# Stability

1 The aerodynamic damping forces resulting from aircraft attitude changes in flight

a) are not affected by altitude since damping is dependent upon speed and the amount of displacement.
b) are lower at high altitude due to the reduced density.
c) are not affected by altitude since damping is only dependent upon speed.
d) are greater at altitude because of the higher TAS and therefore greater dynamic pressure.

2 As a consequence of having the C of G close to its aft limit :

a) the stick forces when pitching the nose down will be very high.
b) the stick forces will be high in fore and aft pitch, due to the high longitudinal stability.
c) the stick forces in roll will be high to overcome the instability.
d) the stick forces to manoeuvre longitudinally will be low due to the low stability.

3 Forward movement of the centre of gravity will

a) decrease static directional stability
b) increase static longitudinal stability
c) increase dynamic lateral stability
d) decrease static longitudinal stability

4 Sweepback

a) increases static lateral stability
b) increases static directional stability
c) increases static longitudinal stability
d) has no effect on stability

5 To have longitudinal stability , and aircraft must have

a) the centre of gravity behind the centre of pressure
b) the centre of gravity in front of the centre of pressure
c) the centre of pressure in front of the centre of gravity
d) be flown faster than its stalling speed

6 Longitudinal dihedral is required to give an aircraft longitudinal stability. An aircraft that has this would have

a) the angle of incidence of the wing greater than the tailplane
b) the angle of incidence of the wing less than the tailplane
c) a negative angle of incidence on the tailplane
d) dihedral on the tailplane

7 With an increase in altitude, the directional stability of an aircraft:

a) increases
b) decreases
c) remains constant
d) increases to the tropopause then decreases

8 Which of the following effects will result from moving the centre of gravity aft

a) the stalling angle will increase
b) longitudinal stability will deteriorate
c) greater elevator deflection is required to achieve a given change in attitude
d) the indicated stalling speed will increase

9 Two identical aircraft are cruising in formation at identical weights. One aircraft is loaded close to its aft C of G limit, and the other loaded close to its forward limit. Which aircraft will have the lowest power setting

a) the aircraft with the aft C of G
b) the aircraft with the forward C of G
c) C of G position has no relevance upon the power required
d) Power setting will be the same as the aircraft have identical weight

10 An aircraft has positive stability if after it has been disturbed from its trimmed position:

a) it has a tendency to return to the original trimmed position.
b) it will continue to move away from the trimmed condition.
c) it will remain at its new position with no tendency to return to the original trimmed position.
d) it goes to the opposite side the amount it was disturbed to one side.

11 As a result of the lateral centre of pressure movement accompanying, flap deployment:

a) lateral stability is increased.
b) lateral control effectiveness is increased.
c) lateral stability is decreased.
d) lateral stability is no more present.

12 Longitudinal dihedral is required to give an aircraft longitudinal stability. An aircraft that has this would have

a) dihedral on the tailplane
b) the angle of incidence of the wing is greater than the tailplane
c) the angle of incidence of the wing is less than the tailplane
d) a negative angle of incidence on the tailplane

13 The term Longitudinal Dihedral means the aircraft has

a) dihedral on the tailplane
b) an angle of incidence of the wing less than the tailplane
c) a negative angle of incidence on the tailplane
d) an angle of incidence of the wing greater than the tailplane

14 Aircraft designed for less lateral manoeuvrability have

a) greater wing dihedral, but less sweepback
b) less wing dihedral, but greater sweepback
c) greater wing dihedral and sweepback
d) smaller ailerons

15 The purpose of aircraft wing dihedral angle is to

a) increase lateral stability
b) increase longitudinal stability
c) increase lift coefficient of the wing
d) reduce drag in turns

16 Dynamic longitudinal instability in an aircraft can be identified by

a) the need to apply continuous forward pressure on the elevators
b) the need to apply continuous back pressure on the elevators
c) pitch oscillations becoming progressively larger
d) pitch response to elevators becoming less positive

