Questions

1. **For a given take-off mass, the maximum brake energy limit speed (V_{MBE}), as an indicated airspeed, will:**

    a. decrease with increasing altitude, and decrease with increasing temperature
    b. increase with increasing altitude and increase with increasing temperature
    c. decrease with increasing altitude, and increase with increasing temperature
    d. not change with altitude, but decrease with increasing temperature

2. **Provided all other parameters stay constant, which of the following statements will decrease the take-off ground run?**

    a. Decreased take-off mass, increased pressure altitude, increased temperature
    b. Decreased take-off mass, increased density, increased flap setting
    c. Increased pressure altitude, increased outside air temperature, increased take-off mass
    d. Increased outside air temperature, decreased pressure altitude, decreased flap setting

3. **A multi-engine aeroplane is flying at the minimum control speed (V_{MCA}). Which parameter(s) must be maintainable after engine failure?**

    a. Heading, altitude and a positive rate of climb of 100 ft/min
    b. Altitude
    c. Straight flight
    d. Straight flight and altitude

4. **How is V_{MCA} influenced by increasing pressure altitude?**

    a. V_{MCA} decreases with increasing pressure altitude
    b. V_{MCA} increases with pressure altitude higher than 4000 ft
    c. V_{MCA} increases with increasing pressure altitude
    d. V_{MCA} is not affected by pressure altitude

5. **Which of the following speeds can be limited by the 'maximum tyre speed'?**

    a. Lift-off ground speed
    b. Lift-off IAS
    c. Lift-off TAS
    d. Lift-off EAS

6. **A higher outside air temperature (OAT):**

    a. decreases the brake energy limited take-off mass
    b. increases the field length limited take-off mass
    c. increases the climb limited take-off mass
    d. decreases the take-off distance

7. **The take-off performance requirements for Class A transport category aeroplanes are based upon:**

a. failure of critical engine
b. failure of critical engine or all engines operating whichever gives the largest take-off distance
c. all engines operating
d. only one engine operating

8. **Maximum and minimum values of V_1 can be limited by:**

a. V_R and V_{MCG}
b. V_2 and V_{MCA}
c. V_R and V_{MCA}
d. V_2 and V_{MCG}

9. **During the certification flight testing of a twin-engine turbojet aeroplane, the actual demonstrated take-off distances are equal to:**

1547 m with all engines operating
1720 m with failure of the critical engine at V_1 and with all other things remaining unchanged.
The take-off distance adopted for the certification file is:

a. 1547 m
b. 1720 m
c. 1779 m
d. 1978 m

10. **The minimum value that V_2 must exceed "air minimum control speed" is by:**

a. 15%
b. 20%
c. 30%
d. 10%

11. **With regard to a take-off from a wet runway, which of the following statements is correct?**

a. Screen height cannot be reduced
b. The screen height can be lowered to reduce the mass penalties
c. When the runway is wet, the V_1 reduction is sufficient to maintain the same margins on the runway length
d. In case of a thrust reverser inoperative, the wet runway performance information can still be used

12. **Balanced V_1 is selected:**

a. for a runway length limited take-off with a clearway to give the highest mass
b. if it is equal to V_2
c. if the accelerate-stop distance required is equal to the one engine out take-off distance required
d. for a runway length limited take-off with a stopway to give the highest mass

13. **How is V_2 affected if take-off flaps at 20° is chosen instead of take-off flaps at 10°?**

a. V_2 increases in proportion to the angle at which the flaps are set
b. V_2 has no connection with take-off flap setting, as it is a function of runway length only
c. V_2 decreases if not restricted by V_{MCA}
d. V_2 has the same value in both cases

14. **Which statement regarding the influence of a runway downslope is correct for a balanced take-off? Downslope:**

a. increases V_1 and reduces the accelerate-stop distance required (ASDR)
b. reduces V_1 and increases the accelerate-stop distance required (ASDR)
c. increases V_1 and increases the take-off distance required (TODR)
d. reduces V_1 and reduces take-off distance required (TODR)

