FLIGHT PLANNING

THEORY

1. The maximum load specified in the loading chart is exceeded by 10%. What action must be taken?

   a) Increase rotor speed by 10%
   b) Take-off carefully
   c) None, since a 10% greater load is still within the specified safety margin
   d) Reduce useful load.

2. In mass and balance calculations the index is:

   a) An imaginary vertical plane or line from which all measurements are taken
   b) Is a figure without unit of measurement which represents a moment
   c) The range of moments the cg can have without making the aircraft unsafe to fly
   d) A location in the aircraft identified by a number

3. Loads must be adequately secured in order to:

   a) Prevent excessive “g:” loading during the landing flare
   b) Avoid any centre of gravity (cg) movement during flight
   c) Allow steep turns
   d) Avoid unplanned centre of gravity (cg) movement and aircraft damage

4. The distance from the datum to the CG is:

   a) The index
   b) The moment
   c) The balance arm
   d) The station

5. Define Balance Arm:

   a) BA = Mass / Moment
   b) BA = Moment / Mass
   c) BA = Mass / Distance
   d) BA = Moment / Distance

6. In mass and balance terms, what is an Index?

   a) A cut down version of a force
   b) A moment divided by a constant
   c) A moment divided by a mass
   d) A mass divided by a moment

7. Define Useful load:

   a) Traffic load plus dry operating mass
   b) Traffic load plus usable fuel mass
   c) Dry operating mass plus useable fuel load
   d) That part of the traffic load which generates revenue

8. The useful load is:

   a) TOM – fuel mass
   b) BEM plus fuel load
   c) TOM minus DOM
   d) TOM minus operating mass

CAP 696: SEP

9. Refer to Figure 2.1: What are the CG limits?

   a) Fwd limit = 74 inches to 80.4 inches
   b) Fwd limit = 74 inches, aft limit = 87.7 inches
   c) Fwd limit = 74 inches to 80.4 inches and aft limit = 87.7 inches
   d) Fwd limit = 74 inches, aft limit = 80.4 inches

10. At reference or see Loading Manual SEP1 Figure 2.4.; With respect to a single-engine piston powered aeroplane, determine the zero fuel moment (lbs.ln./100) in the following conditions:;
    Basic Empty Mass: 2415 lbs.;
    Arm at empty Mass: 77,9 In.;
    Cargo Zone A: 350 lbs.;
    Baggage Zone B: 35 lbs.;
    Pilot and front seat passenger: 300 lbs (total)

    a) 2496,3
    b) 2548,8
    c) 2311,8
    d) 6675

11. Where is the reference datum?

    a) 74 inches aft of the fwd CG position
    b) 80.4 inches aft of the rear CG position
    c) 87.7 inches aft of the rear CG position
    d) 39 inches forward of the firewall

12. The aircraft has 6 six seats. Assuming no other cargo or baggage, what is the maximum fuel that can be carried if all six seats are occupied and the mass of each occupant is 180 lbs?

    a) 50 lbs but the CG would be dangerously out of limits
    b) 155 lbs but the CG would be dangerously out of limits
    c) 50 lbs and the CG would be in limits
    d) 155 lbs and the CG would be in limits

13. Assuming the weight and access is not a problem where can a box of mass 500 lbs be positioned if the dimensions are 0.75 ft x 1.5 ft x 5 ft?

    a) In any of the baggage zones if placed on its smallest side
    b) In zones B or C if placed on its largest side
    c) In zone C only if placed on its middle area
    d) In zone a only if placed on its largest side

14. What is the CG at the BEM?

    a) 77 inches
    b) 87 inches
    c) 77.7 metres
    d) 77.7 inches

15. What is the structural load limit for the floor at baggage zone C?

    a) 50 lbs/ft2
    b) 100 lbs/ft3
    c) 100 lbs/ft2
    d) 100 kg/in2

16. What is the distance of the main undercarriage from the firewall?

    a) 97”
    b) 58”
    c) 87.7”
    d) 39”

17. Where is the centroid of baggage zone B?

    a) 108” from the datum
    b) 120” from the datum
    c) 150” from the datum
    d) 180” from the datum

18. Assuming the weight and access is not a problem, where can a cubic box of mass 500 lbs be positioned if the dimensions are 3.15 ft?

    a) In any of the baggage zones
    b) In zone B and C only
    c) In zone A only
    d) In zone C only

19. What is the maximum ramp mass?

    a) 3 650 lbs
    b) 3 663 lbs
    c) 3 780 lbs
    d) 3 870 lbs

20. If the landing mass is 3 155 lbs and the trip fuel was 40 gallons, what was the ZFM if the fuel tanks held 60 gallons of fuel prior to take-off.

    a) 3 001 lbs
    b) 3 035 lbs
    c) 3 098 lbs
    d) 3 111 lbs

21. How far is the main wheel from the aft CG limit?

    a) 0.7” behind the rear datum
    b) 0.7” forward of the rear datum
    c) 6.6” forward of the rear datum
    d) 9.3” aft of the rear datum

22. How far is the firewall from the fuel tank centroid?

    a) 36”
    b) 37”
    c) 38”
    d) 39”

23. If the total moment is less than the minimum moment allowed:

    a) Useful load items must be shifted aft
    b) Useful load items must be shifter forward
    c) Forward load items must be increased
    d) Aft load items must be reduced.

