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Flight Planning Practice exam 5.
Working

Q 1. Refer B727 manual page 2-9.

FL	BRW 76, 000 kg
FL310	**23°/2950 kg/146 anm**

Corrected for wind the ground distance is 165 gnm.
Answer 'b' best !

Q 2. Refer B727 manual page 2-14 "3 Engine Altitude Capability".

FL	Crz Sched	ISA +10 Max GW
FL350	M 0.80	72, 700 kg
FL310	M 0.80	82, 900 kg

As our planned TopC GW is 77, 000 kg, we will be too heavy for FL350.
FL310 highest Westerly level available.
Answer 'e' best !
Answers 'a' and 'c' are EASTERLY IFR levels.

Q 3. Refer B727 manual page 2-14 "3 Engine Altitude Capability".

FL	Crz Sched	Optimum GW
FL350	**M 0.79**	**67, 400 kg**
FL310	M 0.79	74, 000 kg

The current Optimum GW is the level who's optimum GW we are nearest to.
In this case FL350. ***Answer 'd best !***

Q 4. Refer B727 manual page 5-19 "Low altitude cruise table", 310 KIAS/FL130.

Find ISA deviation for FF correction, and ISA FF.

FL	IAS/STD TAT	70, 000 kg ISA
FL130	310/+8C	1, 569 kg/hr

Current temp is ISA +6 and 3 Eng FF at ISA-6 is (1569 x 3) x 0.98 = **4, 612 kg/hr.** ***Answer 'c' best !***

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Q 5.

Step 1. Refer B727 manual page 5-25 "Yaw Damper Inop" tables.

FL	IAS	68, 000 kg ISA
FL290	280 KIAS	1, 289 kg/hr

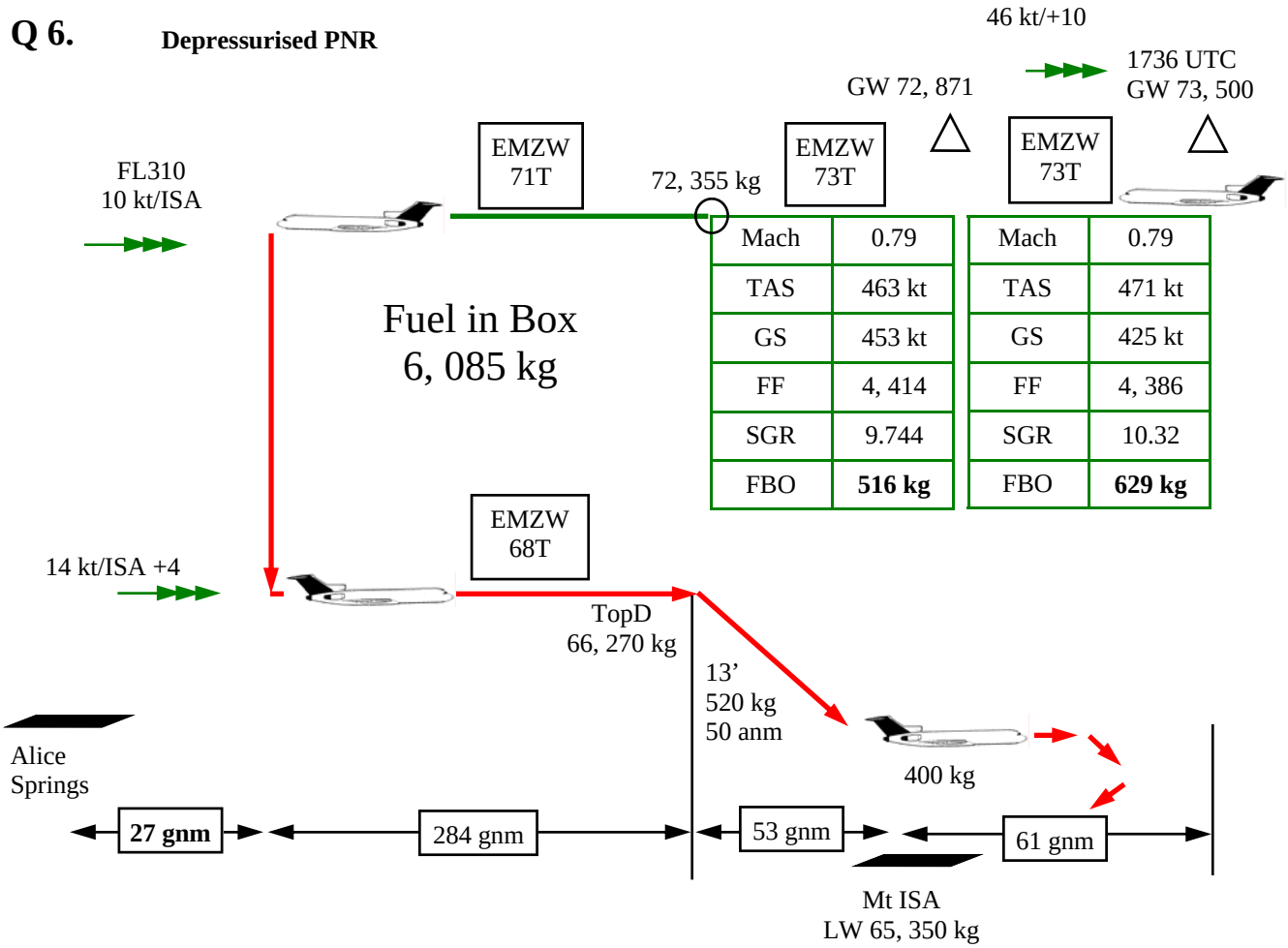
Step 2. ISA at FL290 is -42C, so if OAT -30C, conditions are ISA+12.

