mutual flight?
30. What does the expression "flight level" mean?
31. What rating or endorsement is required to operate a VHF radio in a glider (a) on the specially allocated gliding frequencies, (b) on other frequencies in the aeronautical band?
32. What is the likely range of a VHF radio with a good battery from 5,000ft AGL?
33. When broadcasting on the radio, which comes first, the station calling or the station being called?
34. What are the meanings of the following expressions used on the radio - (a) Affirm, (b) Roger, (c) Acknowledge, (d) Break?
35. Is it mandatory for a glider to carry and use VHF radio above 5,000ft QNH outside controlled airspace?
36. Are gliders permitted to fly in (a) Prohibited, (b) Restricted and (c) Danger areas?

---

1. (a) Below 10,000 ft, horizontal distance from cloud, 1500 metres. Vertical distance from cloud, 1000 ft above and 500 ft below. In-flight visibility 5 km. (b) Above 10,000 ft, horizontal and vertical distances from cloud, same as below 10,000 ft. In-flight visibility 8 km. The difference reflects the fact that powered aircraft are subject to speed restriction below 10,000 ft, but are unrestricted above that level. (Airways and Radio Procedures for Glider Pilots).
2. ANY aircraft landing has right of way over an aircraft taking off (GFA Op Reg 8.17).
3. Yes (MOSP Part 2, Section 24.1.3).
4. No (MOSP Part 2, Section 24.1.3).
5. (a) An "all stations" call, announcing position and intentions. For example "all stations Mildura MBZ, glider Golf Tango Foxtrot is one-fife miles southwest of Mildura aerodrome, at four thousand, tracking direct to Mildura gliding field". Then listen out on the MBZ frequency and respond to any relevant calls (MOSP Part 2, Section 24.1.3).
   (b) No. The word "mandatory" means what it says.
6. Yes, provided the glider is fitted with radio and the pilot is monitoring the MBZ/CTAF frequency (Appendix to MOSP, FOI 21-2, Section 3.5). Note: The active side of the circuit is often known as the "live" side.
7. If radio-equipped, make an "all stations" call. If not radio-equipped, remain clear of the circuit area (GFA Op Reg 6.2.5).
8. Both turn right (GFA Op Reg 8.15).
9. They are shown on "ERC Low" (En-route charts, low-level), available from the CAA publications branch. They are depicted by a double red cross, accompanied by a red "W" symbol if wire-launching is used at that site.
10. Civil Aviation Order (CAO) 95.4, a copy of which will be found in the GFA Operations Manual.
11. Three (downwind, base, final). Refer GFA Op Reg 8.25, which amounts to the same thing.
12. Height is indicated when QFE is set on the altimeter. Altitude is indicated when QNH is set. Flight level when standard pressure setting is set. (Airways and Radio Procedures for Glider Pilots).
13. Standard pressure setting, 1013.2 Hpa. (As question 12).
14. 121.5 Mhz.
15. Obtain the pilot's flight details from the ground-crew supporting the flight. This determines the intended track and most likely search area. Make any radio calls

(including sending the tug up to a considerable height above the home field in an attempt to establish line-of-sight radio contact with the glider. If no joy of any description by 9pm local time, initiate SAR action by telephoning 1800 815 257 and explaining the situation to the Duty Officer at the Rescue Coordination Centre (Airways and Radio Procedures for Glider Pilots).

16. No, a separate charter rating is required (GFA Op Reg 6.3.3 (a)).
17. A glider may hill-soar at any height without restriction, except when within 100 metres of any person, dwelling or public road, when it shall maintain a height of at least 100 feet. (GFA Op Reg 8.12).
18. Silver C (MOSP Part 2, Section 18.1). A waiver may be granted by RTO/Ops in certain circumstances.
19. An accident is an occurrence associated with the operation of an aircraft in which:
    Any person suffers death or serious injury.
    The aircraft incurs substantial damage or structural failure.
    The aircraft is missing or inaccessible.
    An incident is an occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of operation (Airways and Radio Procedures for Glider Pilots).
20. An accident must by law be reported to BASI with the minimum possible delay. An incident must be reported within 48 hours of its occurrence. The RTO/Ops must also be notified of accidents and incidents (Airways and Radio Procedures for Glider Pilots).
21. The tug-pilot (MOSP Part 2, Section 22.2.4).
22. 1,000 feet AGL, except that aerobatic manoeuvres carried out within 2NM of the aerodrome reference point of a licensed aerodrome must be completed by 2,000 feet AGL (GFA Op Reg 8.8).
23. No (MOSP Part 2, Section 16.1.2.1).
24. 40 hours or 150 launches in the two year period, of which 20 hours or 60 launches must be instructing. Of this total, at least 5 hours or 25 launches must be in the six months prior to revalidation (MOSP Part 2, Section 16.1.2.1).
25. Any Level 1 or higher rated instructor who holds either a Flight Radiotelephone Operator's endorsement or a GFA logbook endorsement to operate a radio (MOSP Part 2, Section 24.3).
26. No (MOSP Part 2, section 24.2.1).
27. Medical requirements are as follows :-
    (a) Solo pilots must sign a medical declaration that they do not suffer from specified afflictions, this declaration remaining in force for as long as the medical status remains unchanged.
    (b) Instructors do not need to sign a separate declaration from the one in (a) above.
    (c) The medical declaration for a charter pilot is valid for two years in respect of a pilot aged over 40, and four years in respect of a pilot under the age of 40 (GFA Op Reg 5.2).
28. 100 hours total gliding, with credits for power flying of 10% of power flying hours after 10 hours gliding (or 50 launches) has been gained. Silver C, with the proviso that RTO/Ops may grant a waiver against this requirement if the instructor comes from a club which cannot carry out cross-country flying (MOSP Part 2, 16.1.2.2).
29. Any seat, as agreed by the occupants of the glider and authorised by the Duty Instructor. There is no designated command seat, this being decided on a practical basis, for example some tandem two-seaters lacking certain ancillary controls in the rear cockpit.
30. The height reading on an altimeter with 1013.2 Hpa set on the sub-scale. Note that flight levels are reported in a particular way, for example 15,000 ft is reported as FL150 (Flight Level one-five-zero). (MOSP Part 2, Glossary of Terms).
31. (a) No specific rating or endorsement is required to operate a radio on the designated gliding frequencies. (b) a Flight Radiotelephone Operator's licence or GFA Radio Operator logbook endorsement is required to operate a radio on other frequencies in the aeronautical band (MOSP Part 2, Section 24).
32. 160 km (Airways and Radio Procedures, page 5).
33. The station being called (Airways and Radio Procedures, page 6).

34. (a) Short for "affirmative". Do not use the word "yes". (b) Message received and understood. (c) This means you definitely want an acknowledgment. (d) This is used when you want to call another station immediately following your present call and you want to do it without releasing the transmit button (Airways and Radio Procedures, page 7).
35. No (GFA Op Reg 6.4.9).
36. (a) No, not under any circumstances. (b) Yes. Outside the hours of activation of the area, flight is permitted without a clearance. Within the hours of activation, flight is permitted only with a clearance. (c) Yes, without a clearance, but be warned that a higher than normal risk is implied in this area. (Airways and Radio Procedures for Glider Pilots, page 3).