24. The CG is on the lower of the fuel CG limits:

    a) At a mass of 2 500 lbs and moment of 185 000 lbs/in
    b) At a moment of 175 000 lbs/in and a mass of 2 350 lbs
    c) At a moment of 190 000 lbs/in and a mass of 2 600 lbs
    d) All of the above

CAP 696: MEP

25. Where is the reference datum?

    a) 78.4 inches forward of the wing leading edge t the inboard edge of the inboard fuel tank
    b) 25.3 inches forward of the nose wheel
    c) 109.8 inches forward of the main wheel
    d) **All the above**

26. The main wheel is:

    a) 19 inches forward of the fwd CG limit at the maximum take-off mass
    b) 27.8 inches forward of the fwd CG limit at the maximum take-off mass
    c) 69.3 inches forward of the rear CG limit at the maximum take-off mass
    d) All of the above

27. The nose wheel is:

    a) 56.7 inches forward of the fwd CG limit at the maximum take-off mass
    b) 65.5 inches forward of the fwd CG limit at the maximum take-off mass
    c) 69.3 inches aft of the fwd CG limit at the maximum take-off mass
    d) All of the above

28. Assuming floor loading limits are acceptable, how much freight and fuel load can be carried for MTOM if the pilot's mass was 200 lbs.

a) A full load in each zone plus 380 lbs of fuel
b) 50 lbs in zones 1 or 4 but full loads in each of the other zones, plus 280 lbs of fuel
c) 350 lbs load in zone 4 but full loads in all the other zones, plus 280 lbs of fuel
d) A full freight in each zone plus 280 lbs of fuel

29. If the aircraft is at MTOM with full fuel tanks and a pilot of mass 200 lbs, what traffic load can be carried?

a) Nil
b) 579 lbs providing at least 20.5 gallons of fuel are consumed in start, taxi and flight
c) 625 lbs providing at least 4.3 gallons of fuel are consumed in start, taxi and flight
d) 759 lbs providing at least 59.5 gallons of fuel are consumed in start, taxi and flight

30. A box of mass 100 lbs is to be transported. The box dimensions are 9 x 9 x 12 inches. Which zones can it be carried in?

a) All zones, both the mass and structural loading are within limits
b) Zones 2 and 3 only
c) No zones, both the mass ans structural loading would be exceeded
d) No zones, the structural loading would be exceeded.

31. What is the minimum fuel mass that must be consumed if the aircraft having become airborne at maximum weight, decides to abort the flight.

a) 1 260 lbs
b) 280 lbs
c) 237 lbs
d) 202 lbs

32. If the pilot has a mass of 200 lbs, what is the maximum traffic load?

a) 1 060 lbs
b) 1 600 lbs
c) 1 006 lbs
d) 6 001 lbs

33. What is the maximum fuel tank capacity?

a) Not given
b) 123 USG
c) 46.6 USG
d) TOM minus ZFM

34. The CG when the TOM is 4 300 lbs and the corresponding moment is 408 500 lbs in is:

a) 95"
b) 59"
c) 0.4" tail heavy
d) 0.4" rear of the aft limit

35. At reference or see Loading Manual MEP1 Figure 3.4.; With respect to a multi-engine piston powered aeroplane, determine the CG location at take off in the following conditions;

Basic empty mass:	3 210 lbs.
One pilot:	160 lbs.
Front seat passenger:	200 lbs.
Centre seat passengers:	290 lbs. (total)
One passenger rear seat:	110 lbs.
Baggage in zone 1:	100 lbs.;
Baggage in zone 4:	50 lbs.
Zero Fuel Mass:	4120 lbs.
Moment at Zero Fuel Mass:	377751 lbs.ln;
Block fuel:	100 US Gal.
Trip fuel:	55 US Gal.
Fuel for start up and taxi (included in block fuel):	3 US Gal.

