CHAPTER 16

ANSWERS TO QUESTIONS RELATED TO GLIDING

This pot-pourri of Questions and Answers was prepared as an aid to studying for the GPL Exams and should also serve as a useful refresher for all pilots. *(A. L-du T / March 1999)*

ANSWERS

1.	"CWUB" **C**ommitted to land, **W**ater ballast dumped, **U**nder-carriage down, **B**rakes free and identified.
2.	Stall speed + half stall speed + half wind gust speed Va=Vs*1.5 + Vwg* 0.5
3.	"Worcester Traffic, glider Golf Hotel Bravo Left-hand Downwind Runway 33" "Golf Hotel Bravo Left base 33" . "Hotel Bravo Final Approach runway 33" Refer to winch strip as "Winch Runway 33"
4.	He should be well ahead of the tug and off the runway and repeat the signals given by the Wingman
5.	"BCSIFTBC" **B**allast, **C**ontrols, **S**ecurity, **I**nstruments, **F**laps, **T**rim, **B**rakes, **C**anopy. *Contingencies?*
6.	Wingman lowers the wing, shouts to the pilot to release and crosses his arms in front of him.
7.	"RULL" check **R**ope clear, **Undercarriage**, **L**ocation relative to a/field, **L**ookout responsibility.
8.	(a) Release immediately, (b) Check air brakes closed. (Confirm *on radio brakes closed and locked.)*
9.	Not lower than 800 ft and completed by 2000ft.
10.	126.5 up to 1500ft agl, 126.5 above 1500ft, 119.7 in the TMA and above FL 145. 124.4 in FAD 157.
11.	TMA begins at FL 85. FL 145 is upper limit outside this. FL 70 is the upper limit of FAD 157.
12.	The yaw due to the drag on the rising wing. *more lift and therefore drag.* Counteract with rudder.
13.	The moving elevator is attached to the fixed stabilizer. Stabilizer balances the CofG / Lift couple.
14.	This is the ratio of height lost for distance traveled. Equivalent also to the ratio between lift and drag.
15.	The position of the nose of the glider relative to the horizon. Determines the speed the glider will fly.
16.	The ratio of the chord *(average width)* to the overall length. *A long thin wing has a high aspect ratio.*
17.	The moving rudder is attached to the fixed fin.
18.	Both aircraft turn right except on a ridge when the glider with the **r**idge on the **r**ight has **r**ight-of-way.
19.	The lower of the two gliders has right-of-way. *However respective performances may over-rule this.*
20.	The aircraft which has the other on it's right must give way. *(Give way to traffic on the right)*
21.	Crabbing (yawing), or wing-down (slipping) . The former is preferred for gliders. *(long wing span)*
22.	Glider lower if rope breaks at low altitude, rope can fall over wing. More stable for long or rough tows.
23.	Glider higher – rope falls clear. Can up-end tug if glider gets too high. *Release in normal tow position*
24.	Condition brought on by lack of oxygen. Symptoms are euphoria, impaired judgement, tunnel vision, and drowsiness, to unconsciousness and then a comatose state. (early sign is finger nails turn blue)
25.	This is the drag due the skin friction together with the 'form' drag. (undercarriage, struts etc)
26.	(a) 'Form drag' resulting from wing shape, angle of attack, air density, speed and surface area (b) 'induced drag' (c) skin friction.
27.	(a) 'Lift' which acts at right angles to wing, (b) 'drag' which acts towards the rear and parallel to the free air flow, (c) 'weight' which acts vertically downwards.
28.	(a) 'Form' drag, (b) skin friction for the whole aircraft.
29.	The vertical component of lift *(horizontal component causes aircraft to turn),* drag and weight.
30.	The leading edge of the down-going aileron impinges into the airflow causing an opposite drag.
31.	The angle between the normal airflow and the chord line of the wing is known as the 'angle of attack'.

