Questions

1. **What happens to the speed for V_X and V_Y with increasing altitude?**

   a.   Both remain constant
   b. V_X remains constant and V_Y increases
   c. V_X increases and V_Y remains constant
   d. V_X remains constant and V_Y decreases

2. **The effects of a contaminated runway on take-off are:**

   a.   decreased weight, increased V_1, increased V_R
   b.   decreased weight, same V_1, increased V_R
   c.   decreased weight, same V_1, same V_R
   d.   decreased weight, decreased V_1, decreased V_R

3. **When operating with anti-skid inoperative:**

   a.   both landing and take-off performance will be affected
   b.   only landing performance will be affected
   c.   only take-off performance will be affected
   d.   neither take-off nor landing performance will be affected

4. **When comparing V_X to V_Y:**

   a. V_X will always be greater than V_Y
   b. V_Y will always be greater than or equal to V_X
   c. V_Y will always be greater than V_X
   d. V_X will sometimes be greater than V_Y, but sometimes be less than V_Y

5. **Referring to Fig. 4.24 in CAP 698. Why does the curve for an equivalent weight of 35 000 kg only start 4 mins after engine failure?**

   a.   All the curves start at the same point higher up
   b.   At that altitude the engine takes longer to spool down after failure
   c.   At that weight the aircraft has a higher TAS and therefore more momentum
   d.   At that weight the aircraft takes longer to slow down to the optimum drift down speed

6. **With which conditions would one expect V_{MC} to be the lowest?**

   a.   Cold temp, low altitude, low humidity
   b.   Hot temp, low pressure altitude, high humidity
   c.   Hot temp, high pressure altitude, high humidity
   d.   Cold temp, high altitude, low humidity

7. Give the correct order for the following:

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

8. If the C of G moves aft from the most forward position:

   a. the range and the fuel consumption will increase
   b. the range and the fuel consumption will decrease
   c. the range will increase and the fuel consumption will decrease
   d. the range will decrease and the fuel consumption will increase

9. Descending below the tropopause from FL370 to FL250 at a steady Mach Number, then FL250 to FL100 at a constant CAS, what happens to descent angle?

   a. Increase   Increase
   b. Increase   Constant
   c. Decrease   Decrease
   d. Constant   Constant

10. With a constant weight and Mach No., a higher altitude will require:

    a. lower C_L
    b. lower C_D
    c. higher AoA
    d. no change

11. When approaching a wet runway, with the risk of hydroplaning, what technique should the pilot adopt with an inoperative anti-skid system?

    a. Positive touchdown, full reverse and brakes as soon as possible
    b. Smoothest possible touchdown, full reverse and only brakes below V_P
    c. Positive touchdown, full reverse and only brakes below V_P
    d. Normal landing, full reverse and brakes at V_P

12. An aircraft with a grad of 3.3%, flying at an IAS of 85 kt. At a P.ALT of 8500' with a temp of +15°C will have an ROC of:

    a. 284'/min
    b. 623'/min
    c. 1117'/min
    d. 334'/min

13. An aircraft with a mass of 110 000 kg is capable of maintaining a grad of 2.6%. With all the atmospheric variables remaining the same, with what mass would it be able to achieve a grad of 2.4%?

    a. 119 167 kg
    b. 101 530 kg
    c. 110 000 kg
    d. 121 167 kg

14. **Give the correct sequence:**

  a. V_S, V_X, V_Y
  b. V_X, V_S, V_Y
  c. V_S, max range speed, max endurance speed
  d.   max endurance speed, V_S, max range speed

15. **Flying at an altitude close to coffin corner gives:**

  a.   max speed
  b.   less manoeuvrability
  c.   greater 1 engine inoperative range
  d.   greater 1 engine inoperative endurance

16. **The main reason for using the step climb technique is to:**

  a.   decrease sector times
  b.   increase endurance
  c.   adhere to ATC procedures
  d.   increase range

17. **Ignoring the effect of compressibility, what would C_L do with an increase in altitude?**

  a.   Increase
  b.   Decrease
  c.   Remain the same
  d.   Increase, then decrease

18. **In climb limited mass calculations, the climb gradient is a ratio of:**

  a.   height gained over distance travelled through the air
  b.   height gained over distance travelled across the ground
  c.   TAS over rate of climb
  d.   TGS over rate of climb

19. **In a twin-engine jet aircraft with six passenger seats, and a maximum certified take-off mass of 5650 kg, what is the required en route obstacle clearance, with one engine inoperative during drift down towards the alternate airport?**

  a.   2000 ft
  b.   1500 ft
  c.   1000 ft
  d.   50 ft or half the wingspan

20. **When does THRUST = DRAG?**

  a.   Climbing at a constant IAS
  b.   Descending at a constant IAS
  c.   Flying level at a constant IAS
  d.   All of the above

21. **When take-off mass is limited by V$_{MBE}$, an increase in the uphill slope will:**

    a. have no effect
    b. require a decrease in the mass
    c. allow an increase in the mass
    d. decrease the TODR

22. **SFC will:**

    a. increase if C of G is moved further forward of the C of P
    b. decrease if C of G is moved further forward of the C of P
    c. not be affected by C of G position
    d. only be affected by C of G position if it is behind the C of P

23. **Reference point zero refers to the:**

    a. point where the aircraft lifts off the ground
    b. point where the aircraft reaches V$_2$
    c. point where the aircraft reaches 35 ft
    d. point where gear is selected up

24. **To maintain the same angle of attack and altitude at a higher gross weight an aeroplane needs:**

    a. less airspeed and same power
    b. the same airspeed
    c. more airspeed and less power
    d. more airspeed and more power

25. **The coefficient of lift may be increased by lowering the flaps or:**

    a. increasing CAS
    b. reducing nose-up elevator trim
    c. increasing angle of attack
    d. increasing TAS

26. **An aircraft is certified to land with flaps at either 25 or 35 degrees of flap. If the pilot selects the higher setting there will be:**

    a. increased landing distance and reduced go-around performance
    b. increased landing distance and improved go-around performance
    c. reduced landing distance and improved go-around performance
    d. reduced landing distance and reduced go-around performance

27. **Which conditions are most suited to a selection of lower flap for take-off?**

    a. Low airfield elevation, close obstacles, long runway, high temperature
    b. Low airfield elevation, no obstacles, short runway, low temperature
    c. High elevation, no obstacles, short runway, low temperature
    d. High airfield elevations, distant obstacles, long runway, high ambient temperature

28. During the certification of an aeroplane, the take-off distance with all engines operating and the take-off distance with one engine inoperative are:

1547 m
1720 m

What is the distance used in the aircraft certification?

a. 1547 m
b. 1779 m
c. 1720 m
d. 1798 m

29. V_{2MIN} is determined by: (excluding V_{MCA})

a. $1.08V_{SR}$ for 4 engine turboprops with $1.13V_{SR}$ for 2 and 3 engine turboprops.
b. $1.2V_S$ for all turbojets
c. $1.2V_{SR}$ for all turboprops and $1.15V_{SR}$ for all turbojets
d. $1.15V_S$ for all aeroplanes

30. If the flap setting is changed from 10 degrees to 20 degrees, V_2 will:

a. not change
b. decrease if not limited to V_{MCA}.
c. increase
d. increase or decrease depending on weight

31. For a turbojet aeroplane the second segment of the climb begins when:

a. accelerating from V_2 to flap retraction speed begins
b. the landing gear is fully retracted
c. flap retraction begins
d. the flaps are fully retracted