Step 3. ISA+12 3 Engine FF then is...
(1289 x 3) x 1.04 = **4, 022 kg/hr.**

Step 4. 280 IAS/FL290 combination set on Nav computer produces a Mach No of
M 0.73, which at an OAT of -30 will produce a **TAS of 443 kt.**
Answer 'a' best.
The other two FL answers were WESTERLY, and could NOT be right anyway !

Q 6.

Depressurised PNR



Flight profile

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Step 1. Calculate fuel available for flight by subtracting in-flight reserves.

Item	Kg
FOB at Fix	10, 400
FR	2, 250
INTER YBMA	Nil
WIP	Nil
Taxi IN	Nil
Flight Fuel	**8, 150 kg**

Step 2. Find LW at Mt ISA.
73, 500 - 8, 150 kg = LW 65, 350 kg

Step 3. Find descent data and TopD GW.
In this case 65, 350 kg + 920 kg = 66, 270 kg.

Steps 4 & 5. Find FBO in zones Fix - overhead Mt ISA, and Overhead Mt ISA to above TopD (ie: start of box). In this case 72, 348 kg.

Step 6. Find 'fuel in the box'.
72, 348 kg - 66, 270 kg = 6, 085 kg

Step 7 & 8. Find data OUT & HOME.

Data OUT FL310/M 0.79

Mach	0.79
TAS	463 kt
GS	453 kt
FF	4, 190
SGR	9. 249

Data HOME FL130/310 KIAS

Mach	0.59
TAS	375 kt
GS	389 kt
FF	4, 721
SGR	12. 136

Step 10. Divide the fuel in the box (6, 085 kg) by the sum of the SGR OUT + SGR HOME (9.249 + 12.136). This gives a box length of 284 nm.