Fuel density 6 lbs/USG

a) 91.69 inches aft of datum;
b) 91.92 inches aft of datum;
c) 91.84 inches aft of datum;
d) 93.60 inches aft of datum;

36. Refer to MEP Loading Manual
A pallet having a freight platform which measures 200 cm x 250 cm has a total mass of 300 kg. the pallet is carried on 2 ground supports each measuring 20 cm x 200 cm. Calculate how much mass must be added to, or must be off loaded from, the pallet in order for the load intensity to match the maximum permitted distribution load intensity for lower deck forward cargo compartment.

a) 28.5 kg may be added
b) 158.3 kg must be offloaded
c) 28.5 kg must eb offloaded
d) 285.5 kg may be added

37. Loading Manual MEP1 Figure 3.4)
With respect to a multi-engine piston powered aeroplane, determine the total moment (lbs/in) at landing in the following Conditions:

Basic empty mass:	3 210 lbs.
One pilot:	160 lbs.
Front seat passenger:	200 lbs.
Centre seat passengers:	290 lbs. (total)
One passenger rear seat:	110 lbs.
Baggage in zone 1:	100 lbs.
Baggage in zone 4:	50 lbs.
Block fuel:	100 US Gal.
Trip fuel:	55 US Gal.
Fuel for start-up and taxi (included in block fuel):	3 US Gal.
Fuel density:	6 lbs./US Gal.
Total moment at take-off:	432226 lbs.In

a) 377 746
b) 401 338
c) 432 221
d) 433 906

38. Assuming the maximum zero fuel mass and maximum take-off mass, what fuel load can be carried?

a) 38.9 Imp gallons
b) 46.6 USG
c) 176.8 litres
d) Any of the above

39. If the CG is 86" and the TOM is 4 100 lbs the aircraft is:

a) Just on the forward CG limit
b) Just outside the forward CG limit
c) Just inside the aft CG limit
d) With the two forward limits

40. Refer to MEP Loading Manual
A box having dimensions of 1 x 1.2 m by 0.8 m weighing 600 kg is loaded and secured onto a 4 ft x 4 ft pallet weighing 30 kg. Where could the pallet be positioned?

a) In the forward position of the forward cargo compartment
b) In the mid position of the aft cargo compartment
c) In the aft position of the forward cargo compartment
d) In the aft position of the aft cargo compartment

MASS & BALANCE

41. Determine the Take-off Mass for the following single engine aeroplane.
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) 2 659 lbs
b) 2 809 lbs
c) 2 799 lbs
d) 2 764 lbs

42. The take-off mass of an aeroplane is 141000 kg.
Total fuel on board is 63000 kg including 14000 kg reserve fuel and 1000 kg of unusable fuel.
The traffic load is 12800 kg.
The zero fuel mass is:

a) 65 200 kg.
b) 93 000 kg
c) 78 000 kg
d) 79 000 kg

43. What is the maximum take-off mass given:

MSTOM	43 000 kg
MSLM	35 000 kg
PLLM	33 000 kg
MZFM	31 000 kg
DOM	19 000 kg
Total fuel capacity	12 500 kg
Maximum trip fuel	9 000 kg
Contingency fuel	1 000 kg
Alternate fuel	500 kg
Final reserve fuel	400 kg

a) 43 000 kg
b) 42 000 kg
c) 41 000 kg
d) 40 000 kg

44. Given:

Basic Empty Mass	1764 lbs
Optional Equipment	35 lbs
Pilot + Passenger	300 lbs
Cargo	350 lbs
Ramp Fuel (Block Fuel)	60 Gal
Trip Fuel	35 Gal
Taxi Fuel	1.7 Gal
Final Reserve Fuel	18 Gal
Fuel density	6 lbs/Gal

What is the expected landing mass?

a) 2 599 lbs
b) 2 589 lbs
c) 2 472 lbs
d) 2 557 lbs

45. At reference or see Loading Manual MEP1 Figure 3.4.;
With respect to multi-engine piston powered aeroplane, determine the ramp mass (lbs) in the following conditions:;

Basic empty mass:	3 210 lbs,
Basic arm:	88.5 Inches,
One pilot:	160 lbs,
Front seat passenger:	200 lbs,
Centre seat passengers:	290 lbs,
One passenger rear seat:	110 lbs,
Baggage in zone 1:	100 lbs,
Baggage in zone 4:	50 lbs,
Block fuel:	100 US Gal.
Trip fuel:	55 US Gal.
Fuel for start-up and taxi: (included in block fuel)	3 US Gal.

Fuel density: 6 lbs/US Gal.

a) 4 372
b) 4 720
c) 4 390
d) 4 120

46. Given:

Basic Empty Mass	1764 lbs
Optional Equipment	35 lbs
Pilot + Passenger	300 lbs
Cargo	350 lbs
Ramp Fuel (Block Fuel)	60 Gal
Trip Fuel	35 Gal
Taxi Fuel	1.7 Gal
Final Reserve Fuel	18 Gal
Fuel density	6 lbs/Gal

What is the expected landing mass?

a) 2414 lbs
b) 2659 lbs
c) 2589 lbs
d) 2449 lbs

47. Given the following :

Maximum structural take-off mass	48 000 kg
Maximum structural landing mass:	44 000 kg
Maximum zero fuel mass:	36 000 kg
Taxi fuel:	600 kg
Contingency fuel:	900 kg
Alternate fuel:	800 kg
Final reserve fuel:	1 100 kg
Trip fuel:	9 000 kg.