32. For a turbojet aeroplane the third segment of climb begins when:

a. acceleration to flap retraction speed begins (min 400 ft)
b. the landing gear is fully retracted
c. acceleration from V_{LOF} to V_2 begins
d. the flaps are fully retracted

33. The buffet onset boundary chart tells the pilot the:

a. critical Mach number for various masses and altitudes
b. values for low speed stall and Mach buffet onset for various masses and altitudes
c. Mach number for low speed buffet and shock buffet for various masses and altitudes
d. maximum operating M_{MO} for various masses and altitudes

34. Two identical turbojets are holding at the same altitude and have the same specific fuel consumption. Aeroplane 1 weighs 130 000 kg and fuel flow is 4300 kg/hr. If aeroplane 2 weighs 115 000 kg what is the fuel flow?

  a.   3 804 kg/hr
  b.   4 044 kg/hr
  c.   3 364 kg/hr
  d.   3 530 kg/hr

35. The speed for minimum power required in a turbojet will be:

  a.   slower than the speed for minimum drag
  b.   faster than the speed for minimum drag
  c.   slower in a climb and faster in the decent
  d.   same as speed for minimum drag

36. In wet conditions, what extra percentage over the dry gross landing distance must be available for a turbojet?

  a.   43%
  b.   92%
  c.   67%
  d.   15%

37. In dry conditions, when landing at an alternate airport in a turbojet by what factor should the landing distance available be divided to give landing distance?

  a.   0.6
  b.   1.0
  c.   1.67
  d.   1.43

38. What landing distance requirements need to be met at an alternate airfield compared to a destination airfield for a turboprop?

  a.   Less than destination
  b.   More than destination
  c.   Same as destination
  d.   None applicable

39. For a twin-engine aircraft, which can use either 5 or 15 degrees flap setting, using MRJT fig 4.4 what is the maximum field limited take-off mass?

Pressure Altitude	**7000'**
OAT	**-10°C**
Length available	**2400 m**
Slope	**Level**
Wind	**Calm**

  a.   55 000 kg
  b.   56 000 kg
  c.   44 000 kg
  d.   52 000 kg

40. **Absolute ceiling is defined by:**

    a.   altitude where theoretical rate of climb is zero
    b.   altitude at which rate of climb is 100 fpm
    c.   altitude obtained when using lowest steady flight speed
    d.   altitude where low speed buffet and high speed buffet speeds are coincident

41. **V_{REF} for a Class B aircraft is defined by:**

    a. $1.3V_S$
    b. $1.2V_S$
    c. $1.3V_{MCL}$
    d. $1.2V_{MCL}$

42. **V_R for a jet aircraft must be faster than, the greater of:**

    a. $1.05V_{MCA}$ and V_1
    b. V_{MCA} and $1.1V_1$
    c. V_{MBE} and V_1
    d. V_1 and $1.1V_{MCA}$

43. **Landing on a runway with 5 mm wet snow will:**

    a.   increase landing distance
    b.   decrease landing distance
    c.   not affect the landing distance
    d.   give a slightly reduced landing distance, due to increased impingement drag

44. **Take off on a runway with standing water, with a depth of 0.5 cm. Compared to a dry runway, field length limited mass will:**

    a.   increase, with a reduced V_1
    b.   remain the same, with a reduced V_1
    c.   decrease, with an increased V_1
    d.   decrease, with a decreased V_1

45. **A balanced field length is when:**

    a.   distance taken to accelerate to V_1 and distance to stop are identical
    b.   TORA × 1.5 = TODA
    c. $V_1 = V_R$
    d.   ASDA equals TODA

46. **Increased ambient temperature will result in:**

    a.   increased field length limited mass
    b.   decreased maximum brake energy limited mass
    c.   increased climb limited mass
    d.   increased obstacle limited mass

47. Pitch angle during decent at a constant Mach number will:

a. increase
b. decrease
c. increase at first then decrease
d. stay constant

48. At maximum range speed in a turbojet the angle of attack is:

a. the same as L/D max
b. less than L/D max
c. maximum
d. more than L/D max

49. If there is an increase in atmospheric pressure and all other factors remain constant, it should result in:

a. decreased take-off distance and increased climb performance
b. increased take-off distance and increased climb performance
c. decreased take-off distance and decreased climb performance
d. increased take-off distance and decreased climb performance

50. Climbing to cruise altitude with a headwind will:

a. increase time to climb
b. decrease ground distance covered to climb
c. decreased time to climb
d. increased ground distance covered to climb

51. Requirements for the third segment of climb are:

a. minimum acceleration altitude for one engine inoperative should be used
b. a climb gradient of 5% is required in the third segment
c. level acceleration with an equivalent gradient of 1.2%
d. legal minimum altitude for acceleration is 1500 ft

52. If the calculations for an aeroplane of 3250 lb indicate a service ceiling of 4000 m, what will the service ceiling be when the actual take-off mass is 3000 lb?

a. Higher
b. Lower
c. Higher or lower, more calculations will have to be done
d. The same

53. Why is there a requirement for an approach climb gradient?

a. So that an aircraft falling below the glide path will be able to re-intercept it
b. Adequate performance for a go-around in the event of an engine failure
c. So that the aircraft will not stall when full flap is selected
d. To maintain minimum altitude on the approach

54. **The drift down is a procedure applied:**

    a.   after aircraft depressurization
    b.   for a visual approach to a VASI
    c.   for an instrument approach at an airfield without an ILS
    d.   when the engine fails above the operating altitude for one engine inoperative

55. **A light twin-engine aircraft is climbing from the screen height of 50 ft, and has an obstacle 10 000 m along the net flight path. If the net climb gradient is 10%, there is no wind and obstacle is 900 m above the aerodrome elevation then what will the clearance be?**

    a.   The aircraft will not clear the object
    b.   85 m
    c.   100 m
    d.   115 m

56. **The dry net take-off run required (TORR) for a jet aircraft, with all engines operating is:**

    a.   brake release point to midpoint between V_{LOF} and 35 ft
    b.   brake release point to 35 ft
    c.   brake release point to 15 ft
    d.   the same as for all engines

57. **A jet aircraft's maximum altitude is usually limited by:**

    a.   its certification maximum altitude
    b.   its pressurization maximum altitude
    c.   the altitude at which low and high-speed buffet will occur
    d.   thrust limits

58. **With respect to en route diversions (using drift down graph), if you believe that you will not clear an obstacle do you:**

    a.   drift down to clearance height and then start to jettison fuel
    b.   jettison fuel from the beginning of the drift down
    c.   asses remaining fuel requirements, then jettison fuel as soon as possible
    d.   fly slight faster

59. **With respect to field length limit, fill in the blanks in the follow statement.**

"The distance to accelerate to ...., at which point an engine fails, followed by the reaction time of .... and the ensuing deceleration to a full stop must be completed within the ...."

    a. V_R, 2 sec, TORA
    b. V_1, 2 sec, ASDA
    c. V_{EF}, 2 sec, TORA
    d. V_{GO}, 2 sec, ASDA

60. **How does the power required graph move with an increase in altitude?**

    a.   Straight up
    b.   Straight down
    c.   Up and to the right
    d.   Straight across to the right

61. **What factors would cause V_2 to be limited by V_{MCA}?**

    a.   Flaps at high settings
    b.   With high pressure
    c.   With low temperature
    d.   Combination of the above