---

1. What happens to lift and induced drag when the angle of attack of the wing is increased?
2. In what proportion do profile and induced drag increase with an increase in speed?
3. What is the name of the speed at which total drag is at a minimum?
4. What is the primary turning control?
5. Why is it necessary to apply a certain amount of back stick in a turn?
6. What is the difference between rough air speed and manoeuvre speed?
7. What is Vne?
8. Why must Vne be reduced with an increase in height? In the absence of placarded information, by how much would you reduce Vne with height?
9. What happens to the stall speed with a forward movement in centre of gravity?
10. What happens to the stalling speed on a winch/auto launch?
11. What is the minimum speed to allow a glider to enter the climb on a winch/auto launch?
12. What is the standard recovery action from a fully-developed spin?
13. Draw a diagram of the forces around a glider in a straight and level glide.
14. Draw a diagram of the forces around a glider in a turn.
15. What is lateral damping?
16. What is the difference between the observed secondary effect of rudder at 1.5 Vs and 1.2Vs? What is the significance of this difference?
17. What effect does extension of the airbrakes have on the stalling speed?
18. What effect does downward extension of flaps have on the stalling speed? What about its effect on the glide/angle?
19. Define "safe speed near the ground".
20. What is "autorotation"?
21. What is the purpose of an "anti-balance tab" and where would you be likely to find one?
22. Does the dihedral angle of a wing have any effect in turning flight if sideslip is not present?
23. What effect does water-ballast have on the maximum L/D ratio of a glider?
24. If a variometer system is "over-compensated", what indication will the pilot get when pulling up into a thermal from a fast glide?
25. What kind of stability is desirable in the rolling plane?
26. What is the difference between the static and dynamic pitch stabilities of a glider?
27. What is the effect of rain on a laminar-flow wing and what does the pilot do about it?
28. What is the difference between a spoiler and an airbrake?
29. What would you put into a "drag bucket"?
30. What is a "netto" variometer?
31. What is a "high speed stall"?
32. Describe the cause and effect of aileron drag.
33. What are "differential ailerons"?
34. What is the difference between a spin and a spiral dive?
35. Describe wind gradient and its effect on a glider (a) taking off and (b) approaching to land.

1. They both increase (Basic Gliding Knowledge).
2. Profile drag increases as the square of the airspeed, induced drag increases as the inverse square of the airspeed (BGK).
3. The speed for minimum drag (BGK).
4. The ailerons (BGK).
5. In theory, to effect a slight increase in wing lift which is necessary in a turn. In practice, from the student's viewpoint, to prevent the nose falling in the turn (BGK).
6. Rough air speed (Vra) is the speed above which strong gusts in the atmosphere may cause damage to or failure of the structure. Manoeuvre speed (Va) is the speed above which only one-third deflection of the aileron and rudder controls are permitted and the elevator must be used in such a way as to keep applied "G" forces within permitted limits (BGK).
7. The maximum permitted speed in smooth air (BGK).
8. Because of the reduced IAS with height as a result of decreasing air density. In the absence of detailed placarded information, reduce Vne by 1.5% per 1,000 feet from the absolute value on the placard (BGK).
9. It increases, because of the heavy tailplane download necessary to balance the glider in flight. This detracts from the tailplane's contribution to total lift from the aircraft, thus resulting in a marginal increase in stalling speed.
10. It increases, because of a combination of cable weight and cable download.
11. 1.3Vs (BGK, IH)
12. Full opposite rudder, with ailerons central move stick progressively forward until the spinning stops, centralise rudder and recover from dive (BGK, IH).
13. See BGK.
14. See BGK.
15. The tendency of a glider to resist movement in the rolling plane, because of the increased angle of attack (and hence increased lift) of the downgoing wing. Loss of lateral damping is the primary cause of the onset of autorotation (BGK).
16. At 1.5Vs the pilot will see a marked yaw, followed after a short delay (2-3 seconds) by a developing roll, with noticeable deflection of the yaw string. At 1.2Vs, the pilot will see the glider rolling as soon as the rudder is applied, with no discernible yaw and little or no deflection of the yaw string (Refer NGS "blue pages" and note that some training gliders do this demonstration better than others).
17. An increase in stalling speed of 2-5 knots. This works positively for an instructor, as retraction of the airbrakes in a mishandled situation near the ground restores much-needed energy to the wings and gives the instructor time to assist the student (BGK).
18. A reduction in stalling speed (BGK). It makes the glide/angle worse, because of the increase in both kinds of drag.
19. 1.5Vs (everybody knows that!).
20. The loss of lateral damping, leading to one wing stalling and the commencement of rotation in the direction of the falling wing. Due to the large increase in AoA as this "inner" wing drops, with no lateral damping to stop it, the AoA increases even further, the drag increase is very large and a continuous rotation is encouraged. The "outer" wing remains virtually unstalled (BGK).
21. To provide a force opposing movement of a control surface, usually an elevator. This gives the pilot an improved level of "feel" in the pitching plane, especially at high speeds. An "anti-balance" tab, sometimes referred to as an "anti-servo" tab, is usually combined with a trim tab on gliders, examples being the K7, ASK13 and ES60 Boomerang. When the elevator is moved, the tab moves in the same direction as the main surface (no written reference).
22. None noticeable.
23. It does not usually affect the numerical value of L/D ratio, but causes it to occur at a higher airspeed.

24. A "down" indication.
25. Neutral stability, provided no slip is present (BGK).
26. Static stability is a measure of what the glider tends to do immediately after it has been displaced in pitch and the elevator control released. All gliders must be statically stable (i.e. they should show an immediate tendency to return to the previous nose attitude when the stick is released) in order to gain a Certificate of Airworthiness. Dynamic stability is a measure of what the glider tends to do over a period of time after the static stability has been checked.
    Although it is an airworthiness requirement that a glider must be statically stable, it is acceptable for it to be dynamically neutral or even unstable and most modern gliders are exactly in this category.
27. It degrades the laminar flow, increases the stalling speed and causes a marked loss of performance. The only thing a pilot can do is to add at least 5 knots to the speed and anticipate an increase in the sink rate and degradation in the glide angle of about 20%.
28. A spoiler has a limited ability to control descent rate and is not speed-limiting. An airbrake is generally more effective in controlling descent rate, is speed-limiting in a 30-degree dive and some older airbrake designs may be speed-limiting in a vertical dive (BGK, third edition, pages 20 and 21).
29. Not a lot. The so-called "drag bucket" refers to the shape of the area where the profile and induced drag curves cross over. Rather than being an actual point at which they cross, there is a larger area, encompassing a reasonably wide speed range, at which total drag is at a minimum. This area is fondly imagined to be bucket-shaped, hence the name.
30. Also known as an "air mass" variometer, the netto system is a total-energy vario, from which the sink-rate of the glider at any given speed is subtracted, by means of a calibrated pitot leak. The "net" result is that the pilot is shown only the sink rate of the air through which the glider is flying.
31. A stall during which the glider is in accelerated flight, that is, it is pulling "G" forces. Under such circumstances, the glider can be flown to its stalling angle of attack at an indicated speed much higher than the normal unaccelerated stall speed.
32. The downgoing aileron produces an increased AoA on that part of the wing, the upgoing aileron produces a decreased AoA on the other side. Increased AoA means increased lift (which causes the desired roll), but also means increased induced drag, which causes a yaw in the "adverse" direction (BGK, third edition, page 18).
33. Ailerons which are rigged in such a way that their upward movement is greater than their downward movement, in most cases in the ratio of 2 to 1, but in some cases as high as 3 to 1. This minimises the effect of adverse yaw by reducing the induced drag of the downgoing aileron and capitalising on the effect of the upgoing aileron.
34. In a spin, the airspeed is uniformly low (although slip/skid errors may make ASI readings unreliable), the rotation rate high because of the loss of lateral damping and the onset of aurorotation, the sound level constant and hardly noticeable G forces. In a spiral, the airspeed is high and increasing rapidly, the rotation rate low (lateral damping still present), the sound level and G forces increasing rapidly.
35. Wind gradient is the reduction in windspeed near the ground, due to ground friction. The effect on take-off is to provide a rapidly increasing airspeed to the glider as it gains height. The effect on landing is to cause a reduction in airspeed as the glider descends into the region of reducing windspeed. It is an inertial phenomenon, caused by the glider being unable to change its speed quickly enough to match the rapidly changing speed of the airmass into which it is moving, either upward or downward.

