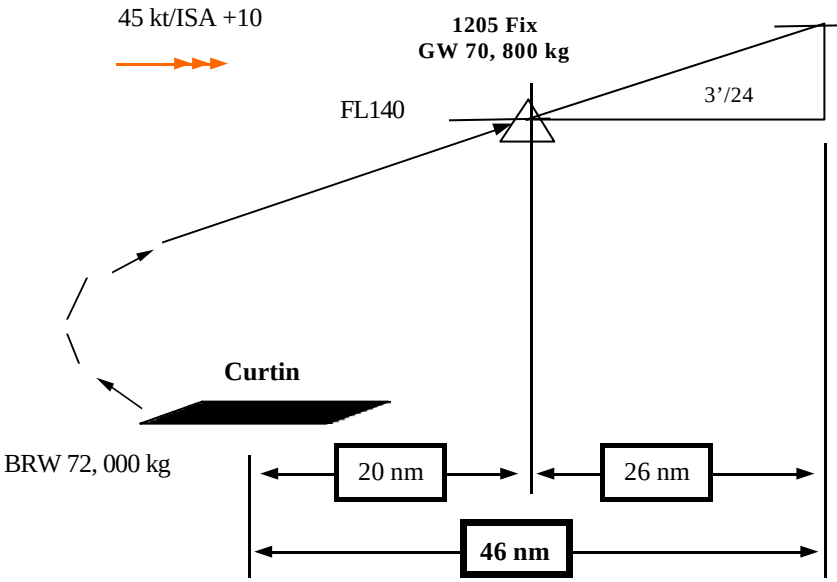
FLIGHT PLANNING EXAM 2 – WORKING

Q 1.



FLIGHT PROFILE

Refer page 2-9 for climb data.

SL - FL200	11 min	55 anm
SL - FL140	8 min	31 anm
Difference	3 min	24 anm
+45 kt TWC		+2 nm
Total	3 min	26 gnm

So the aircraft will reach FL200 46 nm from Curtin. ***Answer 'a' best !***

Q 2.

Check LW YPAS ... BRW 80, 000 - FF 9, 400 = LW 70, 600 kg OKAY

Check ZFW ... BRW 80, 000 - FOB @ BR 16. 740 kg = 63, 260 OKAY

So we can depart Cairns at 80, 000 kg without exceeding the MZFW of 63, 500 kg, or exceeding the Max LW YPAS of 72, 600 kg.

Payload is ZFW - Basic Op GW (ie: 63, 260 - 46, 900 kg in this case)
= 16, 360 kg. ***Answer 'd' is best !***

Note:
1. There is no need to carry the alternate (Yulara - Ayres Rock) if you are carrying the weather holding for your destination (Alice Springs).
2. Always check ZFW (spar limit) when the aircraft is at takeoff point- NOT at the ramp.

Fuel Summary

Item	kg
FF	9, 400
VR	940
FR	3, 300
Wx hold YPAS	2, 000
Traffic YPAS	1, 000
Taxi In	100
Min FOB @ BR	**16, 740 kg**

Q 3.

Refer B727 manual page 4-4 “3 Eng Holding”.
The GW will be 1, 000 kg lighter than the arrival GW in the holding pattern (ie: 70, 000 kg).
We must base the FF on the GW of the aircraft when it is half way through the holding period to get an average FF.

GW	70, 000 kg
FL250	1, 230 kg/eng/hr

ISA 3 engine FF is 1, 230 x 3 = 3, 690 kg/hr.
On an ISA -10C the FF will be 2% lower at 3, 616 kg/hr.
FBO for INTER (30 min) will be 1, 808 kg. *Answer ‘b’ closest !*

Q 4.

Refer B727 manual page 5-3 ... “reduce cruise thrust limits by 9, 000 kg” !
So we must be pretend that the aircraft GW at TopC is 9, 000 kg heavier than the 72, 000 kg given, to account for the extra drag having the tailskid extended. So TopC GW to use in assessing altitude capability is 81, 000 kg in this case.

The track is WESTERLY, so you can eliminate the EASTERLY IFR levels of FL290/FL330/FL370.

FL	Mach	ISA +10
FL310	0.80	73, 900 kg
FL250	0.80	82, 900 kg

Result: FL350 is NOT available as the TopC GW (81, 000 kg) is too high.
FL310 is available. *Answer ‘b’ is best !*

Q 5. Refer B727 manual page 5-27 Landing Gear Down.

GW	ISA	**ISA +5**	ISA+ 10
65, 000 kg	23, 100 ft	**21, 700 kg**	20, 300 ft

Tracking EAST the highest IFR level is FL 210. *Answer ‘e’ is best !*

Q 6.

Refer to B727 manual page 5-2, note 4. Answer is FL250. This is a regulation... see CAO’s.
Answer ‘c’ is best !

Q 7. Refer B727 manual page 1-17, normal ops fuel policy Departure to Destination.

