EAST AFRICAN SCHOOL OF AVIATION
EXAMINATION

FINAL EXAM

IATA/SAFETY SECTION

SUBJECT: PERFORMANCE

Stream: Flight Dispatch No.21 **Duration: 2 Hrs**

DATE: 12/09/2016 **TIME: 8.30 – 10.30 AM**

INSTRUCTIONS TO CANDIDATE:

1. *This paper consists of **THIRTEEN (13)** Printed pages.*
2. Answer the questions as per the instructions given
3. Examination rules and regulations shall apply

1. The affect of a contaminated runway on the field limit mass:

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.

2. 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.

3. The main reason for using the stepped climb technique is to:

A. Decrease sector times.

B. Increase endurance.

C. Adhere to ATC procedures.

D. Increase range.

4. When takeoff 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.

5. 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.

6. An aircraft is certified to land with flaps at 25 or 35degrees 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 reduce go-around performance.

7. Absolute Ceiling is defined by:

A. Altitude where theoretical rate of climb is zero.

B. Altitude at which rate of climb is 100fpm.
C. Altitude obtained when using lowest steady flight speed.
D. Altitude where low speed Buffet and high speed Buffet speeds are coincident.

8. 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.

9. 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 takeoff performance will be affected.
D. Neither takeoff nor landing performance will be affected.

10. V_{RFF} for a Class B aircraft is defined by:
A 1.3Vs
B 1.2Vs
C 1.3Vmcl
D 1.2Vmcl

11. Take off on a runway with standing water, with a depth of 0.5cm. 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

12. 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.

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

A. The aircraft will not clear the object.
B. 85m
C. 100m
D. 115m

14. 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.

15. Which denotes the stall speed in the landing configuration?
A. V_{SO}.
B. V_{S1}
C. V_S
D. V_{SIG}

16. Out of the four forces acting on the aircraft in flight, what balances thrust in the climb?
A. Drag.
B. Weight.
C. W sin O
D. Drag + W sin O

17. 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.

B. With which conditions would one expect V_{MC} to be the lowest?
A. Cold temp, low altitude, low humility
B. Hot temp, low pressure altitude, high humility
C. Hot temp, high pressure altitude, high humility
D. Cold temp, high altitude, low humility

C. Maximum Endurance:
A Can be achieved in level un-accelerated 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.

D. The long range cruise speed is a speed that gives:
A. a 1% increase in range and a decrease in AIS.
B. A 1% increase in TAS.
C. A 1% increase in IAS.
D Gives 99% of best cruise range, with an increase in IAS

E. Optimum altitude can be defined as:
A. The highest permissible altitude for an airplane type.
B. The altitude at which an airplane 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

F. Which of the following speeds give the maximum obstacle clearance in the climb?
A. V_Y.
B. $1.2V_{S1}$.
C V_X.
D V_{FE}.

23. 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.

24: The effect of a decrease in air density is to:
A) decrease the take-off distance and increase the rate of climb
B) increase the take-off distance and increase the rate of climb
C) decrease the take-off distance and reduce the rate of climb
D) increase the take-off distance and reduce the rate of climb

25 V_{LO} is defined as:
A) Actual speed that the aircraft lifts off the ground
B) The long range cruise speed
C) The maximum speed for landing gear operation
D) Minimum possible speed that the aircraft could lift off the ground

26: The speed V_S is defined as
A) safety speed for take-off in case of a contaminated runway
B) design stress speed

C) speed for best specific range
D) stalling speed or minimum steady flight speed at which the airplane is controllable

27 The rate of climb:
A) Is angle of climb times true airspeed
B) Is the downhill component of the true airspeed
C) Is the horizontal component of the true airspeed
D) Is approximately climb gradient times true airspeed divided by 100

28: For a single engine class B aeroplane, V_2 may not be less than:
A) not applicable
B) 1.2Vs
C) 1.15Vs
D) 1.5Vs

29: Density altitude is the:
A) Pressure altitude corrected for 'non standard' temperature
B) Altitude reference to the standard datum plane
C) Altitude read directly from the altimeter
D) Height above the surface

