



**EAST AFRICAN SCHOOL OF AVIATION  
EXAMINATION**

**FINAL EXAMS**

**FLIGHT SAFETY-SECTION**

SUBJECT: AIRCRAFT PERFORMANCE

CLASS: FLIGHT DISPATCH 31

COURSE: DIPLOMA IN FLIGHT DISPATCH

DAY/DATE:

Time: 1400-1600HRS

**INSTRUCTIONS TO CANDIDATES**

1. Answer ALL the questions.

SECTION A: ANSWER AL QUESTIONS

1. How many feet you have to climb to reach FL 75?

Given: FL 75; departure aerodrome elevation 1500 ft; QNH = 1023 hPa; temperature = ISA; 1hPa = 30 ft

- A) 6300 ft.
- B) 6600 ft.
- C) 7800 ft.
- D) 6000 ft.

2. The length of a clearway may be included in:

- A) the distance to reach V1.
- B) the take-off run available.
- C) the take-off distance available.
- D) the accelerate-stop distance available

3. During certification flight testing of a transport aeroplane, the distances measured from

- A) brake release to the 35 feet point are equal to:
- B) 1547 m with all engines running
- C) 1720 m with failure of critical engine at V1, with all other things remaining
- D) unchanged.

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

- A) 1779 m.
- B) 1978 m.
- C) 1547 m.
- D) 1720 m.

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

- A) V1, VR, VMCG, V2.
- B) V1, VMCG, VR, V2.
- C) V1, VR, V2, VMCA.
- D) VMCG, V1, VR, V2.

5. The decision speed at take-off (V1) is the calibrated airspeed:

- A) Below which the take-off must be continued.
- B) At which the failure of the critical engine is expected to occur.
- B) At which the take-off must be rejected.
- D) Below which take-off must be rejected if an engine failure is recognized, above which take-off must be continued.

6. Can the length of a stopway be added to the runway length to determine the take-off distance available ?

- A) Yes, but the stopway must have the same width as the runway.
- B) No.
- C) No, unless its centreline is on the extended centreline of the runway.
- D) Yes, but the stopway must be able to carry the weight of the aeroplane.

7. If the take-off mass of an aeroplane is tyre speed limited, downhill slope would

- A) increase the required take-off distance.
- B) have no effect on the maximum mass for take-off.
- C) increase the maximum mass for take-off.
- D) decrease the maximum mass for take-off.

8. The absolute ceiling

- A) Can be reached only with minimum steady flight speed
- B) Is the altitude at which the rate of climb theoretically is zero.

- C) Is the altitude at which the best climb gradient attainable is 5%  
 D) Is the altitude at which the aeroplane reaches a maximum rate of climb of 100ft/min.
9. The maximum rate of climb that can be maintained at the absolute ceiling is:  
 A) 0 ft/min  
 B) 500 ft/min  
 C) 125 ft/min  
 D) 100 ft/min
10. Which of the following factors will lead to an increase of ground distance during a glide, while maintaining the appropriate minimum glide angle speed?  
 A) Decrease of aircraft mass.  
 B) Increase of aircraft mass.  
 C) Tailwind.  
 D) Headwind.
11. Two identical aeroplanes at different masses are descending at idle thrust. Which of the following statements correctly describes their descent characteristics ?  
 A) At a given angle of attack the lighter aeroplane will always glide further than the heavier aeroplane.  
 B) There is no difference between the descent characteristics of the two aeroplanes.  
 C) At a given angle of attack the heavier aeroplane will always glide further than the lighter aeroplane.  
 D) At a given angle of attack, both the vertical and the forward speed are greater for the heavier aeroplane.
12. On a dry runway the accelerate stop distance is increased  
 A) By low outside air temperature.  
 B) By headwind.  
 C) By a lower take-off mass because the aeroplane accelerates faster to V1.  
 D) By uphill slope.
13. The take-off distance required increases  
 A) Due to downhill slope because of the smaller angle of attack.  
 B) Due to slush on the runway.  
 C) Due to lower gross mass at take-off.  
 D) Due to head wind because of the drag augmentation.
14. Which of the following combinations adversely affects take-off and initial climb performance ?  
 A) Low temperature and low relative humidity  
 B) High temperature and high relative humidity  
 C) Low temperature and high relative humidity  
 D) High temperature and low relative humidity
15. If there is a tail wind, the climb limited Take Off Mass will:  
 A) Decrease.  
 B) Increase in the flaps extended case.  
 C) Not be affected.  
 D) Increase
16. During the flight preparation the climb limited take-off mass (TOM) is found to be much greater than the field length limited TOM using 5° flap. In what way can the performance limited TOM be increased? There are no limiting obstacles.  
 A) By selecting a lower flap setting.  
 B) By selecting a higher V2.  
 C) By selecting a higher flap setting.  
 D) By selecting a lower V2.