Item	kg
FF	9, 000
VR	900
FR	3, 300
Wx Hold Dest	2, 000
Traf hold Dest	1, 333
Taxi OUT	150
Taxi IN	100
Min ramp FOB	**16, 783 kg**

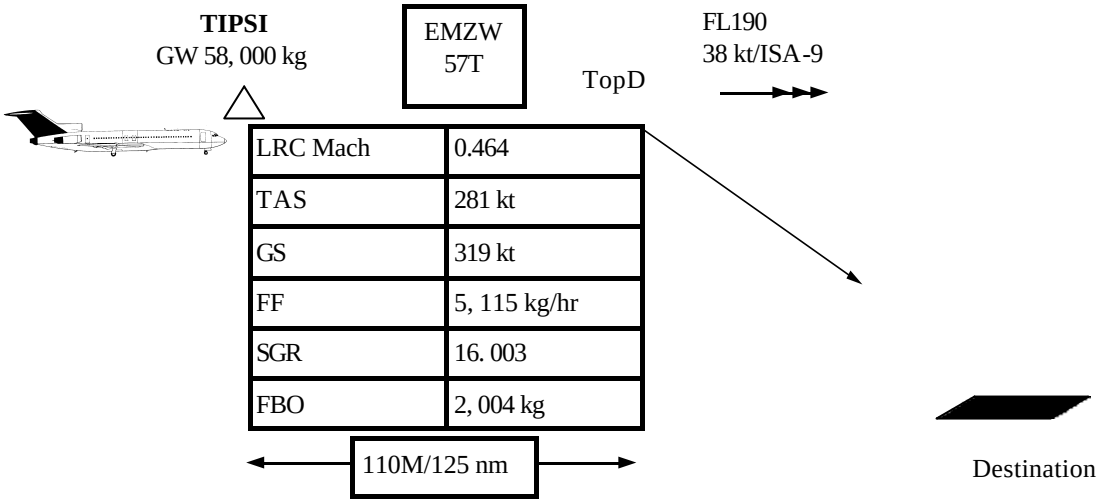
Answer 'e' is best !

Q 8. Refer B727 manual page 1-17, normal ops fuel policy Departure to Destination to Alternate.

Item	kg
FF	14, 500
VR	1, 450
FR (Alt req'd)	2, 250
Wx Hold Alt	4, 000
Traf hold Alt	1, 000
Taxi OUT	150
Taxi IN	100
Min ramp FOB	**23, 450 kg**

Answer 'd' is best !

Q 9. Refer to B727 manual "gear down" cruise tables on page 5-31.



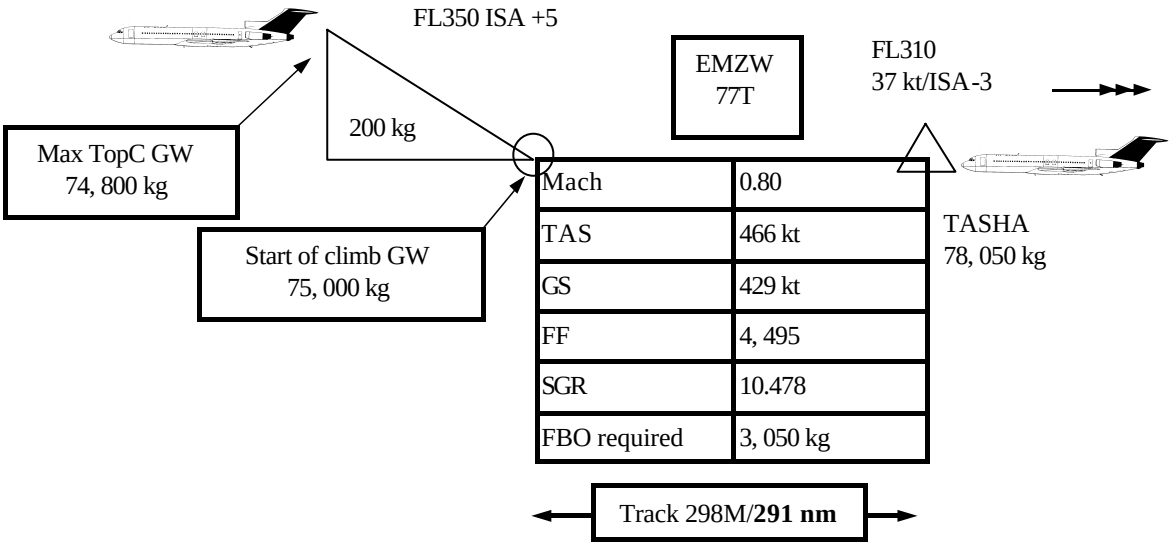
FLIGHT PROFILE

The EMZW identifies the LRC Mach number that you will be cruising at, and the FF/engine/hr. Expect FF in the 5, 000 kg/hr to 6, 000 kg/hr range, and TAS around 280 kt to 300 kt.

The left hand column on the cruise data page shows the ISA TAT for the various flight levels.
Use this to identify the ISA deviation and apply it to get a corrected FF in non-ISA conditions.