Determine the actual take -off mass:

a) 48 000 kg
b) 47 800 kg
c) 53 000 kg
d) 48 400 kg

48. The BEM of an aircraft is 30,000kg. Given the following data calculate the DOM;

Catering	300kg;
Crew	600kg;
Trip Fuel	1,200kg;
Unusable Fuel	30kg;
Traffic Load	2,500kg;

a) 29100kg
b) 34630kg
c) 30930kg
d) 30900kg

49. Given: -
The take-off mass of an aircraft is 8470 kg.
Total fuel on board is 1600 kg including 450 kg reserve fuel and 29 kg of unusable fuel.
The traffic load is 770 kg.
What is the Zero Fuel Mass?;

a) 6870 kg;
b) 6420 kg;
c) 6129 kg;
d) 6899 kg;

50. Given:
Maximum structural take-off mass 146 900 kg,
Maximum structural landing mass 93 800 kg,
Maximum zero fuel mass 86 400 kg,
Trip fuel 27 500 kg,
Block fuel 35 500 kg;
Engine starting and taxi fuel 1 000 kg.
The maximum take-off mass is equal to:

a) 120 900 kg
b) 121 300 kg
c) 113 900 kg
d) 120 300 kg

51. Given an aeroplane with:
Maximum Structural Landing Mass: 68000 kg
Maximum Zero Fuel Mass: 70200 kg
Maximum Structural Take-off Mass: 78200 kg
Dry Operating Mass: 48000 kg
Scheduled trip fuel is 7000 kg and the reserve fuel is 2800 kg,
Assuming performance limitations are not restricting, the maximum permitted take-off mass and maximum traffic load are respectively:

a) 75000 kg and 17200 kg
b) 75000 kg and 20000 kg
c) 77200 kg and 19400 kg
d) 77200 kg and 22200 kg

52. Given:
Zero Fuel Mass: 4920 kg
Trip Fuel: 880 kg
Block Fuel: 1330 kg
Taxi Fuel: 25 kg
The actual Take-Off Mass is equal to:

a) 6 810 kg
b) 6 250 kg
c) 6 360 kg
d) 6 225 kg

53. Given are:
Maximum structural take-off mass: 72 000 kg
Maximum structural landing mass: 56 000 kg
Maximum Zero Fuel Mass: 48 000 kg
Taxi fuel: 800 kg
Trip fuel: 18 000 kg
Contingency fuel: 900 kg
Alternate fuel: 700 kg
Final reserve fuel: 2 000 kg
The actual take-off mass can never be higher than:

a) 74 000 kg
b) 69 600 kg
c) 72 000 kg
d) 70 400 kg

54. Given the following:

APS (aircraft prepared for service) mass	= 3 400 lb
Fuel for sector	= 500 lb
Passengers	= 400 lb
Freight / baggage	= 200 lb
Maximum Take-off mass (structural)	= 4 750 lb
Regulated take-off mass (performance)	= 4 300 lb

How much will the traffic load have to be reduced by in order to bring the take-off mass into the Regulated take-off mass limits?

a) 250 lbs
b) 200 lbs
c) 200 kg
d) 250 kg

55. A mass of 500 kg is loaded at a station which is located 10 metres behind the present Centre of Gravity and 16 metres behind the datum. (Assume: g=10 m/sec squared). The moment for that mass used in the loading manifest is:

a) 50000 Nm
b) 130000 Nm
c) 30000 Nm
d) 80000 Nm

56. Given:
Zero Fuel Mass: 4770 kg
Trip Fuel: 1040 kg
Block Fuel: 1960 kg
Taxi Fuel: 20 kg
The actual Take-Off Mass is equal to:

a) 5890 kg
b) 6710 kg
c) 4970 kg
d) 6730 kg

57. A twin engine aircraft is certified for a MSTOM and a MLM of 58 000 kg and 55 000 kg respectfully. What is the limiting take-off mass for the aircraft.

PLTOM	61 000 kg
PLLM	54 000 kg
Operating mass	45 000 kg
Trip fuel	3 000 kg
Contingency fuel	5% of trip fuel
Alternative fuel	500 kg
Final reserve	500 kg
Flight duration	3 hours
Fuel consumption	500 kg per hour per engine

a) 58 000 kg
b) 61 000 kg
c) 56 145 kg
d) 56 545 kg

58. An aircraft has its centre of gravity located 7 metres from the datum line and it has a weight of 49000 N. The moment about the datum is:

a) 7000 Nm.
b) 343 000 Nm.
c) 343 000 N/m.
d) 1.43 Nm.