17. Commercial flight is planned with a turbojet aeroplane to an aerodrome with a landing distance available of 2400 m. The aeroplane mass must be such that on arrival the aeroplane can be landed within:
- A) 1 655 m.
  - B) 1 440 m.
  - C) 1 250 m.
  - D) 1 090 m.
18. The net flight path gradient after take-off compared to the actual climb gradient is:
- A) Larger.
  - B) Depends on type of aircraft and may be smaller or larger respectively.
  - C) Smaller.
  - D) Equal.
19. For a jet aeroplane, the maximum climb angle is achieved at a speed corresponding to:
- A) The maximum CL/CD ratio
  - B) The maximum CL/CD<sup>2</sup> ratio
  - C) 1.2 V<sub>s</sub>
  - D) 1.1 V<sub>s</sub>
20. Which of the following sequences of speed for a jet aeroplane is correct ? (from low to high speeds)
- A) Maximum endurance speed, maximum range speed, maximum angle of climb speed.
  - B) V<sub>s</sub>, maximum range speed, maximum angle climb speed.
  - C) V<sub>s</sub>, maximum angle climb speed, maximum range speed.
  - D) Maximum endurance speed, long range speed, maximum range speed.
21. The speed for maximum endurance
- A) Is always lower than the speed for maximum specific range.
  - B) Can either be higher or lower than the speed for maximum specific range.
  - C) Is always higher than the speed for maximum specific range.
  - D) Is the lower speed to achieve 99% of maximum specific range.
22. In case of an engine failure which is recognized at or above V<sub>1</sub>
- A) The take-off should be rejected if the speed is still below V<sub>R</sub>.
  - B) The take-off must be continued.
  - C) The take-off must be rejected if the speed is still below V<sub>LOF</sub>.
  - D) A height of 50 ft must be reached within the take-off distance
23. During take-off the third segment begins:
- A) When acceleration to flap retraction speed is started.
  - B) When landing gear is fully retracted.
  - C) When acceleration starts from V<sub>LOF</sub> to V<sub>2</sub>.
  - D) When flap retraction is completed
24. V<sub>x</sub> and V<sub>y</sub> with take-off flaps will be:
- A) Higher than that for clean configuration.
  - B) Lower than that for clean configuration.
  - C) Changed so that V<sub>x</sub> increases and V<sub>y</sub> decreases compared to clean configuration.
  - D) Same as that for clean configuration.

25. For a jet aeroplane, the speed for maximum range is:
- A) That corresponding to the point of the minimum drag at the Drag versus TAS curve.
  - B) That corresponding to the point of contact of the tangent from the origin to the Power required versus TAS curve.
  - C) That corresponding to the point of the minimum power required the Drag versus TAS curve.
  - D) That corresponding to the point of contact of the tangent from the origin to the Drag versus TAS curve.
26. A jet aeroplane is climbing with constant IAS. Which operational speed limit is most likely to be reached?
- A) The Minimum control speed air.
  - B) The Maximum operating Mach number.
  - C) The Mach limit for the Mach trim system.
  - D) The Stalling speed
27. Jet aeroplane is climbing at constant Mach number below the tropopause. Which of the following statements is correct?
- A) IAS increases and TAS increases.
  - B) IAS increases and TAS decreases.
  - C) IAS decreases and TAS decreases.
  - D) IAS decreases and TAS increases
28. The first segment of the take-off flight path ends
- A) At 35 ft above the runway.
  - B) At completion of gear retraction.
  - C) At reaching V<sub>2</sub>.
  - D) At completion of flap retraction.
29. A headwind component increasing with altitude, as compared to zero wind condition, (assuming IAS is constant)
- A) Improves angle and rate of climb.
  - B) Does not have any effect on the angle of flight path during climb.
  - C) Decreases angle and rate of climb.
  - D) Has no effect on rate of climb.
30. The effect of a higher take-off flap setting up to the optimum is:
- A) A decrease of the field length limited take-off mass but an increase of the climb limited take-off mass.
  - B) An increase of both the field length limited take-off mass and the climb limited take-off mass.
  - C) An increase of the field length limited take-off mass but a decrease of the climb limited take-off mass.
  - D) A decrease of both the field length limited take-off mass and the climb limited take-off mass.
31. Which of the following combinations adversely affects take-off and initial climb performance ?
- A) Low temperature and low relative humidity
  - B) High temperature and high relative humidity
  - C) Low temperature and high relative humidity
  - D) High temperature and low relative humidity