Approx SAR used to get EMZW is 20 kg/air nm. Correct for wind by multiplying wind component by 0.02.
Planned GW at TopD is 2, 004 kg lighter than GW given at TIPSI (ie: 55, 996 kg). ***Answer 'e' is best !***

Q 10.

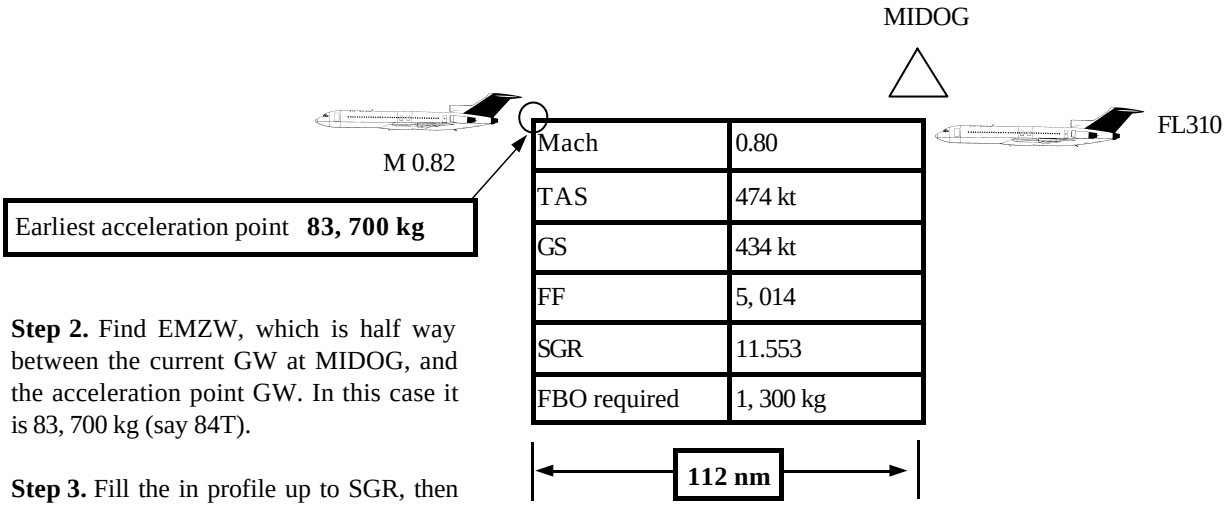


- Refer manual page 2-14. Use ISA dev at FL350 to get max arrival GW. Add 200 kg to get start climb GW.
- FBO required is start climb GW less fix GW. EMZW is half way between fix GW and start climb GW.
- Divide FBO required by SGR to find distance to start climb position. In this case 3, 050 kg divided by 10.748.
- ***Best answer is 'e' !***

Q 11. Refer B727 manual page 2-14 “Altitude Capability”.

Step 1. Find Max GW that the aircraft can accelerate directly to cruise at Mach 0.82 in ISA +5 conditions.

FL	Mach No.	ISA +5
FL310	0.80	**83, 700 kg**



FLIGHT PROFILE

Step 2. Find EMZW, which is half way between the current GW at MIDOG, and the acceleration point GW. In this case it is 83, 700 kg (say 84T).

Step 3. Fill the in profile up to SGR, then divide the fuel required to be burnt by the SGR. The result is the distance to the acceleration point.
In this case 112 nm.
Answer ‘b’ is closest !

Q 12. Refer B727 manual page 2-9 “Climb tables”.

FL	GW 72, 000 kg
FL330	**23 min/2, 850 kg/148 anm**

Add 6 nm for the 15 kt TWC for 23 minutes.
Total GNM is **154 gnm**.
Answer ‘d’ is best !

Q 13.

Step 1. Eliminate answers ‘a’ and ‘b’ as they are EASTERLY IFR levels.

Step 2. Refer B727 manual page 2-14. “Optimum weight for FL” column.