Step 11. The question asked the distance to the PNR measured from Alice Springs. **In this case 27 nm.** ***Answer 'a' best !***

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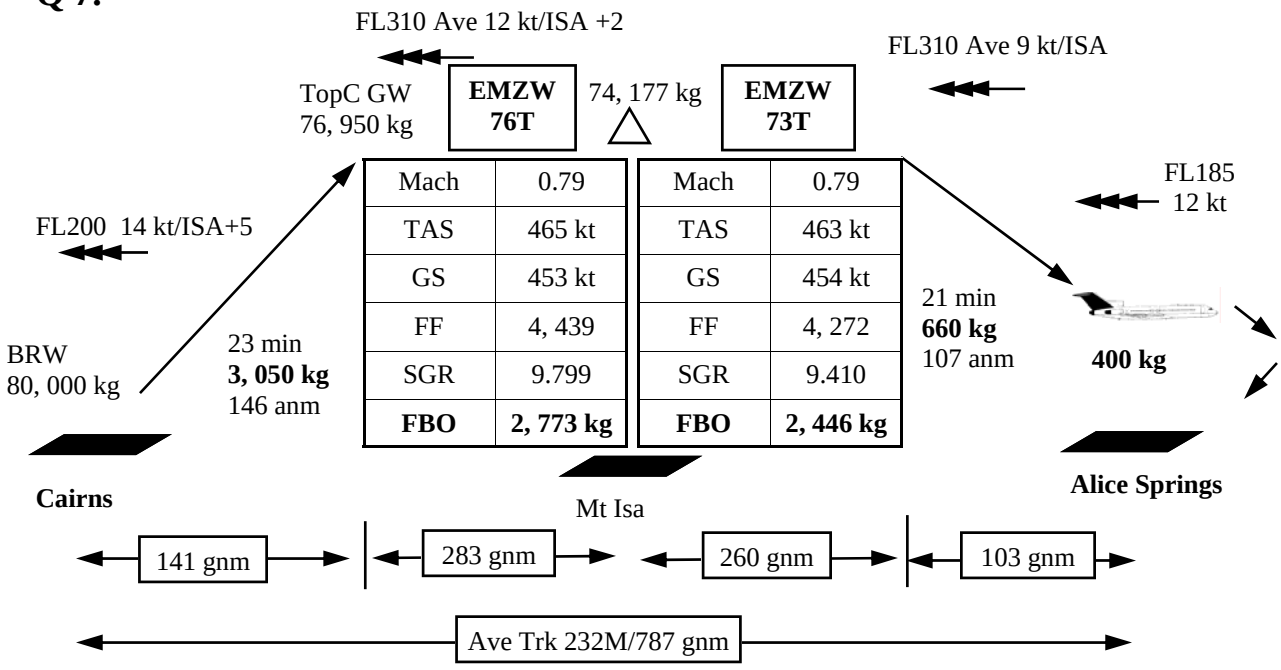
Q 7.



Flight profile

Fuel Summary

Item	Kg
Flight Fuel	9, 329
VR	933
FR	3, 300
Inter YBAS	2, 000
Traffic YBAS	1, 000
Taxi IN	100
Taxi OUT	150
Min FOB at ramp	**16, 812 kg**

Answer 'a' best !

Q 8.

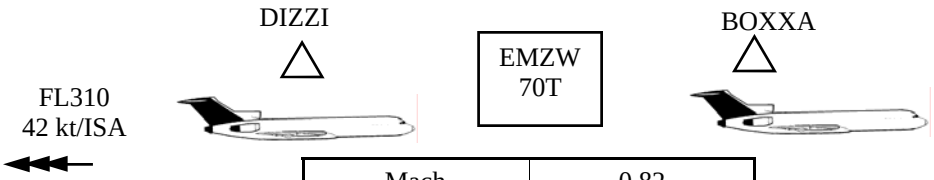
Refer manual pages 2-9 and 2-2a.

Climb data

N/ops 0-FL220	12'/1650 kg/59 anm
1 Inop penalty	14'/1000 kg/60 anm
1 Inop 0 - FL220	26'/2650 kg/119 anm

So TopC GW is 68, 000 kg - 2, 650 kg = **65, 350 kg.** ***Answer 'b' best !***

Q 9.



