

## Robinson R22 Pilot's Technical Quiz

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<b>Candidate</b>	Name	
	Licence class	
	Licence number	
<b>Examiner</b>	Name	
	Licence number	
	Capacity	
<b>Centre</b>		
<b>Date</b>		
<b>Mark</b>	(Pass is 80/100= 80%)	

*Instructions: This is an open-book exam, for which you will need access to an up-to-date RH22 Pilot's Operating Handbook. For each question, mark the block on the answer sheet corresponding to the most correct answer. The quiz forces you to work through the handbook. However, you must also remember most of these facts for use during flight!*

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99	a	b	c	d
100	a	b	c	d

## Section A: Systems

1. The tail rotor is permanently connected to:
  - a. The main rotor.
  - b. The engine.
  - c. Both.
  - d. Neither.
  
2. The type of rotor is:
  - a. Fully articulated.
  - b. Rigid.
  - c. Semi-articulated.
  - d. Teetering.
  
3. The main rotor gearbox is:
  - a. Splash lubricated.
  - b. Lubricated by Teflon (PTFE) bushes.
  - c. Lubricated by a pressure-fed nozzle on each bearing.
  - d. Lubricated by nipples on each bearing.
  
4. The engine displacement is:
  - a. 1,6 l
  - b. 3,0 l
  - c. 5,2 l
  - d. 7,5 l
  
5. The engine manufacturer is:
  - a. Rotax
  - b. Lycoming
  - c. Pratt and Whitney
  - d. Continental

6. Why is the engine derated below its maximum power capacity?
- A. Because the gearbox cannot handle the full power.
  - B. Because there is insufficient airflow to cool the engine.
  - C. Because helicopter engines are subject to more regular power changes than aeroplane engines.
  - D. Because there is a need to maintain the same power to higher altitude.
- a. A, B and D.
  - b. A and B.
  - c. A, B, C and D.
  - d. D.
7. How is the engine restricted to its derated power level?
- a. With a governor.
  - b. By MAP limits imposed on the pilot.
  - c. By limiting the RPM.
  - d. By an automatic restrictor valve.
8. What is the engine layout?
- a. V6.
  - b. V8.
  - c. Boxer.
  - d. In-line.
9. The engine induction can be described as:
- a. Normal-aspirated carburettor.
  - b. Supercharged carburettor.
  - c. Normal-aspirated fuel injection.
  - d. Turbocharged fuel injection.
10. 100% rotor RPM corresponds to:
- a. 459 RPM
  - b. 495 RPM
  - c. 510 RPM
  - d. 530 RPM
11. 100% engine RPM corresponds to:
- a. 2295 RPM
  - b. 2474 RPM
  - c. 2550 RPM
  - d. 2652 RPM

12. The minimum oil temperature for takeoff is:
- a. 75°C
  - b. 75°F
  - c. 24°C
  - d. There is no minimum on Lycoming engines.
13. The minimum oil pressure for takeoff is:
- a. 25 PSI
  - b. 60 PSI
  - c. 90 PSI
  - d. 100 PSI
14. The minimum allowed thickness on the skid pads is:
- a. 0,06 mm
  - b. 6 mm
  - c. 1,5 mm
  - d. 0,15 mm
15. The hour meter (Hobbs) is activated by:
- a. Electrical power, when the Master switch is turned on.
  - b. Oil pressure, when the engine runs.
  - c. Rotor RPM, when above 80%.
  - d. Electrical power, when the radio is turned on.
16. The rotor brake may be operated:
- a. Below 50% rotor RPM.
  - b. Below 60% rotor RPM.
  - c. 30 s after pulling the engine cut-off.
  - d. Any time.
17. The governor is active above:
- a. 55% rotor RPM.
  - b. 75% rotor RPM.
  - c. 80% rotor RPM.
  - d. 97% rotor RPM.

18. The nominal battery voltage is:
- a. 6 V
  - b. 12 V
  - c. 24 V
  - d. 240 V
19. When the engine is started, the rotors immediately start turning slowly, before the clutch is engaged. The problem is:
- a. The lower clutch limit switch is adjusted incorrectly.
  - b. The upper clutch limit switch is adjusted incorrectly.
  - c. The V-belts are worn.
  - d. The lower drive shaft Telatemp has been overheated.
20. When the governor is turned on with the rotor RPM at 104% on the ground:
- a. The collective pitch control will tend to increase.
  - b. The collective pitch control will tend to decrease.
  - c. The cyclic pitch will tend to move forward.
  - d. The cyclic pitch will tend to move aft.
21. A Telatemp without a pencil mark is:
- a. Useless.
  - b. Serviceable.
  - c. Overheated.
  - d. Due for replacement.