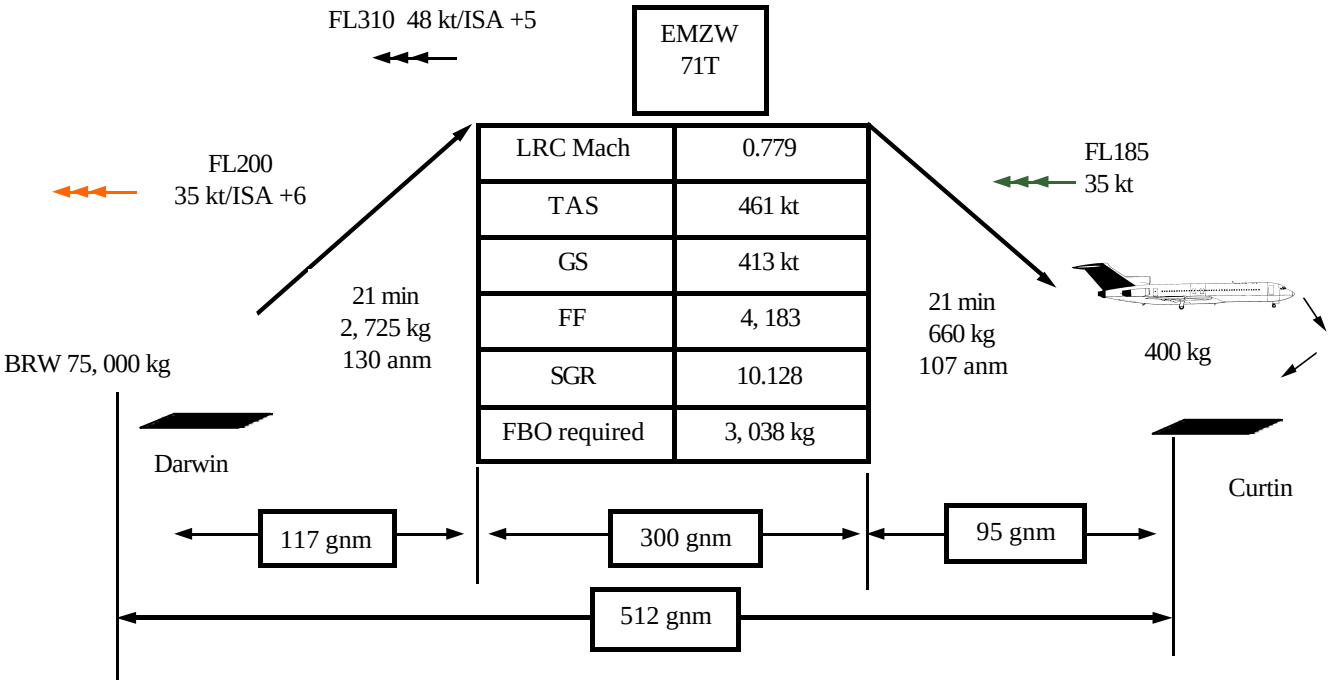
FL	Mach No.	Optimum GW
350	0.80	67, 400 kg
310	0.80	81, 600 kg

Step 3. Check the difference between the current GW given and the optimum GW for FL350, and FL310. Whichever GW is nearest the current GW is the optimum level. In this case FL310 is optimum. ***Answer ‘d’ best!***

Note: *FL280 is not a starter as the Optimum aircraft GW for that level is greater than the aircraft max structural BRW, as indicated by the dashes in the optimum GW column.*

Q 14.

The question asks for the minimum FOB at the Darwin ramp for “NORMAL OPERATIONS”. You do NOT have to assess the minimum fuel required for depressurised or 1 engine inop operations !



FLIGHT PROFILE

Continued on next page...

Q 14 continued...

Fuel Summary

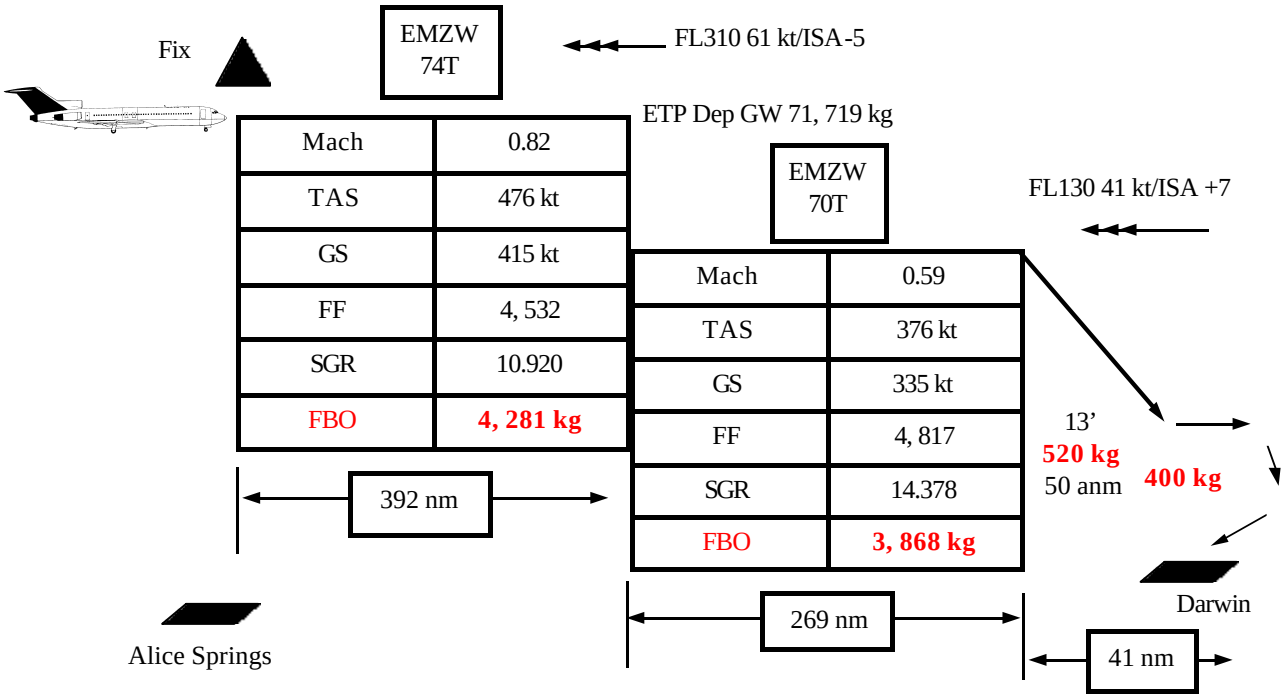
Item	kg
FF	6, 823
VR	682
FR (Alt req'd)	3, 300
Wx Hold YCIN	2, 000
Traf hold YCIN	1, 000
Taxi OUT	150
Taxi IN	100
Min ramp FOB	**14. 055 kg**

Answer 'a' is best !