Mach	0.82
TAS	481 kt
FF	4, 431 kg/hr
SAR	**9. 212 kg/anm**

Flight profile

Step 1. Find approx SGR for M 0.82, with correction for HWC 42 kt.

M 0.82 approx SAR	10.0 kg/anm
+ 42 kt HWC x 0.02	0.84
Approx SGR	10. 84 kg/gnm

Step 2. Find EMZW.
SZW 71, 000 - (110 nm x 10.84) = 69, 807 kg
Round to 70 tonne.

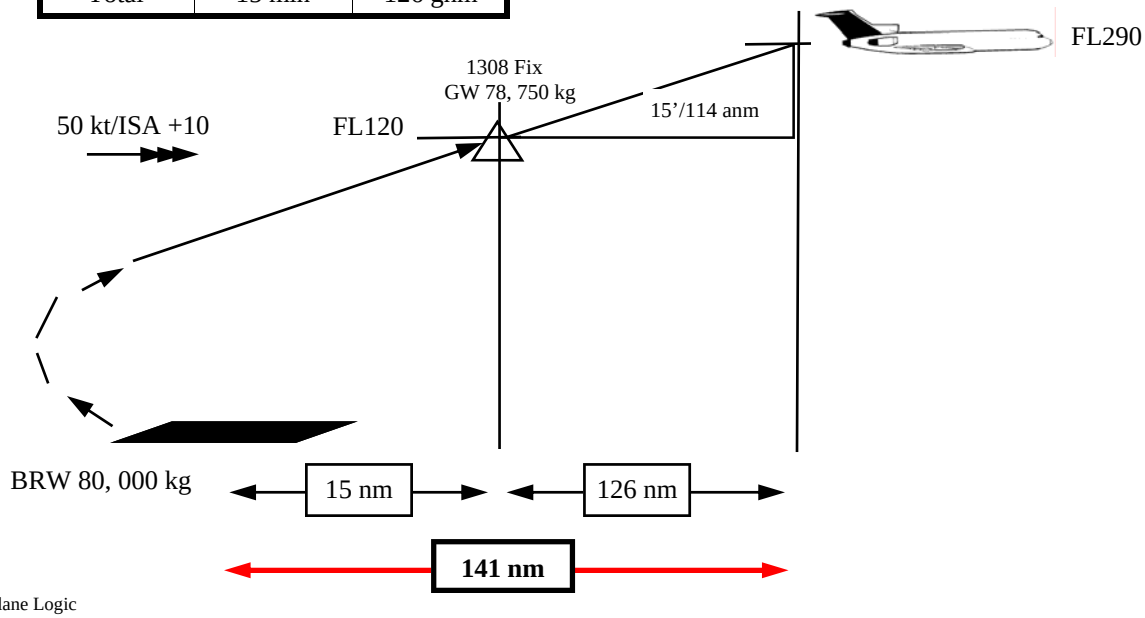
Step 3. Find TAS and FF data, then divide FF by TAS to get Specific Air Range (SAR). In this case it is **9.212 kg/air nm.** ***Answer 'd' best !***

Q 10.