62. **In a climb, at a constant IAS / Mach No. 300 kt / M 0.78, what happens at the changeover point (29 500 ft, ISA)?**

    a.   Accelerate from the IAS to the Mach number, and therefore rate of climb will decrease
    b.   No change in rate of climb since TAS remains constant
    c.   Find that rate of climb would start to increase, because TAS starts to increase
    d.   Find that rate of climb would start to decrease, because TAS would start to decrease

63. **If not V_{MBE} or V_{MCG} limited, what would V_1 be limited by?**

    a. V_2
    b. V_{MC}
    c. V_R
    d. V_{MU}

64. **What procedure is likely to require V_1 to be reduced?**

    a.   Improved climb procedure
    b.   Reduced thrust take-off
    c.   When ASDA is greater than TODA
    d.   Take off with anti-skid inoperative

65. **Which of the following is not affected by a tailwind?**

    a.   Landing climb limit mass
    b.   Obstacle limit mass
    c. V_{MBE}
    d.   Tyre speed limit mass

66. **When flying an aircraft on the back of the drag curve, maintaining a slower speed (but still faster than V_S) would require:**

    a.   more flap
    b.   less thrust due to less parasite drag
    c.   more thrust
    d.   no change

67. During certification test flights for a turbojet aeroplane, the 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:

     1530 m with all engines operating.
     1810 m with the critical engine failure recognized at V_1, other factors remaining unchanged.

     What is the correct value of the take-off run?

     a.   1759 m
     b.   1810 m
     c.   1950 m
     d.   2081 m

68. Taking into account the following, what would be the minimum required headwind component for landing? (Using fig 2.4 in CAP 698.)

     Factored landing distance of 1300 ft.
     ISA temperature at MSL.
     Landing mass of 3200 lb.

     a.   8 kt
     b.   5 kt
     c.   0 kt
     d.   15 kt

69. Two identical aircraft at different masses are descending at idle thrust. Which of the following statements correctly describes their descent characteristics?

     a.   There is no difference between the descent characteristics of the two aeroplanes
     b.   At a given angle of attack, the heavier aeroplane will always glide further than the lighter aeroplane
     c.   At a given angle of attack, the lighter aeroplane will always glide further than the heavier aeroplane
     d.   At a given angle of attack, both the vertical and the forward speeds are greater for the heavier aeroplane

70. When flying in a headwind, the speed for max range should be:

     a.   slightly decreased
     b.   slightly increased
     c.   unchanged
     d.   should be increased, or decreased depending on the strength of the wind

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Questions

71. V_{LO} is defined as:

    a.   the actual speed that the aircraft lifts off the ground
    b.   the minimum possible speed that the aircraft could lift off the ground
    c.   the maximum speed for landing gear operation
    d.   the long range cruise speed

72.   **When flying at the optimum range altitude, over time the:**

    a.   fuel consumption gradually decreases
    b.   fuel consumption gradually increases
    c.   fuel consumption initially decreases then gradually increases
    d.   fuel consumption remains constant

73.   **What happens to the field limited take-off mass with runway slope?**

    a.   It increases with a downhill slope
    b.   It is unaffected by runway slope
    c.   It decreases with a downhill slope
    d.   It increases with an uphill slope

74.   **For a given aircraft mass, flying with a cost index greater than zero set will result in:**

    a.   a cruise at a slower Mach number than the best range Mach number for a given altitude
    b.   a cruise at the maximum endurance speed
    c.   climb at the slowest safe speed, taking into account stall and speed stability
    d.   a cruise at a faster Mach number than the Mach number giving best air nautical miles per kg ratio for a given altitude

75.   **Cruising with 1 or 2 engines inoperative at high altitude, compared to all engines operative cruise, range will:**

    a.   increase
    b.   decrease
    c.   not change
    d.   decrease with 1 engine inoperative, and increase with 2 engines inoperative

76.   **Taking into account the values given below, what would be the maximum authorized brake release mass?**

Flap:	5°	10°	15°
Field limited mass:	49 850 kg	52 500 kg	56 850 kg
Climb limited mass:	51 250 kg	49 300 kg	45 500 kg

    a.   56 850 kg
    b.   49 300 kg
    c.   49 850 kg
    d.   51 250 kg

77.   **A turboprop aircraft with a maximum all up mass in excess of 5700 kg is limited to:**

a.   10° angle of bank up to 400 ft
b.   15° angle of bank up to 400 ft
c.   20° angle of bank up to 400 ft
d.   25° angle of bank up to 400 ft

78.   **With regards to the optimum altitude during the cruise, the aircraft is:**

a.   always flown at the optimum altitude
b.   always flown 2000 ft below the optimum altitude
c.   may be flown above or below the optimum altitude, but never at the optimum altitude
d.   flown as close to the optimum altitude as ATC will allow

79.   **A tailwind on take-off will not affect:**

a.   climb limit mass
b.   obstacle clearance
c.   field limit mass
d. V_{MBE}

80.   **When climbing at a constant Mach number through the troposphere, TAS:**

a.   increases
b.   decreases
c.   remains constant
d.   increases then decreases

81.   **Concerning landing gear, which factors limit take-off performance?**

a.   Brake temperature
b.   Tyre speed and V_{MBE}
c.   Tyre temperature
d.   Brake wear

82.   **In a glide (power-off descent) if pitch angle is increased, glide distance will:**

a.   increase
b.   decrease
c.   remain constant
d.   depend on the aircraft

83.   **With which conditions would the aircraft need to be flown, in order to achieve maximum speed?**

a.   Thrust set for minimum drag
b.   Best lift - drag ratio
c.   Maximum thrust and maximum drag
d.   Maximum thrust and minimum drag

84. **If a jet engine fails during take-off, before V$_1$:**

    a.   the take-off can be continued or aborted
    b.   the take-off should be aborted
    c.   the take-off should be continued
    d.   the take-off may be continued if aircraft speed is above V$_{MCG}$ and lies between V$_{GO}$ and V$_{STOP}$

85. **Up to which height in NADP 1 noise abatement procedure must V$_2$ + 10-20 kt be maintained?**

    a.   1500 ft
    b.   3000 ft
    c.   1000 ft
    d.   500 ft

86. **At MSL, in ISA conditions.**
Climb gradient = 6%

What would the climb gradient be if:

P.altitude   1000 ft
Temperature   17°C
Engine anti-ice on.
Wing anti-ice on.
(- 0.2% engine anti-ice, - 0,1% wing anti-ice, ± 0.2% per 1000 ft P.altitude, ± 0.1 % per 1°C ISA deviation)

    a.   5.1%
    b.   6.3%
    c.   3.8%
    d.   5.5%

87. **An aircraft with 180 minutes approval for ETOPS must be:**

    a.   no more than 180 minutes from a suitable alternate, in still air, at the one engine inoperative TAS
    b.   no more than 180 minutes from a suitable alternate, in still air, at the all engine TAS
    c.   no more than 90 minutes from a suitable alternate, and 90 minutes from departure, at the one engine inoperative TAS
    d.   no more than 180 minutes from a suitable alternate, at the one engine inoperative TGS

88. **In a balanced turn load factor is dependent on:**

    a.   radius of turn and aircraft weight
    b.   TAS and bank angle
    c.   radius of turn and bank angle
    d.   bank angle only