---

1. What is the meaning of the word "adiabatic"?
2. Define the term "dry adiabatic lapse rate". What is its numerical value?
3. What is the purpose of taking the temperatures at various heights (the "temp trace flight")

at the start of a soaring day?
4. Do thermals drift downwind at the same rate as the windspeed?
5. What is the definition of saturated air?
6. What is the definition of "dew point"?
7. What is a Stüve Diagram"?
8. Define the terms "stability" and "instability" when applied to the atmosphere.
9. What do the terms "depression" and "anticyclone" mean?
10. On a cross-country flight, if you are drifting to the left, will your altimeter over-read or under-read when you outland?
11. What do the terms "backing" and "veering" of the wind mean?
12. What are the implications of high surface temperatures and an unstable atmosphere?
13. In a damp airstream, what is the cloudbase likely to be on the lee side of a mountain range, compared with on the windward side?
14. What do the expressions "convergence" and "divergence" mean in meteorology?
15. What are the main requirements for good thermal-soaring conditions?
16. Assuming the terrain is suitable, what are the main requirements for wave-soaring to be possible?
17. What is the so-called "coriolis" force and what is its effect in meteorology?
18. How would you find the general direction of the centre of an anticyclone?
19. What is the definition of a "cold front"?
20. What is a "trough"? What conditions would you expect in a trough if the surface temperatures are high?
21. What is a "microburst" and where would you expect to find one?
22. If a large thunderstorm is visible and green streaks are hanging down underneath it, what does this mean?
23. What is "water vapour"?
24. What is an inversion and what effect does it have on soaring conditions?
25. What are "virgo" and "pileus" and what do they mean to a glider pilot?

---

1. The dictionary definition is "without gain or loss of heat". What this means in practice is that, if a parcel of air (a thermal) rises because it becomes warmer than its surroundings, it will lose heat by expansion as it ascends, and it will not entrain any air from its immediate surrounds.
2. Based on the above reasoning, a "dry" thermal (i.e. a thermal which is not 100% saturated) will cool adiabatically at a fixed rate. This rate is 3 degrees Celsius per 1,000 feet (BGK).
3. To establish the "Environmental Lapse Rate" (ELR) for the day (BGK).
4. Probably not. It is believed that their actual rate of drift is a function of the vector formed by the combination of their climb rate and their rate of drift. They do drift downwind, but at something less than the wind speed.
5. Saturated air is air which has become 100% saturated with moisture. Anything less than 100% saturation is regarded as dry air.
6. The temperature at which the air transforms its water vapour into visible water droplets (BGK).
7. A graphical diagram used by meteorologists to plot various parameters in the atmosphere, such as temperature, humidity, etc.
8. Stability is when the ELR is such that a thermal cools below the temperature of the surrounding air and therefore it stops ascending. Instability is when the ELR is such that a thermal retains its superior temperature over its surrounds as it ascends, thus tending to keep ascending (BGK).
9. A depression (in an extreme form, a cyclone) is an area of low pressure, caused by global variations in air temperature and pressure. A depression always rotates in a clockwise direction in the Southern Hemisphere. An anti-cyclone is an area of high

pressure, rotating anti-clockwise (BGK).

10. If you are drifting to the left, you must be going from high to low pressure. Therefore your altimeter will over-read when you land. Unlikely to be a matter of great importance, but it probably made you think!
11. "Backing" is an anti-clockwise shift in wind direction. "Veering" is a clockwise shift.
12. Strong convective activity, big thermals, probable cumulus cloud development and possible thunderstorms.
13. Higher.
14. "Convergence" is the tendency of air to flow in toward the centre of a depression. It implies instability and is favourable for soaring, provided storms do not develop. "Divergence" is the tendency of air to flow out away from the centre of an anticyclone, resulting in stability and conditions less favourable for soaring.
15. An ELR equivalent to or better than the DALR (i.e. some degree of atmospheric instability), fairly high surface temperatures, low humidity to suppress over-development and inhibit the formations of storms. Light winds.
16. A reasonably strong surface wind (15-20 knots), with the wind increasing in strength with height but remaining fairly constant in direction. Low-level instability capped by an inversion is also helpful.
17. The effect of the earth's rotation on any given air mass. It is responsible for giving depressions and anticyclones their characteristic spiral motion (BGK).
18. Stand with your back to the wind and the centre of the anticyclone is to your left (Buys Ballot's law).
19. Cold air overtaking warm air, undercutting it and forcing it to rise (BGK).
20. An elongated area of low pressure, often pre-frontal, which usually contains unstable conditions. The "west coast trough" in WA is a classic example of this phenomenon.
21. A rapidly descending tongue of cold air emanating from the edge of a developed thunderstorm. It frequently reaches ground level and is characterised by extreme values of sink in the microburst itself and very high winds where it strikes the surface and bursts outwards (BGK).
22. Large hailstones, the green colour being clear ice refracting the light.
23. Unseen moisture latent in any given air mass.
24. A layer of air in which the normal temperature reduction with height is reversed, and the temperature increases with height. It is likely to have a detrimental effect on soaring, because a thermal may encounter air which is warmer than itself and will then stop ascending. Inversions are common in anticyclonic conditions, when very high surface temperatures are required to break through them and enable soaring to take place to reasonable heights.
25. "Virgo" is rain which does not reach the ground. It appears as grey-coloured sheets hanging down from under rain-bearing clouds. Glider pilots should avoid areas of virgo, firstly because of the possibility of getting the wings wet and losing performance, secondly because there will be areas of strong sink in and around the virgo itself.
    " Pileus" is a small lenticular or eyebrow cloud seen at the top of a cumulus cloud on an unstable day. It indicates the presence of wave around the cumulus top, resulting from strong instability at lower levels and a wind which strengthens with height. When such conditions exist, it is possible to soar the thermal to cloudbase, then move upwind, clear of the cloud, and find good lift up the upwind side of the cloud.