15. **Ignoring the minimum control speed limitation, the lowest take-off safety speed (V_{2min}) is:**

a. $1.15V_S$ for all turbojet aeroplanes
b. $1.20V_S$ for all turboprop powered aeroplanes
c. $1.13V_{SR}$ for two-engine and three-engine turbo-propeller powered aeroplanes
d. $1.13V_{SR}$ for turbo-propeller powered aeroplanes with more than three engines

16. **During the flight preparation a pilot makes a mistake by selecting a V_1 greater than that required. Which problem will occur when the engine fails at a speed immediately above the correct value of V_1?**

a. The stop distance required will exceed the stop distance available
b. The one engine out take-off distance required may exceed the take-off distance available
c. V_2 may be too high so that climb performance decreases
d. It may lead to over-rotation

17. **The speed V_2 of a jet aeroplane must be greater than: (assume the aeroplane has provisions for obtaining a significant reduction in the one engine inoperative power-on stall speed.)**

a. $1.13V_{MCG}$
b. $1.05V_{LOF}$
c. $1.3V_1$
d. $1.08V_{SR}$

18. **When an aircraft takes off with the mass limited by the TODA or field length:**

a. the actual take-off mass equals the field length limited take-off mass
b. the distance from brake release to V_1 will be equal to the distance from V_1 to the 35 ft point
c. the "balanced take-off distance" equals 115% of the "all engine take-off distance"
d. the end of the runway will be cleared by 35 ft following an engine failure at V_1

19. **A runway is contaminated by a 0.5 cm layer of wet snow. The take-off is nevertheless authorized by a light-twin's flight manual. The take-off distance in relation to a dry runway will be:**

a. very significantly decreased
b. increased
c. unchanged
d. decreased

20. **What will be the influence on the aeroplane performance at higher pressure altitudes?**

a. It will increase the take-off distance
b. It will decrease the take-off distance
c. It will increase the take-off distance available
d. It will increase the accelerate-stop distance available

21. **During certification test flights for a turbojet aeroplane, the actual measured take-off runs from brake release to a point equidistant between the point at which V_{LOF} is reached and the point at which the aeroplane is 35 ft above the take-off surface are:**

1747 m, all engines operating
1950 m, with the critical engine failure recognized at V1, and all the other factors remaining unchanged.
Considering both possibilities to determine the take-off run (TOR), what is the correct distance?

a. 1950 m
b. 2009 m
c. 2243 m
d. 2096 m

22. **Given that:**
V_{EF} = Critical engine failure speed
V_{MCG} = Ground minimum control speed
V_{MCA} = Air minimum control speed
V_{MU} = Minimum unstick speed
V_1 = Take-off decision speed
V_R = Rotation speed
V_{2MIN}. = Minimum take-off safety speed

The correct formulae are:

a. $1.05V_{MCA}$ is less than or equal to V_{EF}, V_{EF} is less than or equal to V_1
b. $1.05V_{MCG}$ is less than V_{EF}, V_{EF} is less than or equal to V_R
c. V_{2MIN} is less than or equal to V_{EF}, V_{EF} is less than or equal to V_{MU}
d. V_{MCG} is less than or equal to V_{EF}, V_{EF} is less than V_1

23. **If the field length limited take-off mass has been calculated using a balanced field length technique, the use of any additional clearway in take-off performance calculations may allow:**

a. a greater field length limited take-off mass but with a higher V_1
b. the obstacle clearance limit to be increased with no effect on V_1
c. the obstacle clearance limit to be increased with a higher V_1
d. a greater field length limited take-off mass but with a lower V_1

24. **The result of a higher flap setting up to the optimum at take-off is:**

a. a higher V_1
b. a longer take-off run
c. a shorter ground roll
d. an increased acceleration