32. Pressure Energy + Kinetic Energy is a constant (PE + kA = K)
33. A stall occurs when the angle of attack exceeds a critical amount. (approx. 12deg.)
34. The stall speed increases as the angle of bank increase and at 60deg bank will be approx. 40% more.
35. An incipient spin is the first stage of a full spin – just as auto-rotation begins.
36. The glider is stalled and, due to differential wing drag, rotates, nose down, about a vertical axis.
37. Use full opposite rudder to stop the rotation and then ease stick forward to un-stall the wings.
38. The polar curve is a plot of a glider sink-rate against speed and is therefore a measure of performance.
39. The speed at which the sink-rate is a minimum. *Read from the polar curve at the horizontal tangent*.
40. The speed at which the glider achieves the best glide angle and at this speed the glider will remain airborne longest. R*ead from the polar curve at the tangent passing through the origin*.
41. QFE - the altimeter reads zero on the airfield, QNH- reads height above sea-level, 1013.2 used when reporting flight levels *(i.e. Standard Pressure value)*
42. At a rate of 1mb for every 30 ft or 3.3mb per 100ft.
43. An airspeed indicator measures the difference between the static and the pitot pressure.
44. A variometer measures the rate of change of static pressure by measuring airflow in or out of a capacity chamber and therefore effectively this is proportional to the rate of climb or sink of the glider.
45. A probe, usually on the fin, provides a suction proportional to the speed to compensate for "stick ".
46. A calibrated air leak between the pitot and the capacity bottle allows for the polar sink and therefore a netto variometer computes the resultant height gain or loss due to the air mass movement.
47. Continuos Flow is good to 30 000', Diluter Demand to 40 000, Pressure system with nasal spectacle.
48. An inversion limits the vertical development of thermals and is due to a negative lapse rate.
49. This is the difference between True and Magnetic north. It varies with time and geographical location.
50. Isobars are lines joining points of equal pressure on a weather map. If close together this means a high pressure gradient with resultant strong winds.
51. This is the effect on the wind direction due to the rotation of the earth and is to the left in the Southern Hemisphere and is proportional to the wind speed and varies with latitude.
52. The height at which air temperature becomes constant *(-56.5deg., - 6Km at Poles, 18Km at Equator)*
53. **In**coming **sol**ar radi**ation** heats the earth's surface, which in turn heats the overlying air mass.
54. Standing with your back to the wind, the high pressure is on your left in the Southern Hemisphere
55. **Environmental Lapse Rate** *(ELR)* is the rate at which temperature decreases with altitude on any one day. The **Dry Adiabatic Lapse Rate** *(DALR)* = 3 deg. C per 1000ft (1deg./300m). Once a cloud forms the DALR becomes the Saturated Lapse Rate *(SALR)* and is 1.1 deg. / 1000ft which is less due to release of latent heat. If DALR >ELR the air mass is said to be unstable.
56. This is the actual water content of the air expressed as a percentage of the saturated water content.
57. The down-slope movement of cold air. (e.g. on snow-capped mountains)
58. Due to the weight of air column above any point *(14.7 lb./sq. inch or 1013.2mb at sea level.)*
59. The RAS is the Indicated Airspeed corrected for pitot position and instrument error.
60. The TAS is the RAS corrected for pressure *(TAS=[57+H] / 57*RAS where H is in 000's feet)*
61. When the DALR is less than the ELR the air mass is stable. (see 55 above)
62. When the DALR is greater than the ELR the air mass is said to be unstable.
63. The wind direction is clockwise in the Southern Hemisphere in a Low or Depression.
64. The wind direction is anti-clockwise in the Southern Hemisphere in a High or Anti-cyclone..
65. This is the decrease in wind speed near the ground due to friction of the air with the ground.
66. At ground level it is towards a low but at an angle to the isobars and above 1500' along the isobars.
67. RED = emergency canopy jettison, BLUE = airbrakes, YELLOW = cable release, GREEN = trim.
68. The pilot should release immediately otherwise the tug could be 'up-ended' with usually fatal results.