---

1. What is the scale of the World Aeronautical Chart (WAC) commonly used for gliding?
2. On which aeronautical charts are areas of controlled airspace shown?
3. Where is it possible to purchase the required charts for safe cross-country navigation?
4. What is "variation"?
5. What is the commonly-used jingle for remembering the effect of variation?
6. What is "deviation"?

7. Define the terms "heading", "track" and "drift".
8. What is the difference between airspeed and groundspeed?
9. What is the "triangle of velocities"?
10. What is an "isogonal" and where would you find one?
11. What is "GPS"?
12. What action would you take if you realised you were lost?

---

1. 1: 1,000,000.
2. En-Route Charts, Low (ERC LOW) and Visual Terminal Charts (VTC).
3. The Airservices Australia (AA) Publications Centre, P.O. Box 1986, Carlton South, 3053. Phone 1800 33 1676 or 9342 2000 for Melbourne residents. (Airways and Radio Procedures for Glider Pilots)
4. Variation is the difference between true north and magnetic north, caused by magnetic north being at a different physical location on the earth's surface from true north (true north is of course at the north pole, magnetic north is somewhere off the east coast of Canada). This means that a compass will usually have some kind of error wherever it is on the earth's surface and the error may be in an easterly or westerly direction. In Australia, magnetic variation varies from 3 degrees west in WA to 13 degrees east in some areas of the eastern seaboard. (BGK).
5. Variation west, magnetic best, variation east, magnetic least. In other words, in an area of westerly variation (e.g. Perth), add the variation to the required track to get the reading you will need to see on the compass. In areas of easterly variation (i.e. anywhere east of about Kalgoorlie), subtract the variation from the true track to get the required reading. (BGK).
6. Deviation is the error in a compass caused by the presence of metallic objects (structure or instruments) in the glider which upset the magnetism of the compass. It is reduced to the lowest possible figure for each glider by "swinging" the compass on the ground, a process by which small magnets in the compass are adjusted as the glider is "swung" to each of the cardinal headings in turn. Compass swings must be carried out with all electrical equipment, such as variometers and radios, in the position they would normally be in flight, as their influence may change considerably between their on and off positions.
7. Heading is the direction in which the aircraft is pointing in the air (this will the direction shown by the compass, give or take the rather small errors to which the compass is prone).
   Track is the path the aircraft follows over the ground, which will differ from heading if there is any crosswind component.
   Drift is the angle between heading and track. (BGK, navigation chapter).
8. Airspeed is the speed through the air, as indicated on the ASI.
   Groundspeed is the speed over the ground, which is the glider's airspeed plus or minus the windspeed at the height at which the glider is flying. (BGK, navigation chapter).
9. The triangle formed by drawing a diagram of the heading, track and wind velocity. (BGK, nav chapter).
10. An isogonal is a line joining places of equal magnetic variation. Isogonals are shown on WAC charts as broken purple lines at half-degree intervals, the numerical value of the variation being shown at a number of places along the lines. They are shown on ERC LOW charts as broken green lines at one-degree intervals.
    Note that magnetic variation is also shown on VTCs, numerically at the bottom of each chart and in pictorial form on the aerodrome diagrams on each title page.
11. GPS stands for Global Positioning System, a satellite-based navigation system of extreme accuracy. As well as giving an accurate lat/long position, it can also give height if enough satellites are acquired by the unit. GPS is used increasingly in gliding competitions and may eventually eliminate the need for turning-point photography (it has

already done so in major competitions). Some variometer manufacturers now build GPS into their vario/flight management systems.
Note that, by decree of the International Gliding Commission, GPS shall henceforth be known as GNSS (Global Navigation Satellite System).

12. Don't panic. Refer to BGK, nav chapter.

---

1. Which document indicates that the glider is legally able to fly and where would that document be found?
2. When you have found the document, what particular points do you check within it?
3. One more thing needs to be checked in the documentation before satisfying yourself that the glider can legally fly. What is it?
4. Who is entitled to carry out the training of pilots to hold Daily Inspector authorisations?
5. Who is entitled to examine pilots who have been trained as Daily Inspectors and how is such authority obtained?
6. What are the purposes of a Daily Inspection?
7. Give two examples of each of the following (a) fair wear and tear, (b) unservicabilities, (c) unreported damage, (d) incorrect assembly/rigging.
8. What is meant by "semi-monocoque" construction and what are the implications of finding surface damage on such a structure?
9. What are the three loads imposed on a glider wing?
10. What would you look for when checking a glider known to have had a heavy landing?
11. What is the purpose of the "D-box" of a wing?
12. What are the main things to check for when inspecting a tow-release mechanism?
13. Would it be acceptable to fly a glider on aerotow if you found that the back-release mechanism had been prevented from working in some way, e.g. split-pin or tape?
14. What are the colour-coding requirements for glider ancillary controls?
15. How would you check the integrity of a control system on a Daily Inspection?
16. What is the generally accepted amount of free play allowed on a glider control surface?
17. What is the difference between Indicated Air Speed (IAS) and True Air Speed (TAS)?
18. Define the following - (a) Empty weight, (b) Gross weight, (c) CG range.
19. What are the consequences of flying a glider outside the aft CG limit? Is it permissible to do it?
20. What is the purpose of the weak link in a launching cable or rope?
21. Define flutter and name three likely causes of it.
22. Name three reasons for carrying out a walk-round inspection before each flight.
23. What is meant by the expressions Vne, Vra, Vw and Va?
24. Referring to the manoeuvre envelope in the Airworthiness chapter of Basic Gliding Knowledge, what are the consequences of pulling hard back on the stick at a speed somewhere between Va and Vne?
25. What is Vdf?

---

1. The Maintenance Release, which is required to be carried in each glider (BGK, airworthiness chapter).
2. That it is within its validity period, there are no defects which prevent the glider flying, that there is no outstanding maintenance to be performed (BGK, A/W chapter).
3. Check the GFA Form 1 (Daily Inspection record, combined with the Maintenance Release document) to see if a Daily Inspection has been done. If not, do it (BGK, A/W chapter).
4. Any instructor of Level 1 or higher rating or any person with suitable airworthiness qualifications (Daily Inspector's Handbook).