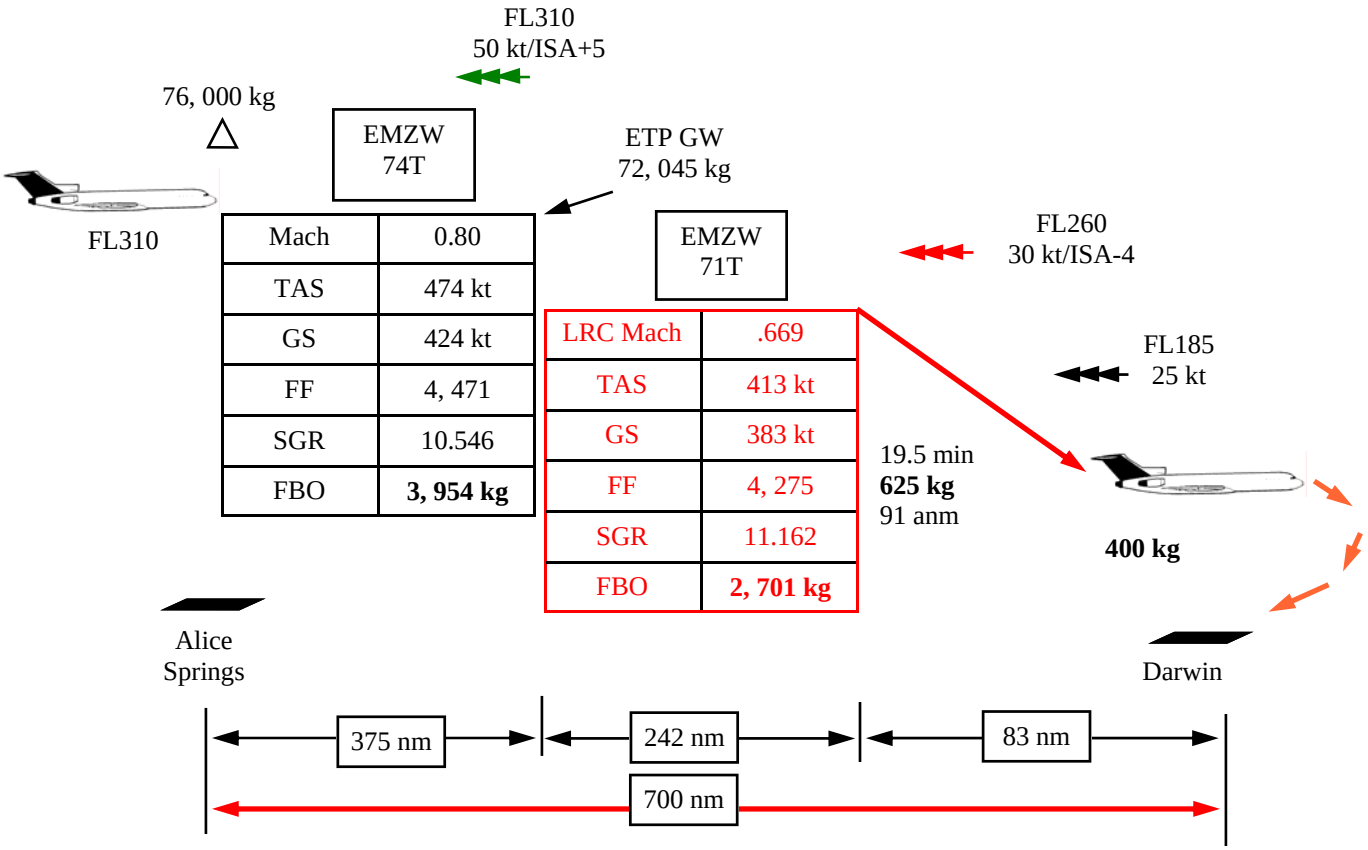
Refer page 2-9 for climb data.

SL - FL290	23 min	143 anm
SL - FL120	8 min	29 anm
Difference	15 min	114 anm
+50 kt TWC		+12 nm
Total	15 min	126 gnm

So the aircraft will reach FL290 141 nm from departure airport. ***Answer 'd' best !***



Q 11.