## **Section B: Operations**

22. Who is responsible for maintaining airworthiness?
- a. The owner.
  - b. The instructor.
  - c. The pilot.
  - d. The Civil Aviation Authority.
23. Who is responsible for checking the aircraft's airworthiness before flight?
- a. The owner.
  - b. The instructor.
  - c. The pilot.
  - d. The Civil Aviation Authority.

24. Where can one find emergency procedures for the RH22?
- In the flight school's checklist.
  - In theory handbooks.
  - In the Pilot's Operating Handbook, Section 2.
  - In the Pilot's Operating Handbook, Section 3.
25. What is the minimum oil quantity for flight?
- 4 l
  - 4 US Quarts
  - 5,7 l
  - 6 US Quarts
26. What is a normal indication for the Manifold Air Pressure gauge during a preflight inspection at Wonderboom airport (elevation 4100')?
- 30"
  - 26"
  - 22"
  - 18"
27. What is the minimum pilot weight in a Beta with full tanks?
- 57 kg
  - 59 kg
  - 61 kg
  - 63 kg
28. Is flight permitted when the ALT warning light is on?
- No, never.
  - Yes, but only with a fresh battery.
  - Yes, but only with the Master switch off.
  - Yes.
29. Is flight without a governor allowed?
- Yes.
  - No.
  - Yes, if it has failed in flight.
  - Yes, if it has failed in flight or for training purposes.

30. The maximum allowed operating temperature (*not* the maximum demonstrated temperature!) at FL120 is:
- a. 0°C
  - b. 10°C
  - c. 20°C
  - d. 30°C
31. Which item, when unserviceable, precludes any further flight?
- a. Alternator.
  - b. Low RPM warning system.
  - c. OAT gauge.
  - d. Any of the above.
32. From which seat may a solo pilot fly?
- a. Left only.
  - b. Right only.
  - c. Either, if sufficient ballast is carried.
  - d. Either, if a weight and balance computation is performed.
33. What equipment is legally required for night flying?
- a. Various lights (landing, instrument, anti-collision etc.).
  - b. Dual landing lights.
  - c. Flight instruments (AI, altimeter, DI, ASI, Turn/bank etc).
  - d. All of the above.
34. When can car fuel (high octane leaded) be used in a Beta?
- a. Never.
  - b. Only for 10 hours per overhaul cycle.
  - c. Only below 8000' elevation.
  - d. Only below 6000' elevation.
35. The maximum demonstrated temperature at an altitude of 4000' is:
- a. 38°C.
  - b. 30°C.
  - c. 15°C.
  - d. 7°C.

36. The minimum acceptable tail skid height for a parked Beta is approximately:
- a. 300 mm
  - b. 600 mm
  - c. 900 mm
  - d. 1200 mm
37. The oil change interval is:
- a. 10 hours
  - b. 25 hours
  - c. 100 hours
  - d. 1800 hours
38. Which item can you fly without?
- a. Headset.
  - b. Pilot's Operating Handbook.
  - c. Mass and Balance document.
  - d. Pilot's checklist.
39. When may the aircraft be jump started if the battery is flat?
- a. Never.
  - b. Any time.
  - c. Only in emergencies.
  - d. Only from another helicopter's battery.
40. Why should you not land in tall grass?
- a. Recirculation problems, leading to loss of control or heavy landings.
  - b. Fire hazard.
  - c. The danger of unseen obstacles below the skids.
  - d. All of the above.
41. A pilot arrives at the airport during a heatwave. He/she/it should be:
- a. Careful, because the helicopter has a maximum certificated operating temperature.
  - b. Careful, because the air density is decreased.
  - c. Pleased, because the helicopter's performance is improved.
  - d. Pleased, because the visibility is probably better.



42. The pilot notices during flight that the auxiliary tank is approaching “Empty”, while there is still lots of fuel in the main tank. Given that the pilot remembers from ground school that the two tanks are interconnected, she is very worried.
- a. She should relax; the situation is to be expected.
  - b. The Auxiliary tank gauge has failed, and the flight should continue.
  - c. The Main tank gauge has failed, and the flight should continue.
  - d. There is a fuel leak in the Auxiliary tank, and the pilot should land as soon as possible.

### Section C: Handling

43.  $V_{NE}$  at 2500' altitude is:
- a. 102 KIAS
  - b. 102 KTAS
  - c. 99 KIAS
  - d. 99 KTAS
44.  $V_{NE}$  at 4500' altitude and 36°C is:
- a. 77 KIAS
  - b. 89 KIAS
  - c. 93 KIAS
  - d. 102 KIAS
45. Maximum continuous MAP on a Beta at 4100' altitude and 36°C is:
- a. 22,3"
  - b. 23,3"
  - c. 24,3"
  - d. 25,3"
46. With the governor off, and rotor RPM at 108%, you should:
- a. Lower collective.
  - b. Raise collective.
  - c. Close throttle.
  - d. Open throttle.