Q 15.

This question is an "in-flight ETP Dep" asking the minimum FOB required at the fix to allow for depressurised operations.. The ETP position is given, and we will proceed out to the ETP normal ops, assume a loss of cabin pressure at the ETP, then continue ON to Darwin, or return to Alice Springs. For profile simplicity we will proceed ON to Darwin from the ETP, as this will consume the same fuel as a return to Alice Springs.

You do NOT need to carry weather holding for either airport provided the airports re at least "ACCEPTABLE" during the period of possible use. No traffic holding need be allowed either, as we will have approach and landing priority from ATC should the aircraft suffer a depressurisation.



FLIGHT PROFILE

Continued on next page...

Q 15 continued ...

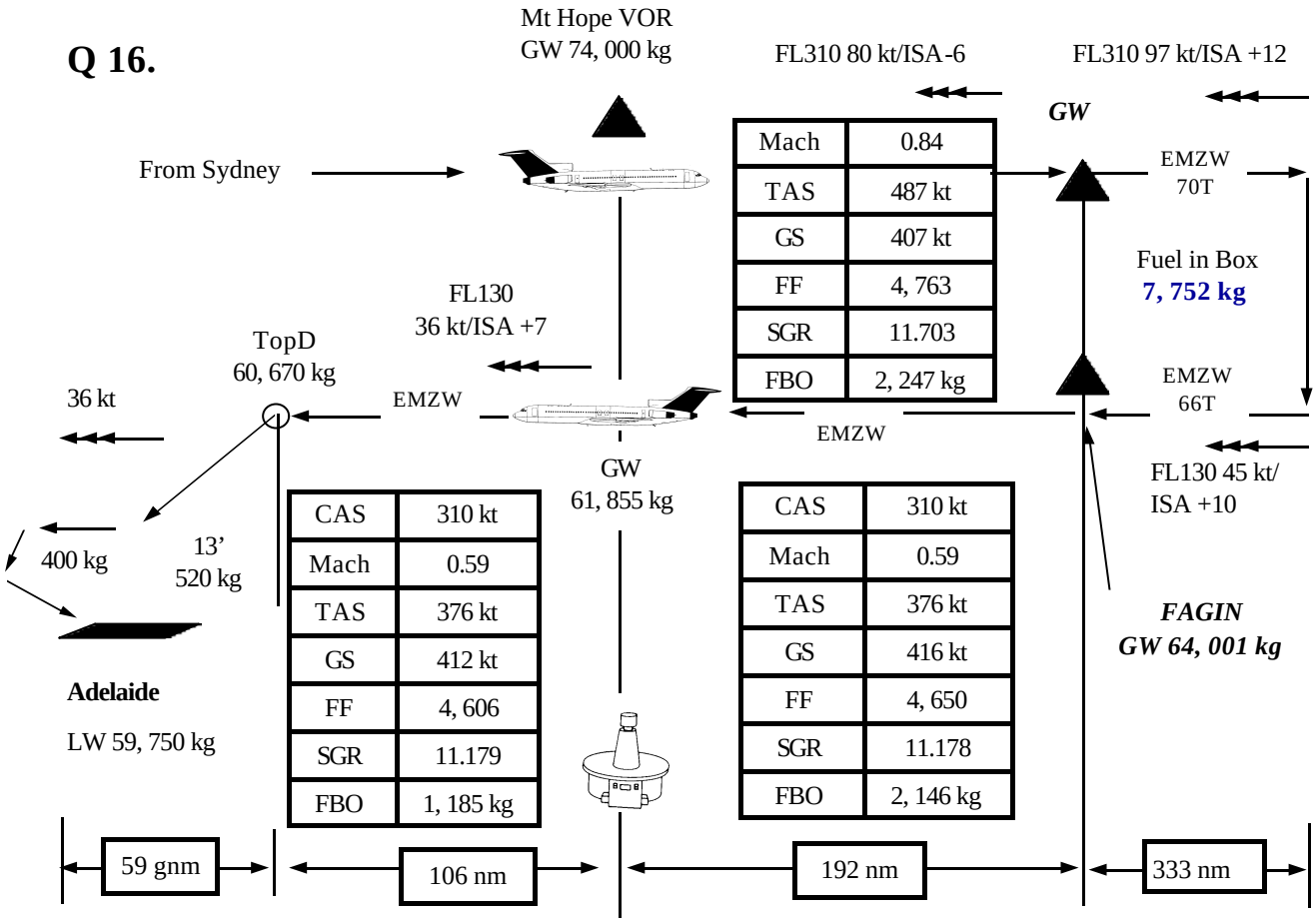
Fuel Summary

Item	kg
FF fix to ETP	4, 281
ETP to Darwin	4, 788
FR Dep	2, 250
Wx Hold	Nil
Traffic hold	Nil
Taxi IN	Nil
Min FOB @ fix	**11, 319 kg**

Answer 'b' best !