89. **Putting in 16 500 litres of fuel with an SG of 780 kg/m², and writing 16 500 kg of fuel on the load sheet will result in:**

    a.   TOD increasing and ASD decreasing, and the calculated V_2 being too fast
    b.   TOD and ASD decreasing, and the calculated V_2 being too fast
    c.   TOD and ASD remaining constant, if the calculated speeds are used
    d.   TOD and ASD increasing, if the calculated speeds are used

90. **If V_1 is found to be lower than V_{MCG}, which of the following statements will be true?**

    a. V_{MCG} must be reduced to equal V_1
    b.   TOD will be greater than ASD
    c.   ASD will be equal to TOD
    d.   Take-off is not permitted

91. **When gliding into a headwind airspeed should be:**

    a.   reduced to gust penetration speed
    b.   the same as the max. range glide speed in still air
    c.   lower than the max. range glide speed in still air
    d.   higher than the max. range glide speed in still air

92. **How does the slush thickness affect the V_1 reduction required?**

    a.   Greater reduction if thicker
    b.   Smaller reduction if thicker
    c.   No effect if mass is reduced
    d.   No effect at all

93. **Which denotes the stall speed in the landing configuration?**

    a. V_{S0}
    b. V_{S1}
    c. V_S
    d. V_{S1g}

94. **When in a gliding manoeuvre, in order to achieve maximum endurance the aircraft should be flown at:**

    a.   the speed for max. lift
    b.   the speed for min. drag
    c.   the speed for max. lift / drag
    d.   the speed for min. power

95. **When descending below the optimum altitude at the long range cruise speed:**

    a.   Mach number decreases
    b.   TAS increases
    c.   Mach number remains constant
    d.   Mach number increases

96.   What does density altitude signify ?

     a.   Pressure altitude
     b.   Flight levels
     c.   ISA altitude
     d.   An accurate indication of aircraft and engine performance

97.   For a turboprop aircraft, the LDA at an aerodrome is 2200 m. If the conditions are indicated as wet, what would the equivalent dry LDA be ?

     a.   1451 m
     b.   1913 m
     c.   1538 m
     d.   1339 m

98.   During aircraft certification, the value of V_{MCG} is found with nose wheel steering inoperative. This is because:

     a.   nose wheel steering does not affect V_{MCG}
     b. V_{MCG} must be valid in both wet and dry conditions
     c.   nose wheel steering does not work after an engine failure
     d.   the aircraft may be operated even if the nose wheel steering is inoperative

99.   Referring to CAP 698 Fig 4.28.

What would the landing distance required be for an MRJT aircraft with anti-skid inoperative if:

Pressure altitude 2000 ft.
Mass 50 000 kg
Flaps for short field.
15 kt Tailwind
Dry runway.

     a.   1700 m
     b.   2500 m
     c.   1900 m
     d.   3100 m

100.   Which is true regarding a balanced field?

     a.   Provides largest gap between net and gross margins
     b.   Provides minimum field length required in the case of an engine failure
     c.   Take-off distance will always be more than stopping distance
     d.   Distances will remain equal, even if engine failure speed is changed

101.   Climbing in the troposphere at a constant TAS:

     a.   Mach number increases
     b.   Mach number decreases
     c.   CAS increases
     d.   IAS increases.

102.   **When an MRJT aircraft descends at the maximum range speed:**

   a.   IAS increases
   b.   CAS increases
   c.   Mach number decreases
   d.   Mach number increases

103.   **What condition is found at the intersection of the thrust available and the drag curve?**

   a.   Unaccelerated flight in a climb
   b.   Accelerated climb
   c.   Unaccelerated level flight
   d.   Accelerated level flight

104.   **Out of the four forces acting on the aircraft in flight, what balances thrust in the climb?**

   a.   Drag
   b.   Weight
   c.   W Sin γ
   d.   Drag + W Sin γ

105.   **The information in a light aircraft manual gives two power settings for cruise, 65% and 75%. If you fly at 75% instead of 65%:**

   a.   cruise speed will be higher, fuel consumption will be higher
   b.   cruise speed will be the same, fuel consumption will be the same
   c.   cruise speed will be higher, fuel consumption will be lower
   d.   cruise speed will be higher, fuel consumption will be the same

106.   **With a downward sloping runway:**

   a. V_1 will increase
   b. V_1 will decrease
   c. V_R will increase
   d. V_R will decrease

107.   **How is fuel consumption affected by the C of G position, in terms of air nautical miles per kg?**

   a.   Increases with a forward C of G
   b.   Decreases with an aft C of G
   c.   Decreases with a forward C of G
   d.   Fuel consumption is not affected by the C of G position

108.   **Rate of Climb 1000 ft/min**
       TAS 198 kt
       What is the aircraft's gradient ?

    a.   5.08%
    b.   3%
    c.   4%
    d.   4.98%

109.   **The reduced thrust take-off procedure may not be used when:**

    a.   runway wet
    b.   after dark
    c.   temperature varies by more than 10°C from ISA
    d.   anti-skid unserviceable

110.   **If the maximum take-off mass is limited by tyre speed, what effect would a down sloping runway have?**

    a.   No effect
    b.   Always increase the mass
    c.   Only increase the mass if not limited by any other limitation
    d.   Decrease the mass

111.   **With an obstacle which is 160 m above the airfield elevation and 5000 m away from the end of the take-off distance (screen height 50 ft), what would the obstacle clearance be with a gradient of 5% ?**

    a.   105 m
    b.   90 m
    c.   250 m
    d.   265 m

112.   **Prior to take-off the brake temperature needs to be checked, because:**

    a.   they indicate the state of the fusible plugs
    b.   if the brakes are already hot, they may fade / overheat during a RTO
    c.   they would work better if they were warm
    d.   they may need to be warmed up to prevent them from cracking during a RTO

113.   **A turbojet is flying at a constant Mach number in the cruise. How does SFC vary with OAT in Kelvin?**

    a.   Unrelated to T
    b.   Proportional to T
    c.   Proportional to 1/T
    d.   Proportional to $1/T^2$

114. **If an aircraft has a stall speed of 100 kt, what would the speed on short finals have to be?**

    a.   100 kt
    b.   115 kt
    c.   130 kt
    d.   120 kt

115. **When descending at a constant Mach number, which speed is most likely to be exceeded first?**

    a.   Max operating speed
    b. M_{MO}
    c.   High speed buffet limit
    d. V_{MO}

116. **What is meant by 'equivalent weight' on the drift down profile graph?**

    a.   Weight compensated for fuel reduction prior to engine failure
    b.   Weight compensated for temperature of ISA +10°C and above
    c.   Weight compensated for density at different heights
    d.   Weight compensated for temperature at different heights

117. **What happens to the speeds V_X and V_Y when lowering the aircraft's undercarriage?**

    a. V_X increases, V_Y decreases
    b. V_X decreases, V_Y decreases
    c. V_X increases, V_Y increases
    d. V_X decreases, V_Y increases

118. **Maximum endurance:**

    a.   can be achieved in level unaccelerated flight with minimum fuel consumption
    b.   can be achieved by flying at the best rate of climb speed in straight and level flight
    c.   can be achieved in a steady climb
    d.   can be achieved by flying at the absolute ceiling

119. **What factors affect descent angle in a glide?**

    a.   Configuration and altitude
    b.   Configuration and angle of attack
    c.   Mass and attitude
    d.   Mass and configuration

120. **What is meant by balanced field available?**

    a.   TORA = TODA
    b.   ASDA = ASDR and TODA =TODR
    c.   TODA = ASDA
    d.   TORA = ASDA

121.	For a piston engine aeroplane at a constant altitude, angle of attack and configuration, an increased weight will require:

	a.	more power but less speed
	b.	more power and the same speed
	c.	more power and more speed
	d.	the same power but more speed

122.	In the climb an aircraft has a thrust to weight ratio of 1:4 and a lift to drag ratio of 12:1. While ignoring the slight difference between lift and weight in the climb, the climb gradient will be:

	a.	3.0%
	b.	8.3%
	c.	16.7%
	d.	3.3%

123.	Which of the following will not decrease the value of V_s?

	a.	The C of G in an aft position within the C of G envelope
	b.	Increased altitude
	c.	Decreased weight
	d.	Increased flap setting

124.	All other factors being equal, the speed for minimum drag is:

	a.	constant for all weights
	b.	a function of density altitude
	c.	proportional to weight
	d.	a function of pressure altitude

125.	Taking into account the values given below, what would be the maximum authorized brake release mass with a 10 kt tailwind?