47. Below what rotor RPM can irrecoverable blade stalling occur at 6000' altitude?
- a. 83%
  - b. 86%
  - c. 90%
  - d. 97%
48. During a low G condition, the helicopter rolls sharply to the right. The correct recovery action is:
- a. Left cyclic, then lower collective.
  - b. Left cyclic, then raise collective.
  - c. Aft cyclic, then left cyclic.
  - d. Right pedal.
49. Carburettor heat is used when:
- a. The Carburettor Temperature gauge is in the yellow arc.
  - b. There is visible moisture around the helicopter.
  - c. The power setting is below 18" MAP.
  - d. Any of the above.
50. Carburettor heat is not used continuously in normal operations because:
- a. It sucks unfiltered air into the engine.
  - b. It reduces engine power because of decreased density.
  - c. It causes a magneto drop.
  - d. It increases exhaust back pressure unnecessarily.
51. Why must the magneto check be done after the mixture has been set?
- a. One must allow maximum time for the magnetos to warm up.
  - b. To ensure that the clutch is fully engaged.
  - c. To ensure that the governor is fully operational.
  - d. To prevent excessive drops due to fouled plugs.
52. Which restriction is recommended during trim usage?
- a. Activate trim only on the ground.
  - b. Activate trim only when carburettor heat is engaged.
  - c. Activate trim only with the hand around the left side of the cyclic stick.
  - d. Activate trim only when the frictions are off (loose).

53. The purpose of the trim control is:
- a. To increase speed during cruise.
  - b. To decrease fatigue due to lateral cyclic forces during takeoff and landing.
  - c. To decrease fatigue due to lateral cyclic forces during cruise.
  - d. To take over the role of the friction control during forward flight.
54. The following constitutes abnormal operation of the CLUTCH warning light:
- A. The light remains on for more than 8 s.
  - B. The light remains on for more than 5 s.
  - C. The light flickers a few times.
  - D. The light comes on at all.
- a. A
  - b. A, C
  - c. D
  - d. B or C
55. The following actions should be taken when the abnormality in the previous question is noted:
- A. Reduce power.
  - B. Increase power.
  - C. Turn off the clutch switch.
  - D. Pull the clutch circuit breaker.
- a. A, C
  - b. C
  - c. B, D
  - d. A, D
56. A pilot with 150 helicopter hours, 10 000 aeroplane hours and 50 hours on the RH22 wants to fly. The wind is 5 gusting 25 knots. May he fly?
- a. No.
  - b. Yes.
  - c. Yes, but not if it is turbulent.
  - d. Yes, but only if it is turbulent.
57. The best rotor RPM to allow maximum glide distance during autorotation is:
- a. 90%
  - b. 97%
  - c. 104%
  - d. 110%

58. The procedure to adopt when the tailrotor fails is:
- Autorotate.
  - Fly fast.
  - Both.
  - Neither.
59. If an engine fire occurs during start:
- Stop cranking immediately.
  - Keep cranking, to suck the fire into the engine.
  - Turn off the Master switch.
  - Lift off immediately.
60. If a difference is observed between the engine and rotor tachometers during flight:
- Always believe the engine tachometer.
  - Always believe the rotor tachometer.
  - Use the Low RPM warning system activation to determine which is correct, by using the one that shows 95% when the horn starts.
  - Use the Low RPM warning system activation to determine which is correct, by using the one that shows 90% when the horn starts.
61. Several possible plans of action are specified in the manual when there is an emergency. The following lists the four possible plans in order of increasing urgency:
- Continue flight, land as soon as possible, land as soon as practical, land immediately.
  - Continue flight, land as soon as practical, land as soon as possible, land immediately.
  - Land immediately, land as soon as practical, land as soon as possible, continue flight.
  - Land immediately, land as soon as possible, land as soon as practical, continue flight.
62. If there is a CHIP warning light, but no abnormal noises:
- Continue flight.
  - Land as soon as practical.
  - Land as soon as possible.
  - Land immediately.

63. If there is a MR CHIP warning light, with a growl from the main rotor gearbox:

- a. Continue flight.
- b. Land as soon as practical.
- c. Land as soon as possible.
- d. Land immediately.