17 Longitudinal stability involves the motion of the aircraft about the

a) longitudinal axis
b) lateral axis
c) vertical axis
d) thrust axis

18 An aircraft that has Longitudinal dihedral

a) has the wing higher than the tailplane
b) has the wing at a higher angle of incidence than the tailplane
c) has the wing at a lower angle of incidence than the tailplane
d) has dihedral on the tailplane

19 In order for an aeroplane to be dynamically stable, it must

a) have C of G aft of the centre of pressure
b) have positive static stability
c) have C of G forward of the centre of pressure
d) have positive wing dihedral angle

20 What effect will rearward movement of the Centre of Gravity have on the static stability of an aeroplane

a. longitudinal stability will improve
b. directional stability will deteriorate
c. lateral stability will improve
d. longitudinal stability will deteriorate and directional stability will improve

21 Which of the following statements correctly describes the speed stability characteristics of a jet transport aircraft when operating in the region of reversed command (slower than $V_{IMD}$)?

a) any decrease in speed will result in increased power required to maintain altitude while an increase in speed will result in less power required to maintain altitude
b) any increase in speed will result in increased power required to maintain altitude while a decrease in speed will result in less power required to maintain altitude
c) small power increases will lead to a rapid decrease in speed while large power increases will result in a slow decrease
d) in speed small power increases will lead to a rapid increase in speed while large power increases will result in a slow increase in speed

22 If an aircraft is flown with the centre of gravity ahead of the forward limit, it would display:

a) enhanced elevator authority
b) degraded elevator authority
c) improved lateral stability
d) decreased lateral stability

23 The pilot of a large, heavy aircraft on approach to land with an excessively aft C of G will experience:

a) heavy elevator controls and decreased pitch stability
b) heavy elevator controls and increased pitch stability
c) light elevator controls and decreased pitch stability
d) light elevator controls and increased pitch stability

24 Which of the following statements is NOT correct concerning the effects of sweepback on aircraft performance?

a) sweepback increases lateral stability
b) sweepback increases directional stability
c) sweepback reduces the tendency to Dutch Roll
d) sweepback increases the tendency for a wing to stall tip first

25 Dutch roll is:

a) a type of slow roll
b) primarily a pitching instability
c) a combined pitch and yaw
d) a combined roll and yaw

26 If a lateral disturbance affects an aircraft at the stalling angle:

a) the downgoing wing will normally stall first
b) the upgoing wing will normally stall first
c) the effect will depend on aircraft speed
d) both wings will stall at the same moment if the taper ratio is unity

27 Yaw dampers:

a) augment aircraft stability
b) must be disengaged when turning
c) must be disengaged before the autopilot when turning
d) must be disengaged when landing

28 The tendency of an aircraft to dutch roll can be reduced by:

a) sweeping the wings
b) giving the wings anhedral
c) reducing the size of the fin
d) longitudinal dihedral

29 When an aircraft is disturbed laterally, dihedral will provide the restoring force by

a) giving the down going wing a larger angle of attack
b) giving the down going wing a lower aspect ratio
c) giving the up going wing a larger angle of attack
d) giving the down going wing a higher aspect ratio

30 When an aircraft is disturbed laterally, sweepback will provide the restoring force by

a) giving the down going wing a larger angle of attack
b) giving the down going wing a lower aspect ratio
c) giving the up going wing a larger angle of attack
d) giving the down going wing a higher aspect ratio

31 An aircraft will experience Dutch Roll when

a) longitudinal stability is greater than directional stability
b) directional stability is greater than lateral stability
c) lateral stability is greater than directional stability
d) when it has too much dihedral or sweepback

## Answers

**1.b 2.d 3.b 4.a 5.b 6.a 7.b 8.b 9.a 10.a 11.c 12.b 13.d 14.c 15.a 16.c 17.b 18.b 19.b 20.b 21.a 22.b 23.c 24.c 25.d 26.a 27.a 28.b 29.a 30.d 31.c**