59. The Take-off Mass of an aeroplane is 66700 kg which includes a traffic load of 14200 kg and a usable fuel load of 10500 kg. If the standard mass for the crew is 545 kg the Dry Operating Mass is

a) 41 455 kg
b) 42 545 kg
c) 42 000 kg
d) 56 200 kg

60. The take-off mass of an aeroplane is 117 000 kg, comprising a traffic load of 18 000 kg and fuel of 46 000 kg. What is the dry operating mass?

a) 53 000 kg
b) 64 000 kg
c) 71 000 kg
d) 99 000 kg

MASS

61. Given:
Total mass 2900 kg
Centre of gravity (cg) location station: 115
Aft cg limit station: 116
The maximum mass that can be added at station 130 is:

a) 207 kg.
b) 14 kg.
c) 140 kg.
d) 317 kg.

62. Given:
Total mass: 7500 kg
Centre of gravity (cg) location station: 80.5
Aft cg limit station: 79.5
How much cargo must be shifted from the aft cargo compartment at station 150 to the forward cargo compartment at station 30 in order to move the cg location to the aft limit?

a) 62.5 kg.
b) 65.8 kg.
c) 68.9 kg.
d) 73.5 kg.

63. What mass has to be entered in the loading chart for aviation fuel F 34 if 170 It may be refuelled? (Fuel density = 0.78 kg/l)

a) 170 kg
b) 133 daN
c) 218 kg
d) 133 kg

64. Given that the total mass of an aeroplane is 112 000 kg with a centre of gravity position at 22.62m aft of the datum. The centre of gravity limits are between 18m and 22m.
How much mass must be removed from the rear hold (30 m aft of the datum) to move the centre of gravity to the middle of the limits:;

a) 43 120 kg
b) 29 344 kg
c) 16 529 kg
d) 8 680 kg

65. The mass of an aircraft is 1950 kg. If 400 kg is added to a cargo hold 1.75 m from the loaded centre of gravity (cg), the loaded cg will move:

a) 33 cm
b) 40 cm
c) 30 cm
d) 34 cm

66. The CG limits of an aircraft are from 83" to 93" aft of the datum. The CG as loaded is found to be at 81" aft of the datum. The loaded mass is 3 240 lbs. How much mass must be moved from the forward hold, 25" aft of the datum to the aft hold, 142" aft of the datum, to bring the CG onto the forward limit.

a) 110.8 lbs
b) 55.3 lbs
c) 193.8 lbs
d) 109.8 lbs

CG QUESTIONS

67. Given:
Actual mass 116 500 lbs,
Original CG station 435.0,
Compartment A station 285.5,
Compartment B station 792.5.
If 390 lbs of cargo is moved from compartment B (aft) to compartment A (forward), what is the station number of the new CG?

a) 423.3
b) 433.3
c) 463.7
d) 506.3

68. Assume:
Aircraft actual mass: 4750 kg
Centre of gravity at station: 115.8
What will be the new position of the centre of gravity if 100 kg is moved from the station 30 to station 120?

a) Station 118.25
b) Station 118.33
c) Station 120.22
d) Station 117.69

69. Given:
Aeroplane mass = 36 000 kg
Centre of gravity (cg) is located at station 17 m
What is the effect on cg location if you move 20 passengers (total mass = 1 600 kg) from station 16 to station 23?

a) It moves forward by 0.157 m.
b) It moves aft by 3.22 m.
c) It moves aft by 0.157 m.
d) It moves aft by 0.31 m

70. The total mass of an aircraft is 9 000 kg. The CG location is 2 m aft the reference datum. What mass of cargo must be shifted from the front cargo hold (0.8 m aft datum) to the rear cargo hold (3.8 m aft datum) to move the CG to the aft limit of 2.1 m aft the reference datum?

a) 900 kg
b) 30 kg
c) 196 kg
d) 300 kg

71. Given:
Aeroplane mass = 36 000 kg
Centre of gravity (cg) is located at station 17 m
What is the effect on cg location if you move 20 passengers (total mass = 1 600 kg) from station 16 to station 23?

a) It moves forward by 0.157 m.
b) It moves aft by 3.22 m.
c) It moves aft by 0.157 m.
d) It moves aft by 0.31 m

72. Aircraft actual mass: 4750 kg
Centre of gravity at station: 115.8
What will be the new position of the centre of gravity if 100 kg is moved from the station 30 to station 120?

a) Station 118.25
b) Station 118.33
c) Station 120.22
d) Station 117.69

73. An aircraft of 110 000 kg has its CG at 22.62 m aft of the datum. The CG limits are between 18 m to 22 m aft of the datum. How much mass must be removed from a hold 30 m aft of the datum to bring CG to its mid-point?

