# EAST AFRICAN SCHOOL OF AVIATION
# SUPPLEMENTARY EXAMINATION

## SAFETY SECTION

## SUBJECT: FLIGHT PLANNING

Stream: Duration: 2Hrs

DATE: TIME:

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Instructions to Candidate:

1. This paper consist of two sections
2. Answer all the questions in both sections
3. Examination rules and regulations should be adhered to.
4. Total marks= 70

STUDENT'S NAME: ----------

STUDENT'S NUMBER: ----------

PART1(40MKS)

1. A jet aircraft has a taxi fuel of 460 kgs, alternate fuel of 2,600kgs, contingency is 5% of trip fuel, cruise fuel flow of 6,000kg/hr and a hold fuel flow of 2,000kgs/hr, flight time is 2hr 15 minutes, what is the required ramp fuel?. **(5mks)**

2. A piston aircraft has a taxi fuel of 50 lbs and a cruise flow of 3,000lbs/hr, hold fuel flow of 1,800 lbs /hr, flight time 4hr 30 minutes, alternate 1085lbs,assuming minimum fuel uplift, normal en-route diversions available and contingency fuel not used en-route, what will be your fuel on arrival at the destination after a 15 minutes hold? **(5mks)**

3. The total distance from A-B is 4,000nm the aircraft true airspeed is 350kts,the wind component from departure to destination is 40 kts Tailwind and wind component back to departure is 20kt tailwind, if the actual time of departure is 1545Z, calculate the distance to PET(point of equal time)and the estimated time of arrival at point of equal time(PET) **(5MKS)**

4. An aircraft at 25,000ft is cleared to level at 2,000ft, 14nm before reaching a beacon, if the true air speed during the descent is 400 kts and a wind component of 50 kts head wind and the rate of descent is 650 fpm, how many miles before the beacon should descent begin? **(5mks)**

5. Aircraft mass at Airport A is 64,500kgs
   Aircraft mass at Airport B is 57,600kgs
   Cruise at L.R.C@FL330
   OAT:-26°c
   Wind component: 25kt head wind
   Calculate the TAS, Ground distance and specific fuel consumption (**6mks)**
   **(Fig4.5.3.1)**

6. An Aircraft is to fly from A-B a distance of 2,800ngm using long range cruise(LRC) at FL330
   Aircraft mass at "A" 55,200kg
   OAT:-36°C
   W/C: 25kt tailwind
   What is the true airspeed and the fuel required? **(5mks)**
   **(Fig 4.5.3.1)**

7. What is the shortest and longest distance between Rome (2530N01110E) and Honolulu (1115N 16850W)? **(4MKS)**

8. Given a break release weight :57,000kg
   Airport elevation: 3,000ft
   Cleared cruise pressure altitude: 29,000ft
   Wind: 30kts tailwind
   ISA +5
   Determine the following:
   a. Sector time
   b. Fuel burned in climb
   c. Nautical ground miles
   **d.** Average true air speed(TAS)
   **e.** Air distance flown (5mks)

**Fig (4.5.1**

## PART 2(30MKS)

1. A revenue flight is to be made by a jet transport ,the following are structural limits

   Maximum ramp mass: 69,9000kgs
   Maximum take off mass: 69,300kgs
   Maximum landing mass; 58,900kgs
   Maximum zero fuel mass: 52,740kgs
   The performance limited take off mass is 67,450kgs and the performance limited landing mass is 55,470kgs,
   Dry operating mass: 34,900kgs
   Trip fuel: 6,200kgs
   Taxi fuel: 250kgs
   Contingency and final reserve fuel: 1,300kgs
   Alternate fuel: 1,100kgs
   The maximum traffic load that can be carried is:

   a. 13,950kgs
   b. 18,170kgs
   c. 17,840kgs
   d. 24,800kgs

2. What is the equation for the climb gradient expressed as percentage during un accelerated flight(applicable to small angles only)

   a. Climb gradient=(thrust-mass/lift)×100
   b. Climb gradient=(thrust –drag/mass)×100
   c. Climb gradient=(thrust-drag/lift)×100
   d. Climb gradient=(thrust-drag/weight)×100

3. The optimum altitude is:
   a. The pressure altitude at which the speed for high buffet as TAS is a maximum
   b. Pressure altitude up to which a cabin altitude of 8,000ft can be maintained
   c. The pressure altitude at which the best specific range can be achieved
   d. Pressure altitude at which fuel flow is a maximum