64. Speed for best rate of climb ( $V_Y$ ) is:

- a. 53 KIAS
- b. 60 KIAS
- c. 65 KIAS
- d. 102 KIAS

65. Recommended takeoff speed is:

- a. 53 KIAS
- b. 60 KIAS
- c. 65 KIAS
- d. 102 KIAS

66. Recommended approach speed is:

- a. 53 KIAS
- b. 60 KIAS
- c. 65 KIAS
- d. 102 KIAS

67. Recommended autorotation speed is:

- a. 53 KIAS
- b. 60 KIAS
- c. 65 KIAS
- d. 102 KIAS

68. Why is the recommended takeoff speed not equal to  $V_Y$ ?

- a.  $V_Y$  is too hard to remember.
- b. The aircraft is more stable at the recommended speed.
- c. The recommended speed provides better engine cooling.
- d.  $V_Y$  would place the aircraft in the Dead Man's Curve.

69. Mixture may only be leaned in flight under the following circumstances:

- a. Only on the ground.
- b. Only at high altitude.
- c. Only during long cruising flights.
- d. Only when operating on one magneto.

70. The following factor aggravates mast bumping:
- Low speed.
  - Low rotor RPM.
  - Sideslipping.
  - All of these.
71. The recommended height at which 40 KIAS must be achieved during takeoff and landing is:
- 8'
  - 15'
  - 50'
  - 100'
72. The recommended height at which 60 KIAS must be achieved during takeoff and landing is:
- 8'
  - 15'
  - 50'
  - 100'
73. During an approach to land, the best strategy is to:
- First reduce speed, then reduce height.
  - First reduce height, then reduce speed.
  - Reduce height and speed simultaneously.
  - First achieve a hover, and then descend to touchdown.
74. The greatest threat to experienced aeroplane pilots in the RH22 is:
- Control reversal effects.
  - Confusion on the sense in which the pedals operate.
  - Much lighter stick forces.
  - The tendency to create low-G conditions by pushing forward on the stick.
75. When changing passengers, the following conditions should exist:
- 104% rotor RPM, with the pilot helping the passengers in and out.
  - 75% rotor RPM, with the pilot helping the passengers in and out.
  - 104% rotor RPM, with the pilot's hands on the controls.
  - 75% rotor RPM, with the pilot's hands on the controls.

**Section D: Performance**

76. A Beta's maximum weight for IGE hover at 7000' and 30°C is:
- a. 1270 lbs
  - b. 1300 lbs
  - c. 1330 lbs
  - d. 1370 lbs
77. A Beta's maximum weight for OGE hover at 4100' and 35°C is:
- a. 1270 lbs
  - b. 1300 lbs
  - c. 1330 lbs
  - d. 1370 lbs
78. Before flying a Beta with new-style seats, an empty weight of 384 kg and a moment arm of 104,8", an 85 kg pilot and his 60 kg passenger load the baggage compartments to capacity. The maximum fuel they can carry is:
- a. 44 l
  - b. 56 l
  - c. 68 l
  - d. 80 l
79. Referring to the previous question, what is their moment arm at takeoff?
- a. 95"
  - b. 96"
  - c. 97"
  - d. 98"
80. Referring to the previous two questions, what is their moment arm when there is no fuel left in the tanks?
- a. 95"
  - b. 96"
  - c. 97"
  - d. 98"

## Section E: Instruments

The table below lists many different instruments. In each case, use the following scale to explain what will happen if the Master switch is turned off:

- a. There will be no effect.
- b. The instrument will start operating.
- c. The instrument will stop operating.
- d. The instrument will be less accurate.

81. Altimeter
82. VSI (Vertical Speed Indicator)
83. ASI (Airspeed Indicator)
84. AI (Attitude Indicator)
85. Engine tachometer
86. Rotor tachometer
87. DI (Direction Indicator)
88. Turn coordinator
89. Compass
90. OAT (Outer Air Temperature) gauge
91. Low RPM warning system
92. Governor
93. Warning lights
94. Oil pressure gauge
95. Oil temperature gauge
96. CHT (Cylinder Head Temperature) gauge

## Section F: The Pilot's Operating Handbook

97. In a Beechcraft Super King Air 200 manual, in which section will emergency procedures be found?
- a. Section 2
  - b. Section 3
  - c. Section 4
  - d. Section 5
98. Arrange the three terms *Warning*, *Caution* and *Note* in order of increasing urgency:
- a. Note, Warning, Caution
  - b. Note, Caution, Warning
  - c. Caution, Note, Warning
  - d. Caution, Warning, Note



99. Which manual should you consult when doing your final preflight planning for a cross-country flight?
- a. The manual you received during training.
  - b. The manual at the flight school.
  - c. The manual in the aircraft.
  - d. The manual on the manufacturer's Web site.
100. What is the  $V_{NE}$  in cruise at sea level for an RH22 with floats?
- a. 102 KIAS
  - b. 102 KIAS
  - c. 95 KIAS
  - d. 95 KTAS