a) 26 800 kg
b) 28 600 kg
c) 86 200 kg
d) 62 800 kg

74. An aircraft has 3 holds situated 10", 100" and 250" aft of the datum, identified as holds A, B, and C respectively. The total aircraft mass is 3 500 kg and the CG is 70" aft of the datum. The CG limits are from 40" to 70" aft of the datum. How much load must be removed from hold C to ensure that the CG is positioned on the forward limit.

a) 1167 kg
b) 700 kg
c) 500 kg
d) 560 kg

75. An aircraft has a mass of 7 900 kg and the CG is located at 81.2" aft of the datum. If a package of mass 250 kg was loaded 32" aft of the datum. What would the new CG position be?

a) 79.7 inches
b) 80.2 inches
c) 78.4 inches
d) 49.2 inches

76. The CG limits of an aircraft are from 72" to 77" aft of the datum. If the mass is 3 700 kg and the CG position is 76.5" aft of the datum. What will be the change to the CG position be if 60 kg is removed from the fwd hold located at 147" fwd of the datum.

a) 1.14 inches
b) 3.55 inches
c) 3.62 inches
d) 1.45 inches

TRAFFIC LOAD & USEFUL LOAD

77. The crew of a transport aeroplane prepares a flight using the following data:;
Block fuel: 40 000 kg;
Trip fuel: 29 000 kg;
Taxi fuel: 800 kg;
Maximum take-off mass: 170 000 kg;
Maximum landing mass: 148 500 kg;
Maximum zero fuel mass: 112 500 kg;
Dry operating mass: 80 400 kg;
The maximum traffic load for this flight is:

a) 18 900 kg
b) 32 100 kg
c) 40 400 kg
d) 32 900 kg

78. The empty mass of an aeroplane, as given in the weighing schedule, is 61300 kg. The operational items (including crew) is given as a mass of 2300 kg. If the take-off mass is 132000 kg (including a useable fuel quantity of 43800 kg) the useful load is

a) 26900 kg.
b) 29600 kg
c) 68400 kg
d) 70700 kg

79. 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;
Take Off and Landing mass are not performance limited.;
Dry Operating Mass: 34 900 kg;
Trip Fuel: 11 800 kg;
Taxi Fuel: 500 kg;
Contingency & final reserve fuel: 1 600 kg;
Alternate Fuel: 1 900 kg ;
The maximum traffic load that can be carried is:

a) 17 840 kg
b) 19 100 kg
c) 19 200 kg
d) 19 500 kg

80. 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.
Take Off and Landing mass are not performance limited.;
Dry Operating Mass: 34 930 kg;
Trip Fuel: 11 500 kg;
Taxi Fuel: 250 kg;
Contingency & final reserve fuel: 1 450 kg;
Alternate Fuel: 1 350 kg ;
The maximum traffic load that can be carried is:

a) 17 810 kg
b) 20 420 kg
c) 21 170 kg
d) 21 070 kg

81. The Basic Empty Mass is 4960 kg, the Dry Operating Mass is 5220 kg and the Zero Fuel Mass is 6040 kg. If the take-off mass is 7630 kg the useful load is

a) 820 kg
b) 1590 kg
c) 2670 kg
d) 2410 kg

82. Given:
Dry Operating Mass: 4920 kg
Zero Fuel Mass: 5740 kg
Trip Fuel: 670 kg
Take-Off Fuel: 1050 kg
The Traffic Load is:

a) 2160 kg
b) 2480 kg
c) 1340 kg
d) 820 kg

83. The following data relates to a planned flight of an aeroplane ;
Dry Operational Mass 60 520 kg ;
Performance limited take-off mass 92 750 kg;
Structural limited take-off mass 88 750 kg;
Performance limited landing mass 72 250 kg ;
Structural limited landing mass 73 500 kg;
Maximum Zero Fuel mass 67 530 kg ;
Fuel on board at take-off:;
Trip fuel 12500 kg ;
Contingency and final reserve fuel 2300 kg ;
Alternate fuel 1700 kg ;
Using this data, as appropriate, calculate the maximum traffic load that can be carried.;

a) 7730 kg
b) 11730 kg
c) 15730 kg
d) 7010 kg

84. The Dry Operating Mass of an aircraft is 2 000 kg. The Maximum Take-off Mass, Landing and Zero Fuel Mass are identical at 3500 kg. The block fuel mass is 550kg, and the taxi fuel mass is 50 kg. The available mass of traffic load is:

a) 1 450 kg
b) 950 kg
c) 1 500 kg
d) 1 000 kg

85. The following data applies to an aeroplane which is about to take off: ;
Certified maximum take-off mass -141500 kg ;
Performance limited take-off mass -137300 kg ;
Dry Operating Mass - 58400 kg ;
Crew and crew hand baggage mass - 640 kg ;
Crew baggage in hold -110 kg;
Fuel on board -60700 kg;
From this data calculate the mass of the useful load.

a) 17450 kg
b) 78900 kg
c) 18200 kg
d) 78150 kg

86. An aeroplane is performance limited to a landing mass of 54230 kg. The Dry Operating Mass is 35000 kg and the zero fuel mass is 52080 kg. If the take-off mass is 64280 kg the useful load is

a) 17080 kg
b) 10080 kg.
c) 12200 kg.
d) 29280 kg.