25. **For Class A aeroplanes the take-off run is:**

a. the horizontal distance along the take-off path from the start of the take-off to a point equidistant between the point at which V_{LOF} is reached and the point at which the aeroplane is 35 ft above the take-off surface
b. 1.5 times the distance from the point of brake release to a point equidistant between the point at which V_{LOF} is reached and the point at which the aeroplane attains a height of 35 ft above the runway with all engines operative
c. 1.15 times the distance from the point of brake release to the point at which V_{LOF} is reached assuming a failure of the critical engine at V_1
d. the distance of the point of brake release to a point equidistant between the point at which V_{LOF} is reached and the point at which the aeroplane attains a height of 50 ft above the runway assuming a failure of the critical engine at V_1

26. **Which statement is correct for a Class A aeroplane?**

a. V_R must not be less than $1.05V_{MCA}$ and not less than $1.1V_1$
b. V_R must not be less than $1.05V_{MCA}$ and not less than V_1
c. V_R must not be less than V_{MCA} and not less than $1.05V_1$
d. V_R must not be less than $1.1V_{MCA}$ and not less than V_1

27. **During certification flight testing on a four engine turbojet aeroplane the actual take-off distances measured are:**

2555 m with all engines operating
3050 m with failure of the critical engine recognized at V_1 and all other things being equal.

The take-off distance adopted for the certification file is:

a. 3050 m
b. 3513 m
c. 2555 m
d. 2938 m

28. **When the outside air temperature increases, then:**

a. the field length limited take-off mass decreases but the climb limited take-off mass increases
b. the field length limited take-off mass increases but the climb limited take-off mass decreases
c. the field length limited take-off mass and the climb limited take-off mass decreases
d. the field length limited take-off mass and the climb limited take-off mass increases

29. **In case of an engine failure which is recognized at or above V_1:**

a. the take-off should be rejected if the speed is still below V_R
b. the take-off must be continued
c. the take-off must be rejected if the speed is still below V_{LOF}
d. a height of 50 ft must be reached within the take-off distance

30. **V_R cannot be lower than:**

a. 105% of V_1 and V_{MCA}
b. $1.2V_S$ for twin and three engine jet aeroplane
c. $1.15V_S$ for turboprop with three or more engines
d. V_1 and 105% of V_{MCA}

31. **If the performance limiting take-off mass of an aeroplane is brake energy limited, a higher uphill slope would:**

a. have no effect on the maximum mass for take-off
b. decrease the required take-off distance
c. increase the maximum mass for take-off
d. decrease the maximum mass for take-off

32. **In which of the following distances can the length of a stopway be included?**

a. In the accelerate-stop distance available
b. In the one-engine failure case, take-off distance
c. In the all engine take-off distance
d. In the take-off run available

33. **In the event of engine failure below V_1, the first action to be taken by the pilot in order to decelerate the aeroplane is to:**

a. apply wheel brakes
b. deploy airbrakes or spoilers
c. reduce the engine thrust
d. reverse engine thrust

34. **Which is the correct sequence of speeds during take-off?**

a. V_1, V_R, V_2, V_{MCA}
b. V_{MCG}, V_1, V_R, V_2
c. V_1, V_{MCG}, V_R, V_2
d. V_1, V_R, V_{MCG}, V_2

35. **Which of the following distances will increase if you increase V_1?**

a. All engine take-off distance
b. Take-off run
c. Accelerate-stop distance
d. Take-off distance

36. If the value of the balanced V_1 is found to be lower than V_{MCG}, which of the following is correct?

a. The ASDR will become greater than the one engine out take-off distance
b. The take-off is not permitted
c. The one engine out take-off distance will become greater than the ASDR
d. The V_{MCG} will be lowered to V_1

37. For this question use Figure 4.4 in CAP 698 Section 4.

For an example twin engine turbojet aeroplane two take-off flap settings (5° and 15°) are certified.

Given:
Field length available = 2400 m
Outside air temperature = - 10°C
Airport pressure altitude = 7000 ft
The maximum allowed take-off mass is:

a. 55 000 kg
b. 70 000 kg
c. 52 000 kg
d. 56 000 kg