- Use the current wind/temp OUT to the ETP. It will be more accurate than using forecast data.
- Use forecast wind/temp for dep cruise at FL130.
- For the purposes of the exam, the ETP is also the equi-fuel point.
- No final taxi when in-flight.

Q 16.



FLIGHT PROFILE

Step 1. Calculate fuel available for FLIGHT.

Step 2. Find LW Adelaide.
BR 74, 000 kg - flight fuel 14, 250 kg = LW 59, 750 kg.

Step 3. Find descent data FL130.
LW 59, 750 kg + APP 400 + Descent 520 = 60, 670 kg.

Step 4. Find Dep cruise data from Mt Hope to TopD, and find GW at Mt Hope (refer profile above).

Step 5. Find normal ops cruise data in Mt Hope to FAGIN zone.

Step 6. Find Dep cruise data FAGIN to Mt Hope.

Step 7. Find Fuel in BOX.
GW at FAGIN 71, 753 kg - 64, 001 kg = 7, 752 kg.

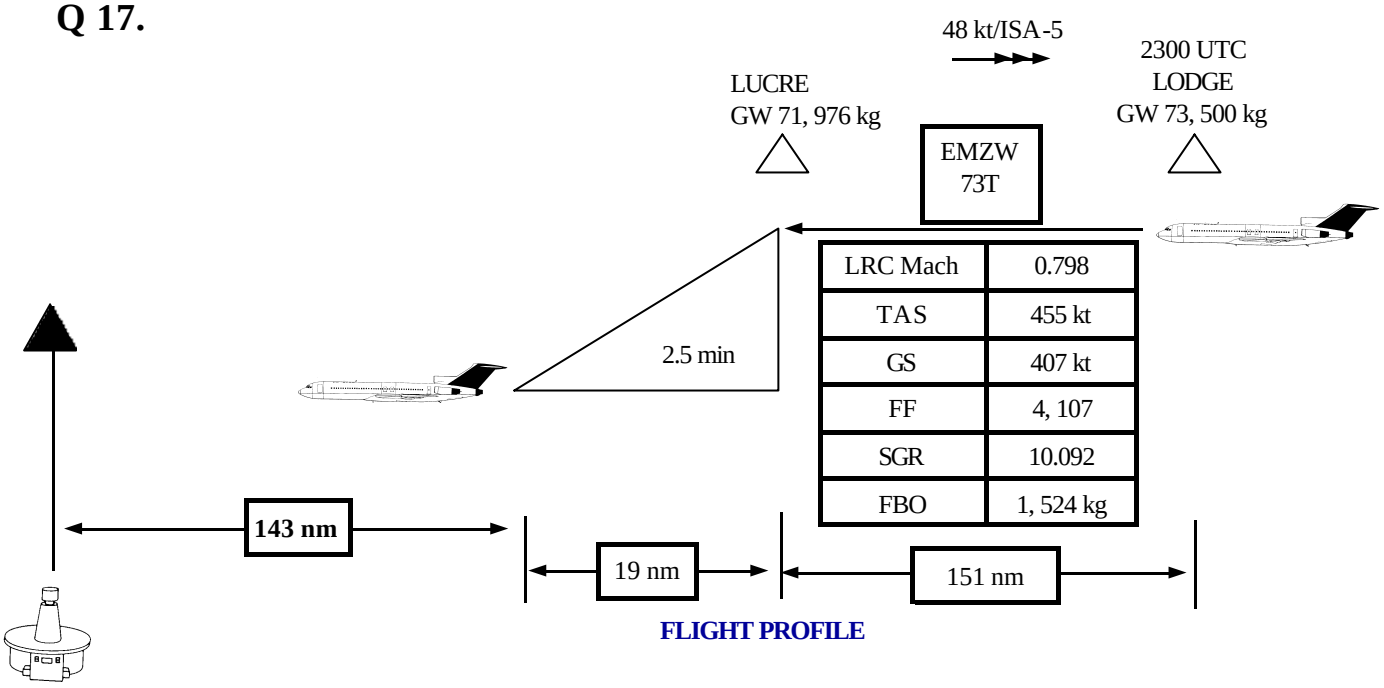
Useable FOB	16, 500 kg
FR Dep	2, 250 kg
Final taxi	Nil
Flight fuel avail	**14, 250 kg**

Step 8. Find EMZW OUT and BACK by dividing the Fuel in the BOX by 4.

Step 9. Find data OUT Normal Ops/FL310, and data home FL130 Dep.

Step 10. Divide the fuel in the box by the sum of the SGR OUT + SGR HOME to get box length, then add distances from FAGIN to Adelaide to get distance from Adelaide to the PNR Dep.
In this case 690 nm from Adelaide.
Answer 'e' best !

