

1 Fill the gaps in the sentences using the words and expressions in the box.

10 marks

up and down lower forwards side to the left back decrease
backwards raised to the right

- 1 The landing gear is _____ and lowered automatically.
- 2 Lateral movement is when something moves from _____ to side.
- 3 The valve can be opened or closed to increase or _____ the flow of oil.
- 4 The flaps are moved _____ by hydraulics.
- 5 When you engage reverse gear, the car will move _____.
- 6 When you engage first gear, the car will move _____.
- 7 The pilot has to _____ the landing gear before landing.
- 8 When the pilot pulls the joystick _____, the plane climbs.
- 9 Turn the screw _____ to tighten it.
- 10 To loosen the screw, turn it _____.

2 Choose the correct verb to complete each sentence.

10 marks

- 1 The rate at which the water *flows* / *flies* is determined by the dimensions of the pipe.
- 2 The air brake system *actuates* / *extends* and retracts the air brake.
- 3 The water is *pumped* / *pulled* to a higher level.
- 4 A cat is able to *access* / *absorb* the shock of landing.
- 5 If the oil light comes on, it may *initiate* / *indicate* a problem.
- 6 The selector valve solenoid is *energised* / *electrified* by the selector switch.
- 7 The elevators *rise* / *raise* the front of the plane.
- 8 The pilot *retracts* / *retraces* the aircraft's wheels during flight.
- 9 He *managed* / *manoeuvred* the plane into the best position.
- 10 The pilot pulls the joystick back if he wants the plane to *climb* / *cling* to a higher level.

3 Complete the sentences with adjectives and adverbs from the box.

10 marks

primary mechanical stiff inoperative longitudinal rolling excessive
hydraulically accurately partially

- 1 The control surfaces help the pilot to manoeuvre _____.
- 2 The controls are _____ if there is _____ tension in the control cables.
- 3 Aircraft may be fitted with _____ linkages for the _____ control surfaces such as the rudder and the ailerons.
- 4 Ailerons control the _____ movement of the plane in the _____ axis.
- 5 The flaps and air brake are usually _____ operated.
- 6 The flaps are _____ extended when the plane takes off.
- 7 A valve prevents any fluid from entering the actuator when the hydraulic system is _____.

4 Match the sentence halves.

10 marks

- | | |
|---|--|
| 1 If a window in the plane is broken, | if you fly a taildragger. |
| 2 You can get a private pilot's licence | the team flies an eight-plane formation. |
| 3 If one pilot is unable to fly, | the cabin pressure drops. |
| 4 When you press this pedal, | when you are seventeen years old. |
| 5 There is more danger of groundlooping | the rudder moves. |

5 Expand the notes to make sentences similar to the ones in Test 4, beginning with *If* or *When*.

10 marks

- 1 water/hits/valve/it/closes

- 2 landing gear/small/plane/fly/faster

- 3 light/comes/on/air brake/extended

- 4 push/pull/joystick/elevators/move

- 5 pilot/tired/make/mistakes

6 Read these maintenance instructions for a hydraulic system and decide whether the statements are true or false according to the text.

10 marks

A thorough visual check of the system components should be a part of the regular maintenance routine and done at least as often as you change the oil. The most common problems to look for are leaks, usually in the seals of the slave cylinder that actuates the rudder, but they may also appear at any joint in the system lines.

Seal leaks can be the result of several conditions. The seals may simply be worn, or possibly damaged by dirt that has been drawn in through the cylinder piston. For that reason, you should keep the piston clean as part of your maintenance routine. The seals can also be affected by a bent piston rod, which may be the result of a poorly aligned or improperly installed system.

The condition of rigid and flexible hydraulic lines should be checked regularly, especially the exposed flexible hoses that may be subject to chafe or wear because of movement during regular operation. Any lines that exhibit fraying or seepage should be replaced immediately to avoid an untimely failure, and the cause of the damage should be removed. A common source of the problem is unsecured equipment or supplies that are haphazardly stored.

When replacing flexible fluid lines, ensure that the new ones are between 5% and 8% longer than the distance between fittings and that they are flexible and free running when attached to moving actuators.

The hydraulic fluid in the system's reservoir must be maintained to the level specified by the manufacturer to avoid the introduction of air into the lines and cylinders. If the reservoir needs to be filled up regularly, the system may have a leak. Be sure to follow up with a more detailed inspection. The fluid should not require changing, except in instances of contamination by water intrusion, as indicated by a milky coloration. When fluid is added, it must comply with the manufacturer's recommendations to avoid potential damage to seals and o-rings.

Mechanical attachment points like clevis pins, ball joints and yokes should be kept lubricated. You should also regularly check these points for corrosion or excess wear. These components are subjected to very high loads, even during normal use, so proper lubrication is essential to ease their operation and reduce wear. When replacing steering system parts, always use new locking hardware such as snap rings or cotter pins.

(Adapted from <http://www.motorboating.com/motorboat/boatkeeper/article/0,12696,480304,00.html>)

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|---|------------|
| 1 Always change the oil when you inspect the system. | True/False |
| 2 Hydraulic fluid often leaks from joints. | True/False |
| 3 Bent piston can cause damage to seals. | True/False |
| 4 Badly stored equipment is often damaged by fluid lines. | True/False |
| 5 Fluid lines do not always need to be flexible. | True/False |
| 6 Don't let air get into the cylinders. | True/False |

- | | |
|---|------------|
| 7 It's normal for the system to need filling up regularly. | True/False |
| 8 Use fluid which the manufacturer recommends. | True/False |
| 9 You never need to change the hydraulic fluid. | True/False |
| 10 Lubrication of mechanical parts reduces corrosion. | True/False |