87. The Basic Empty Mass is 4800 kg,
Dry Operating Mass is 5050 kg
Zero Fuel Mass is 6210 kg.
If the take-off mass is 8010 kg the useful load is

a) 1160 kg
b) 2960 kg
c) 3210 kg
d) 1800 kg

LEMAC QUESTIONS

88. A turbojet aircraft has a planned take-off mass of 190 000 kg. The cargo load is distributed as follows:

Cargo 1:	3 000 kg (3.5 m from reference point)
Cargo 4:	7 000 kg (20.39 m from reference point)
Distance from reference point to the leading edge:	14 m
Length of MAC:	4.6 m

Once the cargo loading is completed the crew is informed that the CG at take-off is located at 38% MAC which is beyond the limits. The Captain decides to redistribute part of the cargo load between Cargo 1 and Cargo 4 in order to obtain a new CG location of 31% MAC
Following the transfer operation, the new load distribution is:

a)	**Cargo 1:**	**6 000 kg**	**Cargo 4:**	**4 000 kg**
b)	Cargo 1:	4 000 kg	Cargo 4:	6 000 kg
c)	Cargo 1:	4 000 kg	Cargo 4:	5 000 kg
d)	Cargo 1:	5 000 kg	Cargo 4:	4 000 kg

89. At a given mass the CG position is at 15% MAC. If the leading edge of MAC is at a position 625.6 inches aft of the datum and the MAC is given as 134.5 inches determine the position of the CG in relation to the datum.

a) 645.78 inches aft of datum
b) 20.18 inches aft of datum
c) 605.43 inches aft of datum
d) 228.34 inches aft of datum

90. Chord Length 1m; C of G 25% MAC; A/C Mass 2200 KGs; Fwd hold - 0.5 m ; Aft hold +2.5 m ; What weight needs to be moved from the forward hold to the aft hold to achieve 40% MAC?;

a) 183kg
b) 104kg
c) 165kg
d) 110kg

91. Given the following data:; Distance from datum to centre of gravity 12.53 m ; Distance from datum to leading edge 9.63 m ; Length of MAC 8.00 m ; Calculate the Centre of Gravity in % MAC (mean aerodynamic chord);

a) 23.1 % MAC
b) 36.3 % MAC
c) 63.4 % MAC
d) 47.0 % MAC

92. The loaded centre of gravity (cg) of an aeroplane is 713 mm aft of datum. The mean aerodynamic chord lies between station 524 mm aft and 1706 mm aft. The cg expressed as % MAC (mean aerodynamic chord) is:

a) 10%
b) 60%
c) 41 %
d) 16%

93. Given the following data calculate the CG as a %MAC when 12000N of last minute cargo is added to a hold 10m from the datum. AUM 460000N, LEMac 14m from datum, MAC 4.6m, Current CG 15.4m from datum.

a) 33.5%
b) 27.5%
c) 25%
d) 29.25%

94. Determine the position of the CG as a percentage of the MAC given that the balance arm of the CG is 724 and the MAC balance arms are 517 to 1706.

a) 14.2%
b) 15.3%
c) 16.3%
d) 17.4%

95. If the MAC is 152 " and the leading edge is 40" aft of the datum and the Cg is at 66" aft of the datum, what is the CG position as a percentage of MAC?

a) 39.5%
b) 2.3%
c) 17.1%
d) 1.4%

96. An aircraft has a MAC of 82". The leading edge of the MAC is 103" aft of the datum. If the.CG is at 14.7% MAC, what is the CG distance from the datum?

a) 115 in
b) 185 in
c) 21 in
d) 120 in

97. Given the following data how much cargo must be moved from the forward hold to the aft hold to achieve a CG at 33% MAC?;
AUM 200 000kg;
Forward Hold Cargo 6500kg;
Aft hold Cargo 4000kg;
Distance between holds 10m;
Current CG: 30%MAC;
MAC 4.6m;

a) 2760kg
b) 6000kg
c) 1467kg
d) 2904kg

98. If the position is at 21% MAC, the MAC is 73" and the CG datum is 26" aft of the leading edge of the MAC, what is the CG position relative to the datum.

a) 10.67 inches aft of datum
b) 10.67 inches fwd of datum
c) 26 inches fwd of datum
d) 26 inches aft of datum

99. If the CG position is 21% MAC, the MAC is 73 inches and the CG datum is 25 inches from the leading edge, what is the CG location relative to the datum?

a) 10.67 inches aft of the datum
b) 40.33 inches aft of the datum
c) 41.33 inches fwd of the datum
d) 10.67 inches fwd of the datum