Q 17.



FLIGHT PROFILE

Step 1. Calculate GW at LUCRE (TopD). You could use an approx SGR for LRC (9.2 kg/anm), corrected for the head wind to estimate this. Use the GW at LUCRE to find descent data. Descent data is 2.5 min/21 anm. When corrected for the headwind descent distance is 19 gnm.

From the ERC chart the distance from LUCRE to the Esperance VOR is 162 nm.
TopD is therefore 143 nm from Esperance. ***Answer 'd best !***

Q 18.

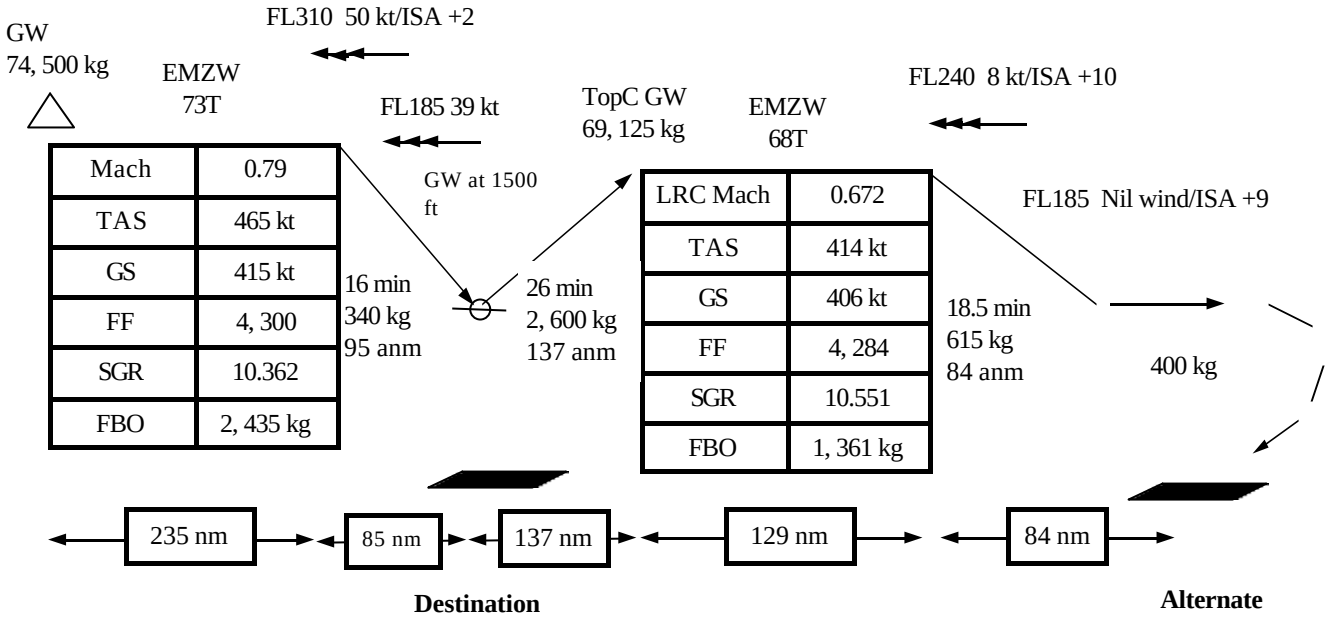
FL185 grid winds indicate the average FL130 (FL185) head wind component in the zone Adelaide/Perth is 11 kt. Depressurised TAS (all temps) is approx 372 kt. GS ON to Perth is 361 kt. GS HOME to Adelaide is 383 kt. Refer ETP formula below.

$$\text{Distance from airport behind to Dep ETP} = \frac{\text{Total Dist x GS HOME}}{\text{GS ON + GS HOME}}$$

$$= \frac{1,144 \text{ nm x } 383 \text{ kt}}{361 \text{ kt} + 383 \text{ kt}}$$

= 589 nm from Adelaide
Answer 'a' best !

Q 19.



FLIGHT PROFILE

Step 1. Find rough LW at Destination. In this case use 70, 000 kg (rounded).

Step 2. Find descent data to 1, 500 ft.

	Min	kg	Dist (anm)
FL310 to SL	21	660	107
-1500 to SL	5	320	12
FL310 - 1500	16	340	95 (85 gnm)

Step 3. Find cruise distance from fix to TopD, and calculate zone Fuel Burn Off (FBO).
In this case 235 nm/2, 435 kg.

Step 4. Find GW at 1, 500 ft, then add 400 kg to get a pretend BRW (72, 000 kg in this case) on destination runway. Use this weight to get normal ops climb data to FL240.

Step 5. 1 Inop climb calculation.