30: Under what condition is pressure altitude and density altitude the same value?
A) When the altimeter setting is 29.92" Hg
B) When indicated, and pressure altitudes are the same value on the altimeter
C) At standard temperature
D) When the altimeter setting is 1013" Hg

31: Pressure altitude is:
A) The altimeter indication when QNH is set on the sub-scale
B) The altimeter indication when QFE is set on the sub-scale
C) The altitude above sea level
D) The altimeter indication when 1013.25 Hpa is set on the sub-scale

32: The 'climb gradient' is defined as the ratio of:
A) Rate of climb to true airspeed
B) The increase of altitude to distance over ground expressed as a percentage
C) True airspeed to rate of climb
D) The increase of altitude to horizontal air distance expressed as a percentage

33: Which of the equations below expresses approximately the un-accelerated percentage climb gradient for small climb angles?
A) Climb Gradient = ((Thrust + Drag)/Lift) x 100
B) Cimb Gradient = (Lift/Weight) x 100
C) Climb Gradient = ((Thrust - Mass)/Lift) x 100
D) Climb Gradient = ((Thrust - Drag)/Weight) x 100

34: The stalling speed or the minimum steady flight speed at which the aeroplane is controllable in landing configuration is abbreviated as
A) V_{MC}
B) V_{S1}
C) V_{SO}
D) V_S

35: What is the standard temperature and pressure values at sea level?
A) 59 degrees Celsius and 1013.2 millibars
B) 59 degrees Fahrenheit and 29.92 millibars
C) 0 degrees Celsius and 1013 hPa
D) 15 degrees Celsius and 1013.25 hPa

36: The coefficient of lift can be increased either by flap extension or by
A) increasing the CAS
B) increasing the TAS
C) increasing the angle of attack
D) decreasing the 'nose-up' elevator trim setting

37: The gross take off distance required for a single engine Class B aircraft is the distance:
A) from the start of the run to a screen height of 50 feet
B) from the start of the run to the point at which the wheels are just clear of the ground
C) from the start of the run to the point at which the wheels are just clear of the ground multiplied by a factor of 1.25
D) from the start of the run to a screen height of 35 feet

38: Regarding take-off, the take-off decision speed V_1:
A) Is an airspeed at which the aeroplane is airborne but below 35 ft and the pilot is assumed to have made a decision to continue or discontinue the take-off
B) Is always equal to VEF (Engine Failure speed)
C) Is the airspeed on the ground at which the pilot is assumed to have made a decision to continue or discontinue the take-off
D) Is the airspeed of the aeroplane upon reaching 35 feet above the take-off surface

39: Gross performance is:
A) The maximum performance which a fleet of aeroplanes should achieve if satisfactorily maintained and flown in accordance with the techniques described in the manual
B) 65 percent of net performance
C) The minimum performance which a fleet of aeroplanes should achieve if satisfactorily maintained and flown in accordance with the techniques described in the manual
D) The average performance which a fleet of aeroplanes should achieve if satisfactorily

maintained and flown in accordance with the techniques described in the manual

40: Two identical airplanes 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, both the vertical and the forward speed are greater for the heavier airplane.
B) There is no difference between the descent characteristics of the two airplanes.
C) At a given angle of attack the heavier airplane will always glide further than the lighter airplane.
D) At a given angle of attack the lighter airplane will always glide further than the heavier airplane.

41: The C of G is:
A) The point on the aircraft where the datum is located
B) The point on the aircraft where the lift acts through
C) The point on the aircraft from where the dihedral angle is measured
D) The point on the aircraft through which gravity appears to act

42: Take-off distance available is:
A) the distance from brake release point to 35ft screen height
B) TORA
C) TORA plus clearway
D) TORA plus stopway

43: The absolute ceiling is defined as:
A) The outer boundary of our galaxy
B) The altitude where the maximum rate of climb is 0 ft/minute
C) The altitude where the rate of climb is maximum
D) The altitude where a certain maximum rate of climb (e.g. 100 ft/min) is attained