Flap :	5°	10°	15°
Field limited mass :	49 850 kg	52 500 kg	56 850 kg
Climb limited mass :	51 250 kg	49 300 kg	45 500 kg

	Assume 370 kg per kt of tailwind.

	a.	56 850 kg
	b.	49 850 kg
	c.	52 500 kg
	d.	48 800 kg

126.   **If a turn is commenced during the take-off climb path:**

(i)   **the load factor.**
(ii)   **the induced drag.**
(iii)   **the climb gradient.**

	(i)	(ii)	(iii)
a.	increases	decreases	decreases
b.	decreases	increases	increases
c.	increases	increases	decreases
d.	decreases	decreases	increases

127.   **What effect does an increase in weight have on V_1?**

a.   It will cause it to increase
b.   It will cause it to decrease
c.   It will have no effect
d.   It will cause it to decrease by the same percentage as the weight increase

128.   **V_R for a Class A aeroplane must not be less than:**

a.   10% above V_{MU}
b.   5% above V_{MCA}
c.   5% above V_{MCG}
d.   10% above V_{MCA}

129.   **As speed is reduced from V_{MD} to V_{MP}:**

a.   power required decreases and drag decreases
b.   power required decreases and drag increases
c.   power required increases and drag increases
d.   power required increases and drag decreases

130.   **The maximum induced drag occurs at a speed of:**

a. V_{MD}
b. V_{MP}
c. V_{S0}
d. $1.32V_{MD}$

131.   **Profile drag is:**

a.   inversely proportional to the square root of the EAS
b.   directly proportional to the square of the EAS
c.   inversely proportional to the square of the EAS
d.   directly proportional to the square root of the EAS

132. **Losing an engine during the take-off above V$_{MCA}$ means the aircraft will be able to maintain:**

   a. altitude
   b. straight and level flight
   c. heading
   d. bank angle

133. **The best EAS / drag ratio is approximately:**

   a. 1.3V$_{MD}$
   b. 1.32V$_{MD}$
   c. 1.6V$_{MD}$
   d. 1.8V$_{MD}$

134. **The effect an increase of weight has on the value of stalling speed (IAS) is that V$_S$:**

   a. increases
   b. decreases
   c. remains constant
   d. increases or decreases, depending on the amount of weight increase

135. **Which one of the following statements is true concerning the effect of changes of ambient temperature on an aeroplane's performance, assuming all other performance parameters remain constant?**

   a. An increase will cause a decrease in the landing distance required
   b. An increase will cause a decrease in take-off distance required
   c. A decrease will cause an increase in the climb gradient
   d. A decrease will cause an increase in the take-off ground run

136. **What percentages of the headwind and tailwind components are taken into account, when calculating the take-off field length required ?**

   a. 100% headwind and 100% tailwind
   b. 150% headwind and 50% tailwind
   c. 50% headwind and 100% tailwind
   d. 50% headwind and 150% tailwind

137. **For a turbojet aircraft planning to land on a wet runway, the landing distance available:**

   a. may be less than 15% greater than the dry landing distance if the flight manual gives specific data for a wet runway
   b. may be less than 15% greater than the dry landing distance if all reverse thrust systems are operative
   c. may be less than 15% greater than the dry landing distance if permission is obtained from the relevant aerodrome authority
   d. must always be at least 15% greater than the dry landing distance

138. The effect of installing more powerful engines in a turbojet aircraft is:

    a.   to increase the aerodynamic ceiling and increase the performance ceiling
    b.   to decrease the aerodynamic ceiling and increase the performance ceiling
    c.   to increase the performance ceiling but not affect the aerodynamic ceiling
    d.   to decrease both the aerodynamic and the performance ceilings

139. In relation to runway strength, the ACN:

    a.   may not exceed 90% of the PCN
    b.   may exceed the PCN by up to 10%
    c.   may never exceed the PCN
    d.   may exceed the PCN by a factor of 2

140. An aerodrome has a clearway of 500 m and a stopway of 200 m.
        If the stopway is extended to 500 m the effect will be:

    a.   the maximum take-off mass will increase, and V_1 will decrease
    b.   the maximum take-off mass will increase and V_1 will remain the same
    c.   the maximum take-off mass will remain the same and V_1 will increase
    d.   the maximum take-off mass will increase and V_1 will increase

141. An aircraft is climbing at a constant power setting and a speed of V_x. If the speed is reduced and the power setting maintained, the:

    a.   climb gradient will decrease and the rate of climb will increase
    b.   climb gradient will decrease and the rate of climb will decrease
    c.   climb gradient will increase and the rate of climb will increase
    d.   climb gradient will increase and the rate of climb will decrease

142. When an aircraft is climbing in a standard atmosphere above the tropopause at a constant Mach number:

    a.   the IAS decreases and TAS remain constant
    b.   the IAS and TAS remain constant
    c.   the IAS decreases and TAS decreases
    d.   the IAS remains constant and TAS increases

143. An aircraft is climbing at a constant IAS, below the Mach limit. As height increases:

    a.   drag decreases, because density decreases
    b.   drag remains constant, but the climb gradient decreases
    c.   drag increases, because TAS increases
    d.   drag remains constant and the climb gradient remains constant

144. Optimum altitude can be defined as:

    a.   the highest permissible altitude for an aeroplane type
    b.   the altitude at which an aeroplane attains the maximum specific air range
    c.   the altitude at which the ground speed is greatest
    d.   the altitude at which specific fuel consumption is highest

145.   **If an aircraft is descending at a constant Mach number:**

    a.   the IAS will increase and the margin to low speed buffet will decrease
    b.   the IAS will increase and the margin to low speed buffet will increase
    c.   the IAS will decrease and the margin to low speed buffet will decrease
    d.   the IAS will decrease and the margin to low speed buffet will increase

146.   **For a given flight level, the speed range determined by the buffet onset boundary chart will decrease with:**

    a.   decreased weight
    b.   decreased bank angle
    c.   a more forward CG position
    d.   increased ambient temperature

147.   **Which of the following variables will not affect the shape or position of the drag vs. IAS curve, for speeds below M_{CRIT}?**

    a.   Aspect ratio
    b.   Configuration
    c.   Altitude
    d.   Weight

148.   **Which of the following would give the greatest gliding endurance?**

    a.   Flight at V_{MD}
    b.   Flight at $1.32V_{MD}$
    c.   Flight at the best C_L / C_D ratio
    d.   Flight close to C_{LMAX}