5. Any person holding Form 2 or higher airworthiness authority automatically holds DI Examiner authority. Any instructor (or other suitable person) holding DI authority may be recommended by the club's Airworthiness Officer to the RTO/Airworthiness of that region to hold DI Examiner authority.
6. (a) To check for fair wear and tear, (b) to check for unservicabilities or sudden deterioration, (c) to check for unreported damage, (d) to check for correct rigging and safety locking, (e) to check for loose items (f) to check for known and recorded minor defects (DI Handbook).
7. See DI handbook.
8. A structure in which approximately 50% of the loads are taken by the surface skin. Any surface damage in such a structure is potentially serious and must be reported (DI Handbook).
9. Lifting, twisting and drag loads (DI Handbook).
10. Bent axle, wrinkling or splitting around undercarriage area, damage in wing-root area (caused by sudden forward loads), damage to wing trailing edges (caused by sudden downloads), damage to tail unit (caused by the glider hitting nose-first, then the tail slamming down hard) (DI Handbook).
11. To take the torsional loads (DI Handbook).
12. No excessive wear or grooving of the "beak" of the hook, no broken springs in either the main or (if fitted) the back-release (DI Handbook).
13. Yes, a back-releasing hook is not a requirement for aerotowing.
14. Airbrakes - blue; trim - green; release - yellow, canopy jettison - red (DI Handbook, page 39). Note: on newer gliders canopy opening handles may be white and they will have a red edging on them if they serve double duty as jettison handles.
15. By having an assistant hold the surface and trying to move the stick or rudder pedals against him/her (DI handbook).
16. 2.5% of the chord of the control surface (DI Handbook).
17. IAS is the speed shown on the ASI at any given time. TAS is the speed shown on the ASI, corrected for air density at the rate of approximately 1.5% per 1,000 feet of altitude gained (BGK, A/W chapter).
18. (a) the empty weight of the glider, in flying condition, without pilot, parachute or removable ballast; (b) the maximum permitted flying weight; (c) the range of movement of the centre of gravity at various load combinations (BGK, A/W chapter).
19. Pitch stability will be degraded, possibly to a dangerous degree. It may be impossible to trim to a safe speed. It may be impossible to recover from a spin. It is not permissible to knowingly fly a glider outside its aft CG limit, although it could happen to the pilot of a high-performance glider if the water-ballast in the wings is jettisoned, but the water-ballast in the fin refuses to jettison. It has happened more than once and the glider has proved to be a real handful, although the pilots managed to land safely. (BGK, A/W chapter).
20. To protect the glider against overstressing during the launch (BGK, A/W chapter).
21. An oscillation of a control surface or surfaces, which can cause an excitation of the main surfaces (wing, tailplane, etc) of a glider. It may be caused by one or more of the following factors :
    Excessive free play in the control surface,
    Incorrect or loose mass-balance weights,
    Slack cables in gliders equipped with such a control system, causing loss of control circuit stiffness,
    Loss of control circuit stiffness due to other factors such as broken control-rod supports, etc,
    Flying outside placarded speed limits, usually too fast at high altitudes.
22. To check for heavy landing damage. To check for in-flight overstressing from the previous flight. To check for damage accumulated during the day's operations (BGK, A/W chapter).
23. "V" is velocity. Note that all Australian gliders have their placarded speeds (velocities) in knots of indicated airspeed.

Vne is the never-exceed speed is smooth air.
Vra is the never-exceed speed in rough air.
Va is the manoeuvre speed, above which no more than one third movement of aileron and rudder are permitted and elevator must be used so as to keep within permissible G limits.
Vt is the maximum permitted aerotow speed.
Vw is the maximum permitted winch/auto launch speed (Note: There is a misprint in the third edition of BGK, where Vt is repeated instead of Vw. This is corrected in the fourth edition).

24. "Pulling hard back" implies a control input which would contravene the requirement to apply elevator at such a rate as to keep G forces within limits. The consequences are therefore likely to be damage to, or failure of, the structure.
25. Vdf is "velocity, demonstrated flight". This is the maximum speed at which the glider is tested for certification purposes. Vdf is 5% higher than Vne, but lower than the theoretical structural limit (non-tested) of Vd.
    Vdf is a test figure and must not under any circumstances be used as a flight limit in routine service.

---

1. What are the barograph requirements for a pilot attempting a Gold C Distance/Diamond Goal?
2. Explain the "1% rule" as applied to distance tasks.
3. What is meant by "great circle distance".
4. What is the height gain required for the Gold height badge?
5. Define the various ways in which a Silver C distance task may be flown.
6. Is it possible to claim all three Silver C requirements on one flight?
7. If you were asked, as an Official Observer, to sign a pilot's application form for a Diamond height claim and you knew that the pilot had completed the flight without carrying oxygen, what would you do?
8. Is it necessary to hold a Competitor's Licence to fly in the State Comps?
9. If claiming a distance record, by how much should the old record be exceeded?
10. What are the "in sector" requirements for turning-point photographs for a closed-circuit task?

---

1. A barograph must be carried, in order to substantiate that a landing was not made at an intermediate point during the flight (FAI Sporting Code, 1993 edition, 2.10).
2. For distances up to 100 km, the loss of height between the start altitude (at the departure point) and the altitude of the finishing point must not exceed 1% of the distance covered. The 1% rule does not apply for distances over 100 km, but there are other requirements (FAI Sporting Code, 2.3.4.3.1).
3. The arc of a great circle on the earth's surface joining given points defined by their geographical coordinates (FAI Sporting Code, 2.2.12.1).
4. 3,000 metres (9,843 feet) (FAI Sporting Code, 4.2.2).
5. A flight over a straight course of 50 km. Any leg of more than 50 km of a longer pre-declared course may qualify, subject to the 1% rule applied over the whole course (FAI Sporting Code, 4.2.1).
6. Yes.
7. There is no FAI ruling on this, but the pilot has broken the law and it is a debatable point whether an Official Observer should sign the application for a badge.
8. Yes.

9. 10 km (FAI Sporting Code, 3.2.3).
10. The so-called "observation zone" for turn-points is the airspace above a 90-degree sector on the ground with its apex at the turn-point and orientated symmetrically to and remote from the two legs meeting at the turn point (FAI Sporting Code, 1.7).

---

1. Define the aims and objectives of the GFA training syllabus.
2. What are the two most important factors in ensuring that information is passed from the short-term memory into the long-term memory?
3. What happens to information lost from the short-term memory?
4. What is the "law of primacy"?
5. Name two successful learning reinforcement techniques.
6. Name three typical human reactions to becoming overloaded.
7. What is "underload" and what is its main effect on a gliding instructor?
8. Name four important instructor characteristics.
9. Name all the principles of gliding instructing.
10. What are the prime objectives of a pre-flight briefing and what three general points need to be taken into account in addition to the specific point being covered?
11. What is a "communication block" and what is the most effective way to prevent one occurring?
12. Although most training emphasises flexibility and encourages pilots to think for themselves, what aspect of training stresses the opposite principle?
13. For effective instruction, who sets the pace of learning, the student or the instructor?
14. Define all the steps necessary to meet the requirements of correct methods of gliding instruction.
15. Name the four stages of carrying out an airborne demonstration.
16. Before allowing the student to take control of the glider, name the essential step which must be taken to eliminate confusion and reduce the danger of not knowing who has control.
17. After handing over to the student, what is the next step to be followed by the instructor?
18. What is the most reliable aid to a satisfactory post-flight debriefing?
19. What are the four points to be considered when planning the management of an instructional flight?
20. What other "management" exercise is an instructor responsible for in flight?
21. Name the four points in instructor/student relations which are essential to satisfactory training progress.
22. About what percentage of gliding accidents are caused primarily through lack of flying discipline?
23. As a Level 1 Instructor, what action would you be likely to take if you observe a gross breach of airmanship and/or flying discipline on the part of a solo pilot, if the Level 2 Instructor on duty was in the air at the time?
24. Describe how you would carry out a stability demonstration in flight.
25. In your opinion, what is the most common error in delivering instructional "patter" in flight?
26. What is the most important point to be remembered in carrying out a post-flight debriefing?
27. What is the secondary effect of elevator?
28. What is the "billy-cart" syndrome?
29. What is the objective of the "rolling on a point" exercise and what is the most important point to remember to achieve a good demonstration?
30. What is the most likely cause of a wavering nose attitude in level flight or in turns and what is the remedy?
31. What is the most important airmanship point to emphasise right from the start?
32. Why is it difficult to demonstrate the use of the elevator trim? What strategy should be

adopted to counter this difficulty and what is the most important message to emerge from teaching he use of this control?