44: The Density Altitude:
A) is used to calculate the FL above the Transition Altitude
B) is used to determine the aeroplane performance
C) is equal to the pressure altitude
D) is used to establish minimum clearance of 2.000 feet over mountains
45: The point where Drag coefficient/Lift coefficient is a minimum is:
A) At stalling speed (VS)
B) On the " back side" of the drag curve
C) The lowest point of the drag curve
D) The point where a tangent from the origin touches the drag curve

46: For a piston engine aircraft the Critical Altitude is:
A) The maximum altitude at which it is possible to maintain a specified power
B) The minimum altitude at which, in standard atmosphere, it is possible to maintain a specified power or a specified manifold pressure

C) The maximum altitude at which it is possible to maintain a specified manifold pressure
D) The maximum altitude at which, in standard atmosphere, it is possible to maintain a specified power or a specified manifold pressure

47: The induced drag of an airplane
A) is independent of the airspeed.
B) Increases with increasing airspeed.
C) Decreases with increasing airspeed.
D) Decreases with increasing gross weight.

48: The two requirements for take-off with which compliance is necessary are (single engine class B):
A) field-length and climb gradient requirements
B) field length and brake energy requirements
C) tyre speed and brake energy requirements
D) obstacle and climb gradient requirements

49: Decreasing take off flap from 15° to 0° will probably result in a _____ V_{lof}.
A) reduced
B) greatly reduced
C) increased
D) unchanged

50: (For this Question use CAP 698 Figure 2-4)
Accounting for the following, what would be the minimum required head wind component for landing? Use the attached chart.
Factored landing distance: 1300 ft
Temperature at MSL: ISA
Landing mass: 3200 lbs
A) 5 Kts
B) 10 Kts
C) 15 Kts
D) 0 Kts

51: The scheduled landing distance required is the distance:
A) From touchdown to the point at which the aircraft has come to a complete stop
B) From a screen of a designated height to the point at which the aircraft has come to a complete stop
C) From touchdown to the point at which the aircraft has decelerated to a speed of 20kts
D) From the point at which the aircraft is 50 metres above the runway to the point at which the aircraft has come to a complete stop

52: At the moment of lift off:
A) rolling resistance is a maximum
B) lift is greater than mass
C) lift and drag are equal to zero
D) lift is equal to weight

53: The landing distance required must not exceed (single engine class B):
A) 70 percent of the landing distance available at a destination aerodrome, and 60 percent of the landing distance available at an alternate aerodrome
B) 60 percent of the landing distance available at destination and alternate aerodromes
C) 60 percent of the landing distance available at a destination aerodrome, and 70 percent of the landing distance available at an alternate aerodrome
D) 70 percent of the landing distance available at destination and alternate aerodromes

54: An upward runway slope:
A) increases the take-off distance required
B) decreases the take-off distance required
C) increases the accelerated-stop-distance available
D) decreases the accelerated-stop-distance available

55: Which of the following combinations will produce the best take-off performance in a normal atmosphere?
A) High altitude, high ambient temperature
B) Low altitude, low ambient temperature
C) High altitude, low ambient temperature
D) Low altitude, high ambient temperature

56: (Refer to CAP 698 figure 2-4)
With regard to the landing chart for the single engine airplane determine the landing distance from a height of 50 ft. Given :

O.A.T: ISA +15° C
Pressure Altitude: 0 ft
Airplane Mass: 2940 lbs
Tailwind component: 10 kt
Flaps: Landing position (down)
Runway: Tarred and Dry
A) approximately: 1400 feet
B) approximately: 950 feet
C) approximately: 1300 feet
D) approximately: 750 feet

57: (For this Question use CAP 698 Figure 2.2)
With regard to the take off performance chart for the single engine airplane determine

the take off speed for (1) rotation and (2) at a height of 50 ft.