149.   **The tyre speed limit is:**

    a. V_1 in TAS
    b.   Max V_{LOF} in TAS
    c.   Max V_{LOF} in ground speed
    d. V_1 in ground speed

150.   **What gives one the greatest gliding time?**

    a.   Being light
    b.   A headwind
    c.   A tailwind
    d.   Being heavy

151.   **For take-off performance calculations, what is taken into account?**

    a.   OAT, pressure altitude, wind, weight
    b.   Standard temperature, altitude, wind, weight
    c.   Standard altitude, standard temperature, wind, weight
    d.   Standard temperature, pressure altitude, wind, weight

152. **Which 3 speeds are effectively the same for a jet aircraft?**

a. ROC, range, minimum drag
b. Range, best angle of climb, minimum drag
c. Best angle of climb, minimum drag, endurance
d. Best angle of climb, range, endurance

153. **The long range cruise speed is a speed that gives:**

a. a 1% increase in range and a decrease in IAS
b. a 1% increase in TAS
c. a 1% increase in IAS
d. gives 99% of best cruise range, with an increase in IAS

154. **When an aircraft takes off at the mass it was limited to by the TODA:**

a. the end of the runway will be cleared by 35 ft following an engine failure just before V_1
b. the actual take-off mass equals the field length limited take-off mass
c. the distance from BRP to V_1 is equal to the distance from V_1 to the 35 ft screen
d. the balanced take-off distance equals 115% of the all engine take-off distance

155. **Which of the following speeds gives the maximum obstacle clearance in the climb?**

a. V_Y
b. $1.2V_{S1}$
c. V_X
d. V_{FE}

156. **The tangent from the origin to the power required curve gives:**

a. Minimum drag coefficient
b. L/D Minimum
c. D/L Maximum
d. L/D Maximum

157. **For a jet flying at a constant altitude, at the maximum range speed, what is the effect on IAS and drag over time?**

a. Increase, Increases
b. Decrease, Constant
c. Constant, Decrease
d. Decrease, Decrease

158. **If an aircraft descends at a constant Mach number, what will the first limiting speed be?**

a. Max operating speed
b. Never exceed speed
c. Max operating Mach number
d. Shock stall speed

159. **For an aircraft gliding at its best glide range speed, if AoA is reduced:**

    a.   glide distance will increase
    b.   glide distance will remain unaffected
    c.   glide distance will decrease
    d.   glide distance will remain constant, if speed is increased

160. **If an aircraft's climb schedule was changed from 280 / M 0.74 to 290 / M 0.74, what would happen to the changeover altitude?**

    a.   It would remain unchanged
    b.   It could move up or down, depending on the aircraft
    c.   It will move down
    d.   It will move up

161. **What happens to the cost index when flying above the optimum long range cruise speed?**

    a.   Cost index is not affected by speed
    b.   Cost index will increase with increased speed
    c.   Cost index will decrease with increased speed
    d.   It all depends on how much the speed is changed by

162. **For an aircraft flying at the long range cruise speed, (i) specific range and (ii) fuel to time ratio:**

    a.   (i) decreases   (ii) increases
    b.   (i) increases   (ii) increases
    c.   (i) decreases   (ii) decreases
    d.   (i) increases   (ii) decreases

163. **By what percentage should V_2 be greater than V_{MCA}?**

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

164. **If a turboprop aircraft has a wet LDA of 2200 m, what would the equivalent dry landing distance allowed be?**

    a.   1540 m
    b.   1148 m
    c.   1913 m
    d.   1339 m

165. **If a TOD of 800 m is calculated at sea level, on a level, dry runway, with standard conditions and with no wind, what would the TOD be for the conditions listed below?**

    2000 ft Airfield elevation
    QNH 1013.25 hPa
    Temp. of 21°C
    5 kt of tailwind
    Dry runway with a 2% upslope.

    (Assuming: ±20 m/1000 ft elevation, +10 m/1 kt of reported tailwind, ±5 m/1°C ISA deviation and the standard slope adjustments).

    a.   836 m
    b.   940 m
    c.   1034 m
    d.   1095 m

166. **At a constant mass and altitude, a lower airspeed requires:**

    a.   more thrust and a lower coefficient of lift
    b.   less thrust and a lower coefficient of lift
    c.   more thrust and a lower coefficient of drag
    d.   a higher coefficient of lift

167. **On a piston engine aeroplane, with increasing altitude at a constant gross mass, angle of attack and configuration, the power required:**

    a.   decreases slightly because of the lower air density
    b.   remains unchanged but the TAS increases
    c.   increases but the TAS remains constant
    d.   increases and the TAS increases

168. **Reduced take-off thrust:**

    a.   can be used if the headwind component during take-off is at least 10 kt
    b.   can be used if the take-off mass is higher than the performance limited take-off mass
    c.   is not recommended at very low temperatures
    d.   has the benefit of improving engine life

169. **Reduced take-off thrust:**

    a.   can only be used in daylight
    b.   can not be used on a wet runway
    c.   is not recommended when wind shear is expected on departure
    d.   is not recommended at sea level

170. **May the anti-skid be considered in determining the take-off and landing mass limits?**

a. Only landing
b. Only take-off
c. Yes
d. No

171. **Climb limited take-off mass can be increased by:**

a. lower V_2
b. lower flap setting and higher V_2
c. lower V_R
d. lower V_1

172. **An operator shall ensure that the aircraft clears all obstacles in the net take-off flight path.**

The half-width of the obstacle accountability area (domain) at distance D from the end of the TODA is:

a. 90 m + (D / 0.125)
b. 90 m + (1.125 × D)
c. 90 m + (0.125 × D)
d. (0.125 × D)

173. **The take-off performance for a turbojet aircraft using 10° flap results in the following limitations:**

Obstacle clearance limited mass: 4630 kg
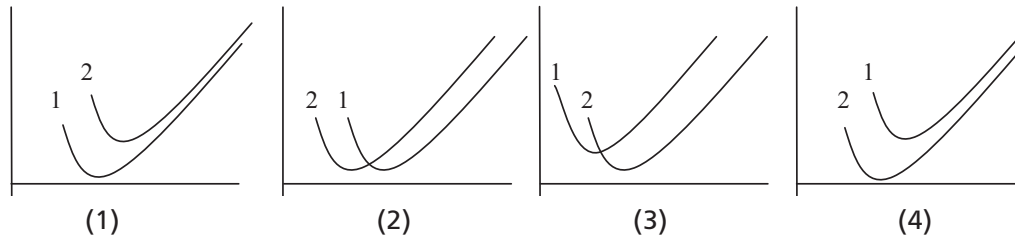Field length limited mass: 5270 kg

Given that it is intended to take-off with a mass of 5000 kg, which of the following statements is true?

a. With 5° flap the clearance limit will increase and the field limit will decrease.
b. With 15° flap both will increase
c. With 5° flap both will increase
d. With 15° flap the clearance limit will increase and the field limit will decrease

174. **Induced drag:**

a. increases with increased airspeed
b. decreases with increased airspeed
c. independent of airspeed
d. initially increases and then decreases with speed

175. **Which of these graphs shows the relationship that thrust required has with decreased weight?**

| (1) | (2) | (3) | (4) |

     a.   1
     b.   2
     c.   3
     d.   4

176. **What is the formula for specific range?**

     a.   Ground speed divided by fuel flow
     b.   True airspeed divided by fuel flow
     c.   Fuel flow divided by SFC
     d.   Ground speed divided by SFC