4. When an ATC flight plan is submitted for a flight outside a designated ATS route points included in item 15(route) should not normally be at intervals of more than:
   a. 20 minutes flying time or 150km
   b. 30 minutes flying time or 370km
   c. 15 minutes flying time or 150km
   d. 1hr flying time or 500km

5. A jet aeroplane has a cruising fuel consumption of 4060kg/hr and 3690kg/hr during holding, if the destination is an isolated airfield, the aeroplane must carry ,in addition to contingency reserves,additional fuel load of:
    a. 1845kg
    b. 8120kgs
    c. 7380kg
    d. 3500kg
6. Given the following:
    Distance from departure to destination: 435nm
    GS out: 110kts
    GS home: 130kts
    What is the distance of PET from the departure point?
    a. 368nm
    b. 199nm
    c. 236nm
    d. 218nm

7. Given :
    Distance from departure to destination: 500nm
    Endurance: 4hrs
    TAS: 140Kts
    Wind component out: 10 kts tailwind
    Wind component on return: 20 kts headwind
    What is the distance and time of PSR from departure point?
    a. 279nm,111min
    b. 221nm,89min
    c. 139nm,60min
    d. 232nm,107min
8. Given :
    Dry operating mass: 5,320
    Zero fuel mass: 6,790kgs
    Trip fuel: 770kgs
    Take off fuel: 1,310kgs
    The traffic load is:
    a. 1610kgs
    b. 2940kgs
    c. 3080kgs
    d. 1470kgs

9. During an IFR flight in a beach bonanza the fuel indicators shows that the remaining amount of fuel is 100 lbs after 38 min, the total amount of fuel at departure was 160 lbs for the alternate fuel 30 lbs is necessary. The planned fuel for taxi is 13 lbs; final reserve fuel is estimated at 50 lbs, if the fuel flow remains the same, how many minutes can be flown to the destination?
    a. 63 minutes
    b. 4 minutes
    c. 12 minutes
    d. 44 minutes

10. In the ATS flight plan item 15, it is necessary to enter any point at which a change of cruising speed take place, for this purpose a change of speed is defined as;
    a. 30 kts or 0.05 mach or more
    b. 370 km apart or 0.05 mach or more
    c. 5% TAS or 0.01 mach or more
    d. 10% TAS or 0.01 mach or more

11. A sector distance is 540 NM Long, the TAS is 500 kts; the wind component is 45 kts headwind, what is the still air distance?
    a. 593 NAM
    b. 545 NAM
    c. 495 NAM
    d. 540 NAM

12. What will be the influence on performance if aerodrome pressure altitude is increased?
    a. It will increase the take off distance available
    b. It will increase the take off distance
    c. it will decrease the take off distance
    d. It will increase friction
13. In order to get alternate fuel and time the twin jet aeroplane operations manual graph shall be entered with:
    a. Still air distance, wind component, zero fuel mass
    b. Flight time, wind component, landing mass at alternate
    c. Distance (Nm), wind component, zero fuel mass
    d. Distance (Nm), wind component, landing mass at alternate

14. During an IFR flight TAS and time appears to deviate from the data in the flight plan. the minimum deviation that should be reported to ATC in order to conform to PANS-RAC are:
    a. TAS 5kts and time 5minutes
    b. TAS 3% and time 3minutes
    c. TAS 5% and time 3minutes
    d. TAS 10kts and time 2minutes

15. In an ATS flight plan item 15(route) in terms of latitude and longitude, a significant point at 44°12´ North and 8° 19´west should be entered as:
    a. 44°12´N 08°19´W
    b. N4412 W0819
    c. 4412N 00819W
    d. 04412N 819W
16. In an ATC flight plan, an aircraft indicate as “L” LIGHT.
    a. Has a certified landing mass greater than 136,000kgs
    b. Requires a short runway length
    c. Is the lowest wake turbulence category
    d. Has a maximum certified take off mass of 7000kgs

17. Turbo-jet aircraft, flying to isolated airfield, with no destination alternate. on top of taxi, trip and contingency fuel what fuel is required?
    a. Greater of 45 min+15%of trip or 2hrs
    b. 30 min holding @450 m above mean sea level
    c. 30 min holding@450 m AAL
    **d.** 2 hours at normal cruise consumption

18. The quantity of fuel which is calculated to be necessary for jet aircraft to fly I.F.R from departure to destination aerodrome is 5,325kgs, fuel consumption in holding is 6000kgs /hr, alternate fuel is 4380kgs, contingency should be 5%of trip fuel, what is minimum required quantity of fuel which should be on board at take off?
    a. 13,220kgs
    b. 14,500kgs
    c. 13000kgs
    **d.** 13,370kgs