Flight profile

Points to note:

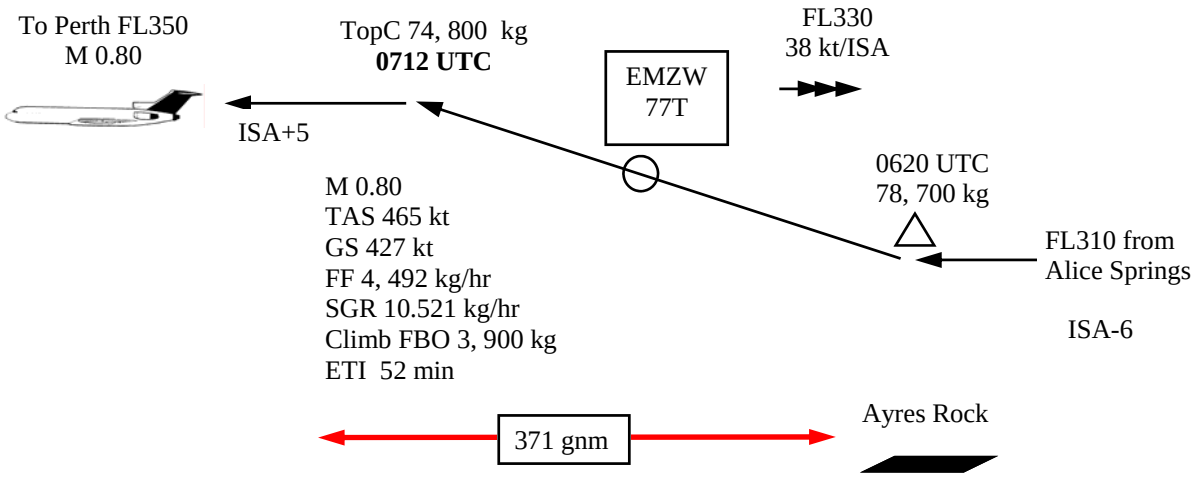
- Complete a normal ops plan from Alice Springs out to the ETP.
- Find GW at ETP (76, 000 kg - 3, 796 kg = 72, 204 kg)
- Find rough LW at Darwin for use in finding descent distance. In this case approx 70, 000 kg (rounded).
- Find FBO from ETP to TopD (FL260/1 Engine Inop cruise).
- Add 1 Engine Inop reserves (manual page 1-17). No taxi in fuel required as we were given an in-flight fix.
- Add weather holding fuel for which airport (Alice or Darwin) has the greatest holding requirement.
- No traffic or works in progress (WIP) holding fuel required as you will get ATC priority with engine inoperative.

Fuel summary

Item	Kg
FBO Fix - Darwin	7, 680 kg
10% V/Res	768
FR 1 Inop	1, 500
Traffic	Not required
TEMPO YPAS	4, 000
Taxi IN	Nil (in-flight)
Min FOB at Fix	**13, 948 kg**

Answer 'b' is best !

Q 12.



Flight profile

Step 1. Refer manual page 2-14. Max arrival weight M 0.80 is 74, 800 kg. So fuel to burn in drift climb is 3, 900 kg.