32. The take-off distance required increases
- Due to downhill slope because of the smaller angle of attack.
  - Due to slush on the runway.
  - Due to lower gross mass at take-off.
  - Due to head wind because of the drag augmentation
33. On a dry runway the accelerate stop distance is increased
- By low outside air temperature.
  - By headwind.
  - By a lower take-off mass because the aeroplane accelerates faster to  $V_1$ .
  - By uphill slope.
34. Two identical aeroplanes at different masses are descending at idle thrust. Which of the following statements correctly describes their descent characteristics ?
- At a given angle of attack the lighter aeroplane will always glide further than the heavier aeroplane.
  - There is no difference between the descent characteristics of the two aeroplanes.
  - At a given angle of attack the heavier aeroplane will always glide further than the lighter aeroplane.
  - At a given angle of attack, both the vertical and the forward speed are greater for the heavier aeroplane.
35. Which of the following factors will lead to an increase of ground distance during a glide, while maintaining the appropriate minimum glide angle speed?
- Decrease of aircraft mass.
  - Increase of aircraft mass.
  - Tailwind.
  - Headwind.
36. The absolute ceiling
- Can be reached only with minimum steady flight speed
  - Is the altitude at which the rate of climb theoretically is zero.
  - Is the altitude at which the best climb gradient attainable is 5%
  - Is the altitude at which the aeroplane reaches a maximum rate of climb of 100 ft/min.
37. The length of a clearway may be included in:
- The distance to reach  $V_1$ .
  - The take-off run available.
  - The take-off distance available.
  - The accelerate-stop distance available
38. Which is the correct sequence of speeds during take-off?
- $V_1$ ,  $V_R$ ,  $V_{MCG}$ ,  $V_2$ .
  - $V_1$ ,  $V_{MCG}$ ,  $V_R$ ,  $V_2$ .
  - $V_1$ ,  $V_R$ ,  $V_2$ ,  $V_{MCA}$ .
  - $V_{MCG}$ ,  $V_1$ ,  $V_R$ ,  $V_2$ .
39. The decision speed at take-off ( $V_1$ ) is the calibrated airspeed:
- Below which the take-off must be continued.
  - At which the failure of the critical engine is expected to occur.
  - At which the take-off must be rejected.
  - Below which take-off must be rejected if an engine failure is recognized, above which take-off must be continued.

40. How does TAS vary in a constant Mach climb in the troposphere (under ISA conditions) ?

- A) TAS is constant.
- B) TAS is not related to Mach Number.
- C) TAS increases.
- D) TAS decreases.

### SECTION B: ANSWER ALL QUESTIONS

1. Explain with a diagram the following declared distances:

- i) TORA
- ii) TODA
- iii) ASDA
- iv) STOPWAY

**(8marks)**

2. A Twin Engine Turbojet Aircraft has engines of 60,000n each; its is 50 tonnes and it has a L/D of 12:1 What is:

- a) Climb Gradient
- b) Climb Angle

**(12marks)**

3. Explain three factors affecting Take Off distance

**(6marks)**

4. State the formula for the following:

- i) Range for the Jet Aircraft
- ii) Endurance for Propeller Aircraft

**(4marks)**