19. Turbo jet aircraft, taxi fuel 600kgs, fuel flow in cruise10000ks/hr
    Fuel flow hold 800kg/hr, alternate fuel 10,200kg, flight time 6hours,visibility at destination 2000m, what is the minimum ramp fuel
    a. 80,500kgs
    b. 79,200kgs
    c. 77,800kgs
    **d.** 76,100kgs

20. Given:

Dry operating mass:46,500kgs,Traffic load:8400kgs,Trip fuel:2600kgs,Final reserve :1200kgs.Alternate fuel:1345kgs,Contingency:5% of trip fuel

Which of the following is correct?

a. Est landing mass at destination 56,100kgs
b. Est landing mass at destination 55,030kgs
c. Est take off mass 60,175kgs
d. Est take off mass 60,045kgs

21. Given:

| | |
|---|---|
| Distance A-B | 2050NM |
| Mean ground speed on | 440kts |
| Mean ground speed back | 540kts |

What is the distance to the point of equal time between A and B?

a. 920nm
b. 1153nm
c. 1130nm
d. 1025nm

22. Determine the Landing Mass for the following single engine airplane.

Given:

Standard Empty Mass :1764 lbs.

Optional Equipment : 35 lbs.

Pilot + Front seat passenger: 300 lbs.

Cargo Mass: 350 lbs.

Ramp Fuel = Block Fuel: 60 Gal.

Trip Fuel: 35 Gal.

Fuel density: 6 lbs./Gal.

a. 2659 lbs.
b. 2449 lbs.
c. 2589 lbs.
**d.** 2799 lbs

23. With respect to the optimum altitude, which of the following statements is correct?

a. An aeroplane flies most time above optimum altitude because this yields the most economic results.
b. An aeroplane always flies at the optimum altitude because this is economically seen as the most attractive altitude.
c. An Aircraft always flies below the optimum altitude because Mach buffet might occur.
d. An Aircraft sometimes flies above or below the optimum altitude because optimum altitude increases continuously during flight.

24. You are to determine the maximum fuel load which can be carried in the following conditions:

-Dry operating fuel: 2800kg
-Trip fuel: 300kg
-Traffic load: 400kg
-Maximum take-off mass: 4,200kg
-Maximum landing mass: 3,700kg

a. 800kg
b. 500kg
c. 700kg
d. 1000kg

25. In the ATC flight plan item 13, in a flight plan submitted before departure, time entered is the:
    a. Estimated take off time
    b. Allocated slot time.
    c. Estimated time over the first point en-route.
    d. Estimated off block time.

26. A revenue flight is to be made by a jet transport. The
    following are the aeroplane's structural limits:
    -Maximum Ramp Mass: 69 900 kg
    -Maximum Take Off Mass: 69 300 kg
    -Maximum Landing Mass: 58 900 kg
    -Maximum Zero Fuel Mass: 52 740 kg
    The performance limited take off mass is 67 450kg and the performance limited landing mass is 55 470 kg.
    Dry Operating Mass: 34 900 kg
    Trip Fuel: 6 200 kg
    Taxi Fuel: 250 kg
    Contingency & final reserve fuel: 1 300 kg
    Alternate Fuel: 1 100 kg
    The maximum traffic load that can be carried is:
        a. 25 800 kg
        b. 17 840 kg
        c. 18 170 kg
        d. 13 950 kg

27. Which of the following statements is relevant for forming route positions in intergraded range flight planning?

a. No segment shall be more than 30 minutes of flight time.
b. Each reporting points requires a new segment.
c. Small change of temperature 2°C can divide segment.
d. The distance from take-off up to the top of climb has to be known.

28. Given;

Distance from departure to destination: 2500nm
TAS: 500Kts
Wind component out: 40kts Tailwind
Wind component on return: 30 Headwind

What is the time of the PET from departure point?

a. 28 min
b. 129 min
c. 180 min
d. 161 min

29. Given:

Distance from departure to destination: 2450 nm
Endurance 7.5 hrs
TAS: 41O
Ground speed out: 360 Kts
Ground speed home: 460kts

What is the time of the point of safe return (PSR) from departure point?

a. 158 min
b. 252 min
c. 190 min
d. 111 min

30. At the flight preparation stage, the following parameters in particular are available for determining the mass of an aircraft:

1- Dry Operating Mass
2-Operating Mass

Which statement is correct?

a. Dry Operating Mass includes fixed equipment needed to carry out a specific flight.
b. Operating Mass is the mass of an aircraft without take off fuel.
c. Operating Mass includes the traffic load.
d. Dry Operating Mass includes take off fuel.