33. If you have progressed to teaching turns and the student is at the stage of doing the actual flying in this manoeuvre, what action would you take if a student failed to look out before turning?
34. What does the memory-jog "ARE" mean in relation to turning?
35. When coming out of a turn, if the rate of turn increases momentarily before recovery to level and the intended heading is overshot, what is the most likely fault?
36. If you are instructing in a glider which has airbrakes having very high operating loads and/or a tendency to "suck out" when unlocked, what training strategy would you adopt to teach the use of these devices safely?
37. If converting a pilot from a glider with airbrakes to one with spoilers, what briefing points would you isolate?
38. Define the two purposes of stall training.
39. Apart from careful and thoughtful handling of the glider, what is the most effective way to counter any discomfort which might be felt by the student during stall training?
40. What is meant by the "low-G syndrome" and how can its effects be minimised?
41. What causes wing-drop at the stall and what is the most effective way to arrest it?
42. Name the symptoms of a developing stall.
43. Where should the student be instructed to concentrate his/her attention during stall exercises, in order to minimise discomfort and possible onset of the "low-G" syndrome?
44. What is the key point in incipient spin training?
45. What part of the incipient spin recovery action must become a conditioned response?
46. Define autorotation.
47. Describe how you would demonstrate a realistic departure into a spin, simulating what happens to pilots who spin accidentally.
48. For the purpose of practical spin awareness, list the sequence of events which, if not broken, will lead to a spin developing.
49. What are the most common student faults in spin recovery?
50. What are the two things which cannot be adequately simulated during spin training?
51. What are the parameters which define the "working speed band" on a winch/auto launch?
52. Name the four stages of a winch/auto launch.
53. What cues do you offer the student to help judge the correct nose attitude during a winch/auto launch?
54. Define the non-manoeuvring area.
55. What is the first priority following a winch/auto launch failure of any kind?
56. What is the approximate time interval between a launch failure occurring in the full climb of a winch/auto launch and the speed settling at a safe value after lowering of the nose?
57. What are the two vital responses to a winch/ auto launch failure?
58. What is the primary reference for establishing the correct towing position on aerotow?
59. What do you think is the most common reason for students having difficulties learning to aerotow?
60. What demonstration should always be given to a student learning to aerotow, with the object of building confidence?
61. What important quality should a student have acquired before handing over control to him/her on aerotow?
62. What little jingle should be understood by the student before operating the cable release for the first time?
63. Name the three parts of the pre-flight briefing for an aerotow take-off.
64. State the procedure for carrying out launch ground signals following "clear above and behind".
65. What is the "break-off point"?
66. What is the object of flying a circuit?
67. What "safe habits" must be cultivated in a student when joining a circuit for landing?
68. What factors determine the decision to turn from the downwind leg onto the base leg?

69. What is a "modified circuit"?
70. What action would you instruct the student to take in the event of meeting strong sink at or around the base-leg turn?
71. If the glider is too steep or too shallow in relation to the landing area when on base-leg, what options are available to fix the problem?
72. What three things should an instructor teach a student to remember after completing the final turn?
73. Why should an overshoot situation be established before using the airbrakes on final approach?
74. What danger do you think is inherent in allowing a student (or solo pilot) to develop a habit of making consistent high approaches and always using full airbrake?
75. What should be the minimum time-span of a final approach to allow the student sufficient time to make adjustments in direction and glide-path?
76. Define "Check 1" and "Check 2".
77. What is the "instructor's defensive posture"?
78. How do you know whether a student is going to carry out Check 1 or not? How would you protect yourself against a major error on the student's part at this time?
79. If the student loses directional control at an early stage of the approach, what is the most effective training strategy to deal with this situation?
80. What is the most common cause of "ballooning" near the ground and how would you deal with it?
81. What action would you take if the student carries out Check 1 too early?
82. What do you think are the most common pitfalls near the ground in converting (a) hang-glider pilots and (b) power pilots to gliders?
83. How would you teach a pilot to search for thermals?
84. Having found a thermal, how would you teach a pilot to locate the core and centre on it?
85. When introducing a pilot to cross-country flying, at what height AGL would you teach that pilot to (a) choose a generally suitable outlanding area, (b) select a suitable paddock within that area, and (c) commit yourself to a circuit for a landing into that paddock?
86. How would you teach a pilot to assess the surface wind during cross-country flying?
87. What are the 5 "S's" for outlandings?
88. What are likely effects of praise on a student's progress? Is there a particular point about praise which an instructor should be aware of?
89. Define the objectives of a pre-flight briefing.
90. What instrument is desirable as a training aid for the teaching of aerobatics?
91. What action would you take if you feared a tailslide was about to occur in mishandled aerobatics?
92. If the "proof" load factor of a glider is known to be 5G, what in-flight limit is permitted?
93. What precaution would you take if performing aerobatic manoeuvres which involved flying at a speed higher than the manoeuvre speed (Va)?
94. What is "rolling G" and what problems is it likely to produce?
95. What is G-LOC?
96. Based on the law of primacy (see question 4), what two things, if not successfully instilled in a student pilot, have an above-average potential to cause a fatal accident?

---

1. To produce glider pilots with a high degree of ability, understanding, initiative and safety consciousness, leading to safe, efficient and competent cross-country gliding (Instructor Handbook (IH), part 2, page 7).
2. Continuous attention and rehearsal, but be aware that while this process is going on, a person has very limited ability to accept any new information. Time is therefore needed to balance the conflicting needs of ensuring that information "sticks" in the person's mind, yet feeding new information into the person in order to effect some progress through flying training.