177. **When does the first segment of the take-off climb begin?**

     a.   When V_2 is reached
     b.   When 35 feet is reached
     c.   When flaps are up
     d.   When gear and flaps are up

178. **A headwind component:**

     a.   increases climb flight path angle
     b.   decreases climb flight path angle
     c.   increases best rate of climb
     d.   decreases rate of climb

179. **V_1 is limited by:**

     a. V_{MCG} and V_R
     b. V_{MCA} and V_R
     c. V_2 and V_R
     d. $1.05V_{MCA}$

180. **V_R is:**

     a.   less than V_1
     b.   more than V_2
     c.   less than V_{MCG}
     d.   equal to or more than V_1

181.   **What is the effect of an increase in pressure altitude?**

    a.   Increased take-off distance with increased performance
    b.   Decreased take-off distance and increased performance
    c.   Increased take-off distance and decreased performance
    d.   Decreased take-off distance with decreased performance

182.   **What affects endurance?**

    a.   Speed and weight
    b.   Speed and fuel on board
    c.   Speed, weight and fuel on board
    d.   None of the above

183.   **What degrades aircraft performance?**

    a.   Low altitude, low temperature, low humidity
    b.   High altitude, high temperature, high humidity
    c.   Low altitude, high temperature, low humidity
    d.   High temperature, high altitude, low humidity

184.   **If your take-off is limited by the climb limit mass, what is the effect of a headwind?**

    a.   No effect
    b.   Increased mass
    c.   Decreased mass
    d.   Dependant on the strength of the headwind

185.   **What is the effect on accelerate-stop distance of the anti-skid system being inoperative?**

    a.   Increased
    b.   Decreased
    c.   Constant
    d.   Unable to be determined without further information

186.   **What is V_{REF} for Class A aircraft?**

    a. $1.3V_S$
    b. $1.13V_{SR0}$
    c. $1.23V_{SR0}$
    d. $1.05V_{MCL}$

187.   **During planning V_{MCG} is found to be greater than V_1. If V_1 is adjusted to equal V_{MCG} and engine failure occurs at the new V_1, then:**

    a.   ASDR is smaller than TODR
    b.   ASDR is larger than TODR
    c.   ASDR is the same as TODR
    d.   the aircraft weight must be reduced in order to permit take-off

188.   **Refer to CAP 698 Fig 2.1. What is the Gross TODR for an aircraft in the following conditions:**

A/C TOM 1591 kg
Field elevation 1500 ft (QNH 1013)
OAT is +18°C
16 kt Headwind Component
1% downhill slope
Paved, dry surface
No stopway or clearway

a.   335 m
b.   744 m
c.   555 m
d.   595 m

189.   **What is the take-off run defined as for a Class A aircraft:**

a.   the distance from brakes release to V_{LOF}
b.   the distance from brakes release to a point on the ground below which the aircraft has cleared a screen height of 35 ft
c.   the distance from brakes release to a point on the ground below which the aircraft has cleared a screen height of 50 ft
d.   the distance from brakes release to a point half way between where the aircraft leaves the ground and the point on the ground above which it clears a height of 35 ft

Specimen Examination Paper

40 Questions, 40 Marks
Time Allowed: 1 hour

1. **A turbo-propeller aircraft is certified with a maximum take-off mass of 5600 kg and a maximum passenger seating of 10. This aircraft would be certified in:**

    a. Class A
    b. Class B
    c. Class C
    d. Either Class A or Class B depending on the number of passengers carried
        (1 mark)

2. **How does the thrust from a fixed propeller change during the take-off run of an aircraft?**

    a. It remains constant
    b. It increases slightly as the aircraft speed builds up
    c. It decreases slightly as the aircraft speed builds up
    d. It only varies with changes in mass
        (1 mark)

3. **The take-off run is defined as:**

    a. distance to V_1 and then to stop, assuming the engine failure is recognised at V_1
    b. distance from brake release to the point where the aircraft reaches V_2
    c. the horizontal distance from the start of the take-off roll to a point equidistant between V_{LOF} and 35 ft
    d. the distance to 35 ft with an engine failure at V_1 or 1.15 times the all engine distance to 35 ft
        (1 mark)

4. **What effect does a downhill slope have on the take-off speeds?**

    a. It has no effect on V_1
    b. It decreases V_1
    c. It increases V_1
    d. It increases the IAS for take-off
        (1 mark)

5. **Which of the following combinations most reduces the take-off and climb performance of an aircraft?**

    a. High temperature and high pressure
    b. Low temperature and high pressure
    c. Low temperature and low pressure
    d. High temperature and low pressure
        (1 mark)

6.   **Density altitude is:**

   a.   the true altitude of the aircraft
   b.   the altitude in the standard atmosphere corresponding to the actual conditions
   c.   the indicated altitude on the altimeter
   d.   used to calculate en route safety altitudes
          (1 mark)

7.   **The take-off climb gradient:**

   a.   increases in a headwind and decreases in a tailwind
   b.   decreases in a headwind and increases in a tailwind
   c.   is independent of the wind component
   d.   is determined with the aircraft in the take-off configuration
          (1 mark)

8.   **The effect of changing altitude on the maximum rate of climb (ROC) and speed for best rate of climb for a turbojet aircraft, assuming everything else remains constant, is:**

   a.   as altitude increases the ROC and speed both decrease
   b.   as altitude increases the ROC and speed both increase
   c.   as altitude increases the ROC decreases but the speed remains constant
   d.   as altitude increases the ROC remains constant but the speed increases
          (1 mark)

9.   **A runway at an aerodrome has a declared take-off run of 3000 m with 2000 m of clearway. The maximum distance that may be allowed for the take-off distance is:**

   a.   5000 m
   b.   6000 m
   c.   3000 m
   d.   4500 m
          (1 mark)

10.   **An aircraft may use either 5° or 15° flap setting for take-off. The effect of selecting the 5° setting as compared to the 15° setting is:**

   a.   take-off distance and take-off climb gradient will both increase
   b.   take-off distance and take-off climb gradient will both decrease
   c.   take-off distance will increase and take-off climb gradient will decrease
   d.   take-off distance will decrease and take-off climb gradient will increase
          (1 mark)

11.   **The use of reduced thrust for take-off is permitted:**

a.   if the field length limited take-off mass is greater than the climb limited take-off mass

b.   if the actual take-off mass is less than the structural limiting mass

c.   if the actual take-off mass is less than the field length and climb limited take-off masses

d.   if the take-off distance required at the actual take-off mass does not exceed the take-off distance available
(1 mark)

12.   **Planning the performance for a runway with no obstacles, it is found that the climb limiting take-off mass is significantly greater than the field limiting take-off mass with 5° flap selected. How can the limiting take-off mass be increased?**

a.   Use an increased V_2 procedure

b.   Increase the flap setting

c.   Reduce the flap setting

d.   Reduce the V_2
(1 mark)

13.   **The maximum and minimum values of V_1 are limited by:**

a. V_R and V_{MCG}

b. V_2 and V_{MCG}

c. V_R and V_{MCA}

d. V_2 and V_{MCA}
(1 mark)

14.   **If the TAS is 175 kt and the rate of climb 1250 ft per minute, the climb gradient is approximately:**

a.   7%

b.   14%

c.   12%

d.   10%
(1 mark)

15.   **A pilot inadvertently selects a V_1 which is lower than the correct V_1 for the actual take-off weight. What problem will the pilot encounter if an engine fails above the selected V_1 but below the true V_1?**

a.   The accelerate-stop distance required will exceed the distance available

b.   The climb gradient will be increased

c.   The take-off distance required will exceed that available

d.   There will be no significant effect on the performance
(1 mark)

