EAST AFRICAN SCHOOL OF AVIATION EXAMINATION

SAFETY SECTION

DIPLOMA IN FLIGHT DISPATCH

FLD 37

FINAL EXAMINATION

SUBJECT: AIRCRAFT PERFOMANCE

Duration: 02 Hrs: 30 Min

DAY/DATE: TIME: 0830HRS – 1030HRS

SECTION: A Answer all questions (40marks)

1. 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

2. 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

3. VLO 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

4. 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

5. What is meant by balanced field available?
a. TORA = TODA
b. ASDA = ASDR and TODA =TODR
c. TODA = ASDA
d. TORA = ASDA

6. 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

7. 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

8. 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

9. 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

10. 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

11. 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

12. 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

13. 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

14. 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

15. 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

16. 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

17. 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

18. 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

19. 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

20. 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

21. 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

22. 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

23. 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

24. 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

25. 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

26. 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

27. If a jet engine fails during take-off, before V1:
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 VMCG and lies between VGO and VSTOP

28. Which denotes the stall speed in the landing configuration?

a. VS0
b. VS1
c. VS
d. VS1g

29. What does density altitude signify ?
a. Pressure altitude
b. Flight levels
c. ISA altitude
d. An accurate indication of aircraft and engine performance

30. 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

31. 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

32. 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

33. 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

34. 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

35. 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

36. 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

37. 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

38. 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

39. Can a clearway be used in the accelerate-stop distance calculations?
a. Yes
b. No
c. Only if the clearway is shorter than the stopway
d. Only if there is no clearway

40. A four jet engine aeroplane whose mass is 150 000 kg is established on climb with engines operating. The lift over drag ratio is 14:1. Each engine has a thrust of 75 000 Newtons.
The gradient of climb is: (given: g = 10 m/s2)
a. 12.86%
b. 27%
c. 7.86%
d. 92%

SECTION B: Answer ALL Questions (30 marks)

1. Define Range of an aircraft. (1 mark)

2. Define endurance of an aircraft. (1 mark)

3. Define absolute ceiling. (1 mark)

4. Define Service ceiling. (1 mark)

5. Which is the main parameter affecting rate of climb? (1 mark)

6. Define pitch angle. (1 mark)

7. Given the following runway information (4 marks)

RWY 06/24 – TORA - 7500m

Stopway off RWY 06/24 - 3500m

Clearway off RWY 06/24 – 1500m

Displaced threshold RWY 06/24 -1200m

    a) Calculate landing distance available RWY 06
    b) Calculate accelerate-stop distance available RWY 24
    c) Calculate take off distance available RWY 06
    d) Calculate landing distance available RWY 24

8. The Landing performance is divided into two parts airborne section and ground run, state two critical actions during the airborne section. (2 marks)

9. List and explain FIVE factors affecting landing distance (5 marks)

10. List and explain FIVE factors affecting take-off distance (5 marks)

11. Explain how weight affect the endurance. (4 marks)

12. Describe the relationship between payload and range. (4marks)