3. It is lost forever (IH, part 1, page 5).
4. The concept that an item learned first is the most likely one to stick in the mind. An example of this is the principle of instilling safety as a prime concept - if safe habits are not learned at the outset, they will not be acquired later (IH, part 1, page 12).
5. Repetition; recency effect (IH, part 1, pages 8 and 9).
6. Error. Omission. Approximation (IH, part 1, page 10).
7. A "laid back" state of mind, which can induce an instructor to lack concentration when he needs it most (IH, part 1, pages 10 and 11).
8. Example, integrity, self-discipline, empathy (IH, part 1, pages 13 and 14).
9. Responsibility, communication, orientation, skill, safety (IH, part 1, pages 15 to 19).
10. Define the objective of the flight, describe briefly what the objective consists of, allocate responsibility for who does what (IH, part 1, page 20).
11. Usually a situation where an instructor has mistakenly conducted a "one-way" flow of communication, which results in boredom, resentment and a "block" to further successful communication. Encourage student to participate. (IH, part 1, pages 16 and 17).
12. Habits of safety (e.g. careful lookout at all times, safe speed near the ground) which should be regarded as inflexible and unbreakable principles.
13. Generally the student, but an instructor needs to manage the training in such a way that the right balance is achieved between getting bogged down and forcing the pace too hard.
14. Pre-flight briefing, airborne demonstrations and patter, handover/takeover procedure, student practice and feedback, fault analysis and prompting, post-flight debriefing (IH, part 1, page 20).
15. Name the exercise, describe effect to be observed, stabilise the glider, demonstrate clearly and in a manner synchronised with the patter (IH, part 1, page 20).
16. Positive handover/takeover procedure (IH, part 1, page 21).
17. Feedback, depending on what the instructor sees from the student. Then fault analysis and prompting, as necessary (IH, part 1, page 21).
18. A notebook, to aid "recency effect".
19. Glider performance, weather, launch method, exact student needs (IH, part 1, page 23).
20. Risk management (IH, part 1, page 24).
21. Criticism, praise, respect, progress (IH, part 1, pages 25 and 26).
22. About 80%.
23. Firstly, let the pilot know that you saw what had occurred and you had some concerns about it. Remembering that you are not in charge of the day's operations, you may at your discretion invite the pilot to give you his/her side of the story. It might be that the occurrence had a perfectly feasible explanation. If not, and you are concerned that the pilot should not fly until further counselling has taken place, advise the pilot that you wish to consult with the duty Level 2 instructor and to remain on the ground until you have done so.
24. Establish correct nose attitude for level flight and trim the glider accurately. Show student your hands, to establish confidence in the glider's stability. Gently raise the nose and let the stick go - point out to student that the nose tries to get back to its previous position. It may oscillate a bit in this attempt, but it will eventually get there. Keep everything smooth and gentle (IH, part 2, page 14).
25. Talking too much.
26. Remember recency effect. The student will have maximum recall of the last things that happened on the flight. Work back through the flight to find the bits you wish to comment upon, helping the student to remember as you go. This is where a notebook comes in handy; don't forget to carry one.
27. There is no secondary effect of elevator.
28. Confusion about which way to move the rudder-pedals to get the desired effect, the student possibly remembering his billy-cart days, when he pushed right to swing left and vice-versa.
29. To develop aileron/rudder coordination. Make all movements smooth and keep bank angles small (IH, part 2, page 20).

30. Student is watching the ASI instead of monitoring the nose attitude. Cover up the ASI - a rubber soap-holder with multiple suction pads is a useful addition to an instructor's armoury and is just the right size to cover a glider instrument.
31. Lookout.
32. Because there is nothing to see if the glider is properly trimmed. Hand over an out-of-trim glider (be sure to warn the student that it is out-of-trim!) and coach the student to maintain a constant nose attitude despite the out-of-trim force, then make a positive movement of the trimmer so as to make its effect clearly apparent. The important thing is that the student must realise that the trim control only relieves loads - it must not be used as a "mini-elevator" (IH, part 2, page 22).
33. Stop the student turning immediately, in order to drive the message home (IH, part 2, page 26).
34. Aileron, Rudder, Elevator, to be monitored during the turn in that order (IH, part 2, page 24).
35. Lack of aileron/rudder coordination (IH, part 2, page 26).
36. Ensure the airbrakes are taught initially at height, rather than give the student a nasty surprise in the high-workload environment on the approach (IH, part 2, page 28).
37. Spoilers are less effective than airbrakes and will cause a nose-down trim which must be counteracted. This is in contrast with the high drag of airbrakes, which need a positive lowering of the nose in order to maintain speed, thus giving a steeper glide-path. The trim change is in a nose-up sense when the spoilers are retracted (IH, part 2, page 27).
38. To learn recognition of the symptoms, with a view to prevention. If a stall should occur, to take the necessary recovery action (IH, part 2, page 29).
39. Ensure that the student looks outside the cockpit at the horizon, rather than inside at the instrument panel (IH, part 2, page 31).
40. A sensitivity which is apparent in some pilots to G values which are lower than unity. This does not mean negative G, but just a lowering of the G value, such as may occur in turbulence and which has been likened to driving at speed over a hump-back bridge. Its effects can be minimised by looking outside the cockpit, to allow the strong visual impact of outside scenery to suppress the feelings of discomfort (IH, part 2, page 108).
41. One wing stalling before the other. Wing-drop is fixed by forward movement of the stick (IH, part 2, page 30).
42. Nose higher than normal. Possible buffeting. Less effective controls. Lower sound level. Increasing back-pressure on stick. Possible wing-drop. Nose drop in spite of stick coming back, or high descent rate with nose-high attitude (IH, part 2, page 32).
43. The horizon (IH, part 2, page 31).
44. The nose is not particularly high when the glider departs into the manoeuvre (IH, part 2, page 34).
45. Move stick smoothly and progressively forward, using only sufficient rudder to counteract any yaw which may be present (IH, part 2, pages 33 and 34).
46. The rotation of the glider around a stalled wing, created initially by loss of lateral damping (IH, part 2, page 34).
47. See IH, part 2, page 35.
48. See IH, part 2, page 36.
49. Insufficient opposite rudder. Failure to move stick forward, believing that opposite rudder alone stops rotation. Disorientation.
50. Ground-rush, which is believed to be a factor in inhibiting pilots from attempting recovery from low-level spins. It is obviously too dangerous to continue spinning to low-level as a normal practice, and there is no intention of lowering the minimum recovery height for such manoeuvres from the present 1,000ft.
    Stress, which is almost certainly why pilots progressively apply excessive rudder during a turn at low-level. At the very least, instructors must ensure pilots are acquainted with the likelihood of stress and to keep it within manageable limits.
51. The lower limit is 1.3Vs, the upper limit is set by the glider placard (IH, part 2, page 44).
52. Ground-run and separation, initial climb, full climb, release (IH, part 2, page 40).
53. Look to the side to see the angle between the wing and the horizon (IH, part 2, page 41).