	Min	kg	Dist (anm)
SL to FL240	14	2000	77
-SL to 1500	2	400	0
FL310 - 1500	16	340	77
1 Inop penalty	14	1000	60
1 Inop climb	26	2600	137

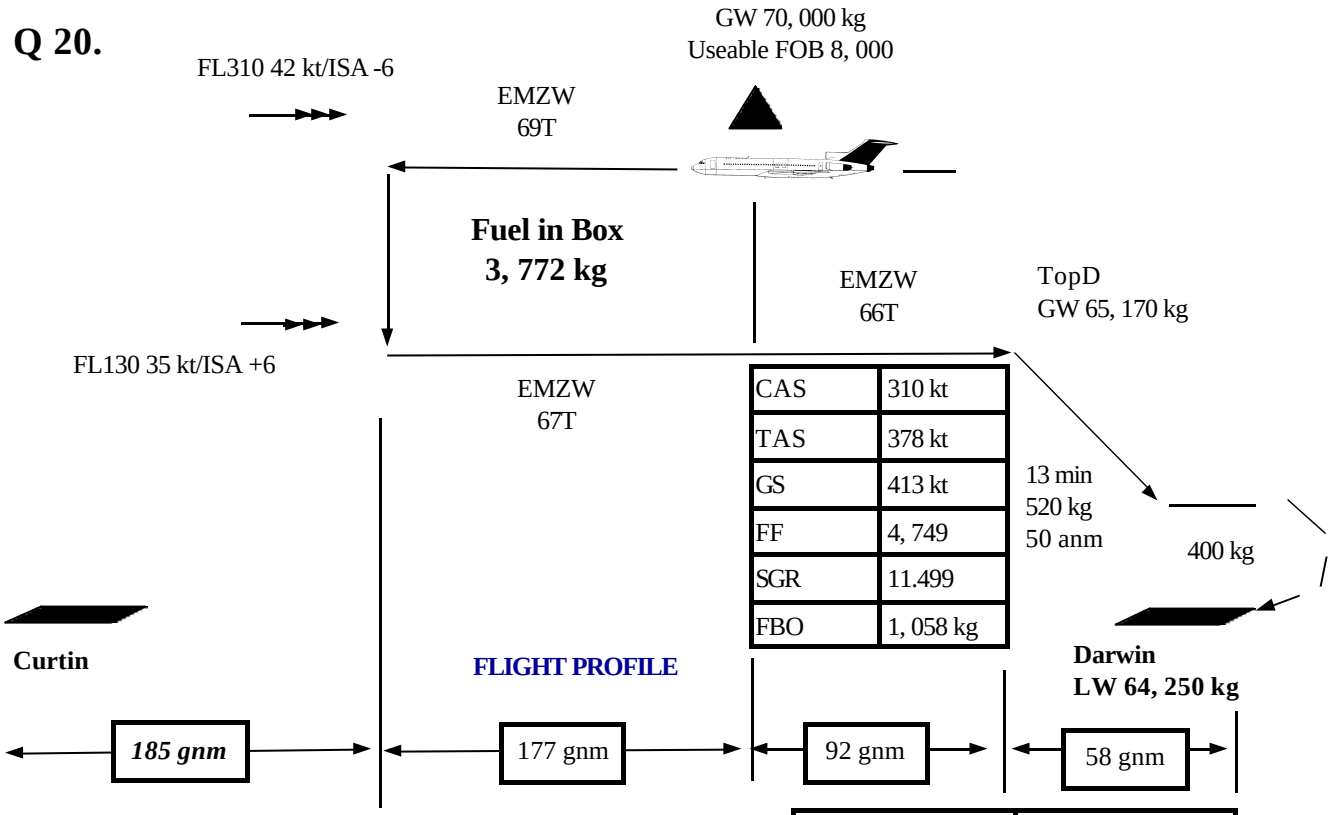
Step 6. Descent data. In this case ...
18.5 min/615 kg/84 gnm (Nil wind here).

Step 7. Calculate 1 Inop cruise distance and FBO data.

Step 8. Add up zone FBO's, and add reserves.

Answer is 12, 607 kg. ***Answer 'd' best !***

Q 20.



Step 1. Calculate fuel available for FLIGHT.

Useable FOB	8, 000 kg
FR Dep	2, 250 kg
Final taxi	Nil
Flight fuel avail	**5, 750 kg**

Step 2. Find LW Darwin.
BR 70, 000 kg - flight fuel 5, 750 kg = LW 64, 250 kg.

Step 3. Find descent data FL130.
LW 64, 250 kg + App 400 + Descent 520 = 65, 170 kg.

Step 4. Find Dep cruise data from below fix to TopD, and find GW below fix (ie: at end of box).

Step 5. Find FUEL in BOX.
GW at Fix 70. 000 kg - 66, 228 kg = 3, 772 kg.

Step 6. Find EMZW OUT and BACK
by dividing the Fuel in the BOX by 4.

Step 7. Find SGR OUT Normal Ops/FL310, and SGR HOME FL130 Dep.

Step 8. Divide the fuel in the box by the sum of the SGR OUT + SGR HOME (21.325) to get box length, then add descent distance to get distance from Darwin to the PNR Dep.
The question asked for the PNR position expressed as a distance from Curtin.
In this case 185 nm from Curtin.
Answer 'a' best !

END OF WORKING FILE 2.