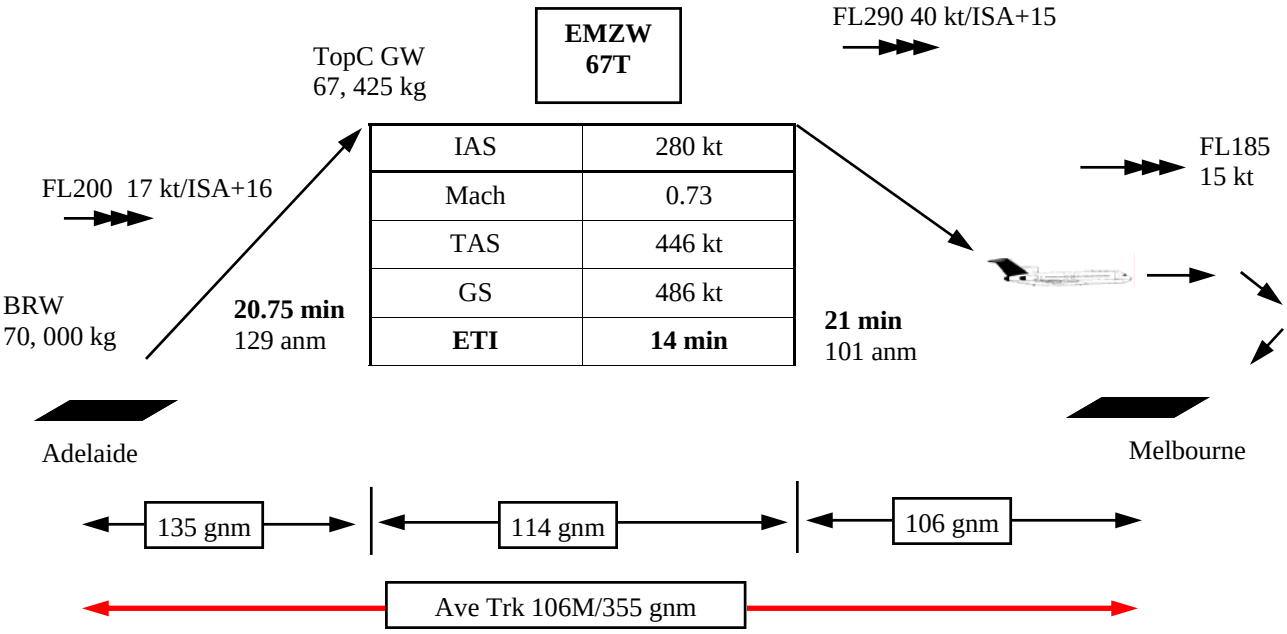
Step 2. Average wind/temp data between FL310 and FL350 to get average conditions in the climb (ie: at FL330). In this case 38 kt HWC/ISA.

Step 3. EMZW during climb is half way between fix GW (ie: 78, 700 kg) and TopC GW (ie: 74, 800 kg). It is 77T.

Step 4. Find climb zone data for FL330/M 0.80/ISA, the divide FBO required (3900 kg) by SGR (10.521) to get distance to TopC. In this case 371 nm.

Step 5. Find ETA at TopC using average GS at FL330 (427 kt), and 371 nm.
ETA at TopC is 0712 UTC. ***Answer 'a' best !***

Q 13. Refer B727 manual pages 1-3/5-25 (Yaw Damper Inop).