54. The area of sky which, if a launch fails, a glider is too high to land ahead in the space available, but too low to carry out a circuit (IH, part 2, page 47).
55. Attain a safe speed near the ground, 1.5Vs (IH, part 2, page 45).
56. About 5 seconds (IH, part 2, page 46).
57. Regain and maintain safe speed, operate the cable-release twice (IH, part 2, page 45).
58. The slipstream (IH, part 2, page 51).
59. In some cases, instructors introduce students to aerotowing too early, possibly before they have acquired proper coordination and almost certainly before they have acquired anticipation (IH, part 2, page 53).
60. Trim the glider and demonstrate the hands-off "stable platform" on tow (IH, part 2, page 52).
61. Anticipation (IH, part 2, page 53).
62. Locate - identify - operate (IH, part 2, page 54).
63. Glider and tug on ground. Glider airborne, tug on ground. Both glider and tug airborne (IH, part 2, page 54).
64. Pilot gives thumb up sign and says "pilot ready". Wingtip holder raises wing and repeats signal to signaller. When rope tight, wingtip holder gives "all out" ("full power") signal. (MOSP, part 2, page 26, item 22.1.4 and page 31, item 22.2.7).
65. The point at which all previous exercises are terminated and a commitment made to prepare the glider for landing (IH, part 2, page 60).
66. To establish a suitable landing area. To select a landing direction. To establish a final approach path with a safe margin over obstacles (IH, part 2, page 60).
67. Safe speed near the ground (1.5Vs), other traffic, wind strength and direction, landing area obstructions (IH, part 2, page 61).
68. To intersect the final approach path at a suitable position, taking into account wind strength and other weather-related factors (IH, part 2, page 62).
69. A circuit in which the original plan cannot be maintained (usually because of running out of height) and a changed plan must be implemented (IH, part 2, pages 70 and 71).
70. If turn has not commenced, turn immediately. Once turn has been completed, assess whether it is necessary to make further modifications to angle the base leg in toward the field and shorten the final approach. In an extreme case, make final approach at an angle, direct from base turn.
71. Angle base leg in or out to join the final approach either shorter or longer (IH, part 2, page 63).
72. Check direction, speed and rate of descent (IH, part 2, page 63 and BGK, third edition, page 56).
73. As a precaution against undershooting. An undershoot is much more difficult to detect early than an overshoot (IH, part 2, pages 64 and 65).
74. This technique runs the risk of developing a habit of "automatic" use of full airbrake without making a judgement of how much airbrake is actually required. This can in turn lead to undershoot accidents, because the pilot is flying from habit and is not exercising judgement. Instructors working in trainers with weak spoilers/airbrakes (e.g. early marks of Kookaburra) must be on their guard for this syndrome developing. The student must realise that the principle of checking direction, speed and rate of descent, after completion of the final turn, applies to all approaches and airbrake should not be used until an overshoot is detected, and then should be used progressively, starting with a small amount and increasing the amount if necessary (IH, part 2, page 64).
75. About 30 seconds (Flight Reference Cards "Circuit, approach and landing").
76. Check 1 is the initial stick movement to change from the approach path to level flight just above the ground (otherwise known as the "flare"). Check 2 is the resumption of backward stick movement to "fly the speed off" (otherwise known as the "hold-off") (IH, part 2, page 65).
77. The right hand loosely around the bottom of the stick, the left hand behind the spoiler/airbrake lever (NGS "blue pages").
78. You don't! See instructor's defensive posture. The best initial defence is a clear briefing and advice to the student to make Check 1 early rather than late. This gives the instructor

valuable time to correct the situation. This is backed up by cueing the student, at the appropriate moment, to look well ahead, rather than stare fixedly at the aiming point. Remember that a student must be allowed to make mistakes, but not serious ones! Refer to IH, part 2, page 72 for further guidance.

79. If talking is not successful, take over early and correct the directional problem. Then hand the glider back to the student, so as not to waste a landing.
80. Either (a) Student not applying correct "Check 1, check 2" technique (maybe not pausing) or (b) Student using correct technique but overdoing it a bit at Check 1 (IH, part 2, page 72).
81. Talk student into looking ahead, closing airbrakes, establishing fixed nose attitude on the horizon and wait for the glider to start to sink again before carrying out another landing. If talking not immediately successful, take over and do it yourself.
82. (a) Hang-glider pilots are used to pushing a bar forward to raise the nose of the machine prior to touchdown. They might try the same technique with the stick in a glider. It has happened a number of times. Watch it!
    (b) Power pilots are used to closing the throttle immediately prior to touchdown. For throttle, read "airbrake" and they might extend the airbrakes fully near the ground, the throttle habit being ingrained. A further problem with power pilots which may be apparent is that they are used to applying full flap at some stage during the final approach and leaving it there all the way to touchdown. If not adequately briefed that spoilers/airbrakes may be adjusted as required during the approach, and we expect pilots to do so, an ingrained power pilot may select full airbrake and leave it untouched right to the ground, regardless of any undershoot that might be developing.
83. On a cloudy day, search under the thickest part of the cumulus clouds. On a blue day, it is rather random at height, but lower down the pilot must be taught to use ground features as thermal sources, such as various coloured paddocks, etc.
84. The easiest way for a student to initially learn the feel of thermalling is the "straighten on the surge" method, in which the glider is straightened when a surge is felt, then a turn in the same direction as before is resumed and the situation monitored again. This method is quite successful for well-defined thermals.
    There are other methods to assist in locating the centre of a thermal. These may be found in the GFA document "Better Thermalling" produced by the High-Performance Coach.
85. (a) 2,000 feet. (b) 1,500 feet. (c) 1,000 feet.
86. Wind on dams (calm surface area immediately in the lee of the bank around the dam). Dust from cars on dirt roads. Smoke from farmers burning off stubble.
87. Size, slope, surface, stock, surroundings (including SWER lines).
88. The effect of well-judged praise is generally entirely positive. False praise must be avoided at all costs (IH, Part 1, pages 25, 26, 40).
89. DEFINE the objectives of the flight. DESCRIBE briefly what the objectives consist of. ALLOCATE RESPONSIBILITY for who does what (IH, Part 1, page 20).
90. A "G" meter (accelerometer). This is a useful educational aid, to show the pilot what G loads are being applied to the glider. It is not mandatory, unless specified in the glider's flight manual as minimum equipment for aerobatics.
91. Take hold of the stick firmly with both hands and place both feet firmly on the rudder pedals. Ensure all controls are held firmly in the CENTRAL position. The forces trying to slam the control surfaces against their stops are extremely high when the glider is flying backwards.
92. The same value, 5G. The proof load factor is the same thing as the in-flight permitted load factor. In modern gliders, there is a safety factor of 1.5 before reaching the ultimate load factor, at which damage or failure is likely to occur.
93. Ensure all controls are used gently. Ailerons and rudder should be used progressively less and less as speed is increased beyond Va, until they should not be deflected by more than one-third at Vne. The elevator should be used in such a way as to keep G loadings within permissible limits.
94. Rolling G is the result of applying G loads while ailerons is being applied at the same

time. This results in an asymmetric G loading across the wing structure, which could result in some parts of the wing reaching or exceeding their structural limit when the overall G loading seems to be within limits. Always reduce or centralise ailerons before applying significant amounts of G.

95. G-induced Loss Of Consciousness. This is a condition of loss of consciousness WITHOUT passing through a "greying-out" or "blacking-out" phase. It occurs entirely without warning and is obviously hazardous. Although mainly a feature of military-style flying, Australian research shows that it can occur in light aircraft used in fairly strenuous aerobatic routines (the research aircraft was the Bellanca Decathlon). The inference is that, although unlikely in gliders, it could occur if a pilot is fond of aerobatics in which G loadings approaching limit values are commonly used, especially if applied suddenly.
96. Look-out and safe speed near the ground.