16. **A turbojet is in a climb at a constant IAS. What happens to the drag?**

    a.   It increases
    b.   It decreases
    c.   It remains constant
    d.   It increases initially then decreases
        (1 mark)

17. **Comparing the take-off performance of an aircraft from an aerodrome at 1000 ft to one taking off from an aerodrome at 6000 ft, the aircraft taking off from the aerodrome at 1000 ft:**

    a.   will require a greater take-off distance and have a greater climb gradient
    b.   will require a greater take-off distance and have a lower climb gradient
    c.   will require a shorter take-off distance and have a lower climb gradient
    d.   will require a shorter take-off distance and have a greater climb gradient
        (1 mark)

18. **Which is the correct sequence of speeds?**

    a. V_S, V_Y, V_X
    b. V_X, V_Y, V_S
    c. V_S, V_X, V_Y
    d. V_X, V_Y, V_S
        (1 mark)

19. **Which of the following will increase the accelerate-stop distance on a dry runway?**

    a.   A headwind component
    b.   An uphill slope
    c.   Temperatures below ISA
    d.   Low take-off mass, because of the increased acceleration
        (1 mark)

20. **A turbojet aircraft is climbing at a constant Mach number in the troposphere. Which of the following statements is correct?**

    a.   TAS and IAS increase
    b.   TAS and IAS decrease
    c.   TAS decreases, IAS increases
    d.   TAS increases, IAS decreases
        (1 mark)

21. **The induced drag in an aeroplane:**

    a.   increases as speed increases
    b.   is independent of speed
    c.   decreases as speed increases
    d.   decreases as weight decreases
        (1 mark)

22.   **The speed range between low speed and high speed buffet:**

    a.   decreases as altitude increases and weight decreases
    b.   decreases as weight and altitude increase
    c.   decreases as weight decreases and altitude increases
    d.   increases as weight decreases and altitude increases
            (1 mark)

23.   **Thrust equals drag:**

    a.   in unaccelerated level flight
    b.   in an unaccelerated descent
    c.   in an unaccelerated climb
    d.   in a climb, descent or level flight if unaccelerated
            (1 mark)

24.   **A higher mass at a given altitude will reduce the gradient of climb and the rate of climb. But the speeds:**

    a. V_X and V_Y will decrease
    b. V_X and V_Y will increase
    c. V_X will increase and V_Y will decrease
    d. V_X and V_Y will remain constant
            (1 mark)

25.   **If the other factors are unchanged, the fuel mileage (NM per kg) is:**

    a.   independent of the centre of gravity (C of G)
    b.   lower with a forward C of G
    c.   lower with an aft C of G
    d.   higher with a forward C of G
            (1 mark)

26.   **Concerning maximum range in a turbojet aircraft, which of the following is true?**

    a.   The speed to achieve maximum range is not affected by the wind component
    b.   To achieve maximum range speed should be increased in a headwind and reduced in a tailwind
    c.   To achieve maximum range speed should be decreased in a headwind and increased in a tailwind
    d.   The change in speed required to achieve maximum range is dependent on the strength of the wind component acting along the aircraft's flight path and may require either an increase or decrease for both headwind and tailwind
            (1 mark)

27.   **V_1 is the speed:**

    a.   above which take-off must be rejected if engine failure occurs
    b.   below which take-off must be continued if engine failure occurs
    c.   below which if an engine failure is recognized, take-off must be rejected and above which take-off must be continued
    d.   that we assume the critical engine will fail
            (1 mark)

28. A constant headwind in the descent:

    a.   decreases the angle of descent
    b.   increases the rate of descent
    c.   increases the angle of the descent flight path
    d.   increases the ground distance travelled in the descent
            (1 mark)

29. For a turbojet aircraft what is the reason for the use of maximum range speed?

    a.   Greatest flight duration
    b.   Minimum specific fuel consumption
    c.   Minimum flight duration
    d.   Minimum drag
            (1 mark)

30. Why are step climbs used on long range flights in jet transport aircraft?

    a.   To comply with ATC flight level constraints
    b.   Step climbs have no significance for jet aircraft, they are used by piston aircraft
    c.   To fly as close as possible to the optimum altitude as mass reduces
    d.   They are only justified if the actual wind conditions differ significantly from the forecast conditions used for planning
            (1 mark)

31. The absolute ceiling of an aircraft is:

    a.   where the rate of climb reaches a specified value
    b.   always lower than the aerodynamic ceiling
    c.   where the rate of climb is theoretically zero
    d.   where the gradient of climb is 5%
            (1 mark)

32. In the take-off flight path, the net climb gradient when compared to the gross gradient is:

    a.   greater
    b.   the same
    c.   smaller
    d.   dependent on aircraft type
            (1 mark)

33. To answer this question use CAP 698 SEP1 figure 2.1. Conditions: aerodrome pressure altitude 1000 ft, temperature +30°C, level, dry, concrete runway and 5 kt tailwind component. What is the regulated take-off distance to 50 ft for an aircraft of weight 3500 lb if there is no stopway or clearway?

    a.   2800 ft
    b.   3220 ft
    c.   3640 ft
    d.   3500 ft
            (1 mark)

34. **To answer this question use CAP 698 MRJT figure 4.4. Conditions: Pressure altitude 5000 ft, temperature –5°C, balanced field length 2500 m, level runway, wind calm. What is the maximum field length limited take-off mass and optimum flap setting?**

    a. 59 400 kg, 15°
    b. 60 200 kg, 5°
    c. 59 400 kg, 5°
    d. 60 200 kg, 15°
    (1 mark)

35. **The effect of a headwind component on glide range is:**

    a. the range will increase
    b. the range will not be affected
    c. the range will decrease
    d. the range will only be affected if incorrect speeds are flown
    (1 mark)

36. **Refer to CAP 698 MRJT figure 4.24. At a mass of 35 000 kg, why does the drift down curve start at approximately 3 minutes at an altitude of 37 000 ft?**

    a. The origin of the curve lies outside the chart
    b. At this altitude it takes longer for the engines to slow down, giving extra thrust for about 4 minutes
    c. Because of inertia at the higher TAS it takes longer to establish the optimum rate of descent
    d. It takes about this time to decelerate the aircraft to the optimum speed for drift down
    (1 mark)

37. **A twin engine turbojet aircraft having lost one engine must clear obstacles in the drift down by a minimum of:**

    a. 35 ft
    b. 1000 ft
    c. 1500 ft
    d. 2000 ft
    (1 mark)

38. **The landing speed, V_{REF}, for a single-engine aircraft must be not less than:**

    a. $1.2V_{MCA}$
    b. $1.1V_{S0}$
    c. $1.05V_{S0}$
    d. $1.3V_{S0}$
    (1 mark)

39.   **What factor must be applied to the landing distance available at the destination aerodrome to determine the landing performance of a turbojet aircraft on a dry runway?**

a.   1.43
b.   1.15
c.   0.60
d.   0.70
(1 mark)

40.   **An aircraft is certified to use two landing flap positions, 25° and 35°. If the pilot selects 25° instead of 35° then the aircraft will have:**

a.   an increased landing distance and reduced go-around performance
b.   a reduced landing distance and reduced go-around performance
c.   an increased landing distance and increased go-around performance
d.   a reduced landing distance and increased go-around performance
(1 mark)