FLOOR LOADING

100. The floor of the main cargo hold is limited to 4 000 N/m2. It is planned to load a cubic container each side of which measures 0.5m. Its maximum gross mass must not exceed: (assume g=10m/s2)

a) 500 kg
b) 5 000 kg
c) 100 kg
d) 1 000 kg

101. The maximum load per running metre of an aircraft is 350 kg/m. The width of the floor area is 2 metres. The floor strength limitation is 300 kg per square metre. Which one of the following crates (length x width x height) can be loaded directly on the floor?

a) A load of 400 kg in a crate with dimensions 1.2 m x 1.2 m x 1.2 m.
b) A load of 500 kg in a crate with dimensions 1.5 m x 1 m x 1 m.
c) A load of 400 kg in a crate with dimensions 1.4 m x 0.8 m x 0.8 m.
d) A load of 700 kg in a crate with dimensions 1.8 m x 1.4 m x 0.8 m.

102. The maximum intensity floor loading for an aeroplane is given in the Flight Manual as 650 kg per square metre. What is the maximum mass of a package which can be safely supported on a pallet with dimensions of 80 cm by 80 cm?

a) 41.6 kg
b) 101.6 kg
c) 1015.6 kg
d) 416.0 kg

103. The floor limit of an aircraft cargo hold is 5 000 N/m2. It is planned to load-up a cubic container measuring 0,4 m of side. It's maximum gross mass must not exceed: (assume g=10m/s2)

a) 80 kg
b) 32 kg
c) 800 kg
d) 320 kg

104. The maximum floor loading for a cargo compartment in an aircraft is given as 750 kg per square metre. A package with a mass of 600 kg. is to be loaded. Assuming the pallet base is entirely in contact with the floor, which of the following is the minimum size pallet that can be used?

a) 30 cm by 300 cm
b) 30 cm by 200 cm
c) 40 cm by 200 cm
d) 40 cm by 300 cm

105. The baggage compartment of a particular helicopter is 1.2 m wide by 1.4 m long and has a maximum floor loading of 500 kg per square metre. What is the maximum capacity of the baggage compartment limited by maximum floor load only?

a) 298 kg
b) 192 kg
c) 1 300 kg
d) 840 kg

106. The maximum compartment of an aircraft is 1.2 m wide by 1.2 m long and has a maximum floor loading of 520 kg per square metre. What is the mass capacity of the baggage compartment?

a) 181 kg
b) 144 kg
c) 1 497 kg
d) 1 872 kg

107. The maximum floor loading of a baggage compartment floor is 120 lbs per square foot. If the surface area in contact with the floor is 4 ft x 2 ft 6 inches and the mass of the total load is 1 220 lbs, the actual floor load on this aircraft is?

a) 11 lbs/ft^2
b) 122 lbs/ft^2
c) 10 lbs/ft^2
d) 120 lbs/ft^2

FUEL QUESTIONS

108. The maximum zero-fuel mass:
1- is a regulatory limitation
2- is calculated for a maximum load factor of +3.5 g
3- is based on the maximum permissible bending moment at the wing root
4- is defined on the assumption that fuel is consumed from the outer wings tank first
5- is defined on the assumption that fuel is consumed from the centre wing tank first
The combination of correct statements is:

a) 1, 2, 3
b) 2, 3, 5
c) 2, 3, 4
d) 1, 3, 5

109. The following data applies to a planned flight.

Dry Operating Mass	34900 kg
Performance limited Take-Off Mass	66300 kg
Performance limited Landing Mass	55200 kg
Maximum Zero Fuel Mass	53070 kg
Fuel required at ramp:-	
Taxi fuel	400 kg
trip fuel	8600 kg
contingency fuel	430 kg
alternate fuel	970 kg
holding fuel	900 kg
Traffic load	16600 kg

Fuel costs at the departure airfield are such that it is decided to load the maximum fuel quantity possible.
The total fuel which may be safely loaded prior to departure is:

a) 10730 kg
b) 12700 kg
c) 13230 kg
d) 15200 kg

110. The maximum quantity of fuel that can be loaded into an aircraft's tanks is given as 2200 I. If the fuel density (specific gravity) is given as 0.79 the mass of fuel which may be loaded is:

a) 2098 kg
b) 2785 kg
c) 1738 kg
d) 1798 kg

111. Given: Fuel volume: 3800 US Gallons. Fuel density: 0.79 kg/l. What is fuel mass?

a) 11364 kg.
b) 14383 kg.
c) 18206 kg.
d) 13647 kg.

112. The maximum quantity of fuel that can be loaded into an aircraft's tanks is given as 400 US Gallons. If the fuel density (specific gravity) is given as 0.79 the mass of fuel which may be loaded is:

a) 2302 kg
b) 1916 kg
c) 1437 kg
d) 1196 kg