Given:
O.A.T: ISA+10° C
Pressure Altitude: 5000 ft
Aeroplane mass: 3400 lbs
Headwind component: 5 kt
Flaps: up
Runway: Tarred and Dry
A) 73 and 84 KIAS
B) 65 and 75 KIAS
C) 71 and 82 KIAS
D) 68 and 78 KIAS

58: The minimum value of V2 must exceed "air minimum control speed" by:
A 15%
B 20%
C 30%
D 10%

59: How does the thrust of fixed propeller vary during take-off run? The thrust
A) has no change during take-off and climb
B) varies with mass changes only
C) decreases slightly while the aeroplane speed builds up
D) increases slightly while the aeroplane speed builds up

60: For an aeroplane nn Performance Class B the net take-off flight path begins at a height of _____ and ends at a height of _____ .
A) 35 feet; 1500 feet
B) 50 feet; 1000 feet
C) 50 feet; 1500 feet
D) 35 feet; 1000 feet

61: (For this Question use CAP 698 Figure 2.4)
With regard to the landing chart for the single engine aeroplane determine the landing distance from a height of 50 ft.
Given:
O.A.T: ISA
Pressure Altitude: 1000 ft
Aeroplane Mass: 3500 lbs
Tailwind component: 5 kt
Flaps: Landing position (down)
Runway: Tarred and Dry
A) 920 feet
B) 1150 feet

C) 1700 feet
D) 1500 feet

62: Which statement regarding the relationship between traffic load and range is correct?
A) The maximum landing mass is basically equal to the maximum zero fuel mass.
B) The maximum traffic load is not limited by the reserve fuel quantity.
C) The traffic load can be limited by the desired range.
D) The maximum zero fuel mass limits the maximum quantity of fuel.

63 The first segment of the take-off flight path ends
A at completion of gear retraction
B at completion of flap retraction
C at reaching V2
D at 35 ft above the runway

64: If the flap angle is reduced below the optimum take-off setting, the field limited take-off mass... and the climb gradient limited mass...
A) decreases, decreases
B) decreases, increases
C) increases, decreases
D) increases, increases

65: With the flaps in the take-off position, compared to the clean configuration, the climb gradient... and the speed for best climb angle...
A) decreases, decreases
B) increases, increases
C) increases, decreases
D) decreases, increases

66: A decrease in atmospheric pressure has, among other things, the following consequences on take-off performance:
A) A reduced take-off distance and degraded initial climb performance
B) An increased take-off distance and improved initial climb performance
C) An increased take-off distance and degraded initial climb performance
D) A reduced take-off distance and improved initial climb performance

67: (For this Question use CAP 698 Figure 2.2)
With regard to the take off performance chart for the single engine airplane determine the take off distance over a 50 ft obstacle height.
Given:
O.A.T: 30° C
Pressure Altitude: 1000 ft
Airplane Mass: 2950 lbs
Tailwind component: 5 kt

Flaps: Approach setting
Runway: Short, wet grass, firm subsoil
Correction factor: 1.25 (for runway conditions)
A) 2000 ft
B) 1600 ft
C) 2375 ft
D) 1900 ft

68: The effect of increased weight on a glide descent in a normal atmosphere is:
A) Forward speed decreased, rate of descent decreases
B) Forward speed decreased, rate of descent increases
C) Forward speed increases, rate of descent decreases
D) Forward speed increases, rate of descent increases

69: ETOPS flight is a twin engine jet airplane flight conducted over a route, where no suitable airport is within an area of
A) 75 minutes flying time at the approved one engine out cruise speed.
B) 60 minutes flying time in still air at the approved one engine out cruise speed.
C) 60 minutes flying time in still air at the normal cruising speed.
D) 30 minutes flying time at the normal cruising speed

70: (Refer to CAP 698 figure 2.1)
With regard to the take off performance chart for the single engine airplane determine the maximum allowable take off mass. Given:

O.A.T: ISA
Pressure Altitude: 4000 ft
Headwind component: 5 kt
Flaps: up
Runway: Tarred and Dry
Factored runway length: 2000 ft
Obstacle height: 50 ft
A) 3650 lbs
B) 2900 lbs
C) 3240 lbs
D) 3000 lbs