69. In an emergency continue flying the aircraft then navigate and then communicate in this order. *(ANC!)*
70. Vne = speed which should never be exceeded and Vm = maximum speed at which full control movements can be deployed.
71. Tug has excessive ground run, a jerk causes glider to over run rope, glider wingtip touches ground.
72. Lift generated by the wing depends on airspeed, angle of attack, and wing area and air density.
73. The CofG of an aircraft is the point through which the total weight of the aircraft acts. *(balance point)*
74. The stalling speed increases in proportion to the amount of 'g' imposed.
75. Changing the angle of attack *(back pressure in a turn)* or increasing speed will increase the wing lift.
76. The static pressure is reduced and the dynamic is pressure increased.
77. Induced drag is caused by vortices generated by the equalization of pressure, mainly at the wing tips.
78. The stalling speed decreases. *(after selecting positive flaps on approach they should never be reduced)*
79. At the stall lift decreases and drag increases. *(cause of auto-rotation when one wing stalls first)*
80. Airbrakes cause the stall speed to increase and the glide angle to steepen. *(increased rate of descent).*
81. The glider requires more lift because of the increased 'g' force. *(see74)*
82. The further aft the CofG the easier it is to induce a spin *(if beyond rear limit may spin uncontrollably)*
83. No oil or grease on or near oxygen system as explosive spontaneous combustion can take place.
84. GREEN is the normal operating range and RED the Vne. *(see 70)*
85. For ASK13:– Vne = 200 Kph, Rough air = 140 Kph, Aerotow = 140 Kph, Winch launch = 100 Kph.
86. Because it is mandatory that gliders can communicate with a ground station.
87. Aerodrome traffic limits, if not published otherwise, are 2000ft above and 5 nautical miles of center.
88. Lower limit of the airway is 1500ft agl and upper limit is 38 000ft *(sub-scale on 1013.2)*
89. If launch is too slow lower the nose and unless speed picks up you should release.
90. If the launch is too fast yaw with the rudder but release if it exceeds the placard limit.
91. LS1 inspections should be carried out annually, after a major overhaul or on change of ownership.
92. 1500metres
93. Gliders are not permitted to fly in cloud in SA. *(Accidental entry - open airbrakes, centralize controls)*
94. Every two years on 1st Jan of every even year. The club CFI renews it.
95. A minimum of 40 flts and 30 hrs, of which 15hrs must be solo, are required after obtaining a Silver 'C'
96. The SSSA requires 5 hours flying time and 10 launches for each method of launch endorsed on GPL.
97. Except for very experienced pilots aerobatics should be completed by 2000ft agl.
98. The leading glider lands deep, .i.e. far down the runway, and the second glider lands short.
99. The take-off acceleration may cause the hands or feet to come off the controls.
100. If height permits return to the airfield and drop the rope over a clear area.
101. Make decision to bail out in plenty of time, jettison canopy, loosen harness, jump, and pull ripcord fully.
102. "HASSLL" **H**eight adequate, **A**irframe certified, **S**traps, **S**ecurity, **L**ocation and Lookout turns.
103. Consider the field's **S**ize, **S**urface, **S**lope, **S**tock, and the **S**un relative to the approach direction.
104. Level the glider and raise the nose. *Compare this with spin recovery.*
105. In a spiral dive the airspeed is higher and the speed of rotation slower than in a spin.
106. A Tephigram is a plot of pressure, temperature and moisture data from which can be read such things as wind direction and speed with height, trigger temperature, inversion level, thermal instability and likelihood of wave development, all of which are of interest to glider pilots.
107. A Tephigram is constructed by overlying five sets of lines, namely isobars, isotherms, saturated mixing ratio (or dew–point) lines, dry adiabats, and wet adiabats. Pressure, temperature and moisture data are obtained from radiosonde meteorological balloons.

108. Other than the tug pilot giving a blind call *"MIV has released glider at 3000ft south-east of the airfield"*, **no** communication between the glider and tug aircraft is permitted, except in an emergency.
109. Take up any slack in the actuating system then give a firm pull *(two in the case of a winch release).*
110. At least three people should assist, one being in-charge and giving instructions. Remove the tail-dolly.
111. "High-Key" is the point at which a normal circuit commences and is 1000ft agl and abeam the opposite threshold.
112. **"T**hat **L**ooks **A**bout **R**ight". The circuit is flown on its appearance only with a point opposite the touchdown reference point being at a vertical angle of about 35 degrees.

TEST YOURSELF!

If you are ready for the GPL Exams you should score at least 90%.

CGC Blanik at Fissantekraal