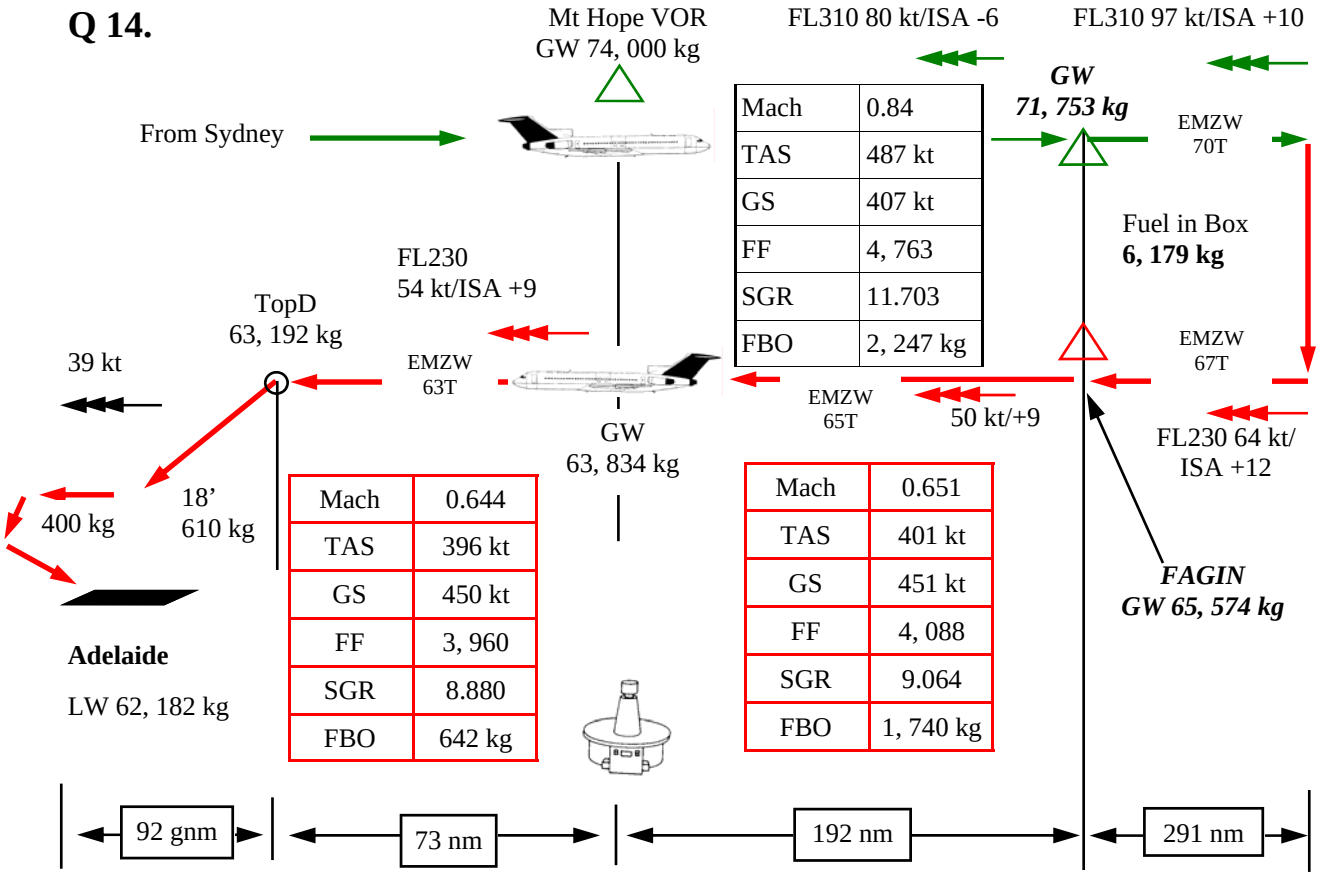


Flight profile

Points to note:

- Yaw damper Inop imposes max forward speed and cruise altitude limits, but does NOT add to the drag.
- Use your Nav computer to find Mach No. from IAS/FL (280 KIAS/FL290 = M 0.73). From this find TAS as usual using cruise temperature.
- Block time is flight time + 10 minutes for taxi IN/OUT. **In this case 65.75 min.** ***Answer 'd' best !***

Q 14.



Mach	0.84
TAS	487 kt
GS	407 kt
FF	4, 763
SGR	11.703
FBO	2, 247 kg

Mach	0.644
TAS	396 kt
GS	450 kt
FF	3, 960
SGR	8.880
FBO	642 kg

Mach	0.651
TAS	401 kt
GS	451 kt
FF	4, 088
SGR	9.064
FBO	1, 740 kg

Flight profile

Useable FOB	16, 500 kg
FR Dep	1, 500 kg
Inter Adelaide	2, 000 kg
Traffic Adelaide	Not required
Final taxi	Nil
110 %	13, 000 kg
100% Flight fuel	**11, 818 kg**

Step 1. Calculate fuel available for FLIGHT.

Step 2. Find LW Adelaide.
BR 74, 000 kg - flight fuel 11, 818 kg = LW 62, 182 kg.

Step 3. Find descent data FL230.
LW 62, 182 kg + APP 400 + Descent 610 = 63, 192 kg.

Step 4. Find 1 Inop 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 1 Inop cruise data FAGIN to Mt Hope.

Step 7. Find Fuel in BOX.
GW at FAGIN 71, 753 kg - 65, 574 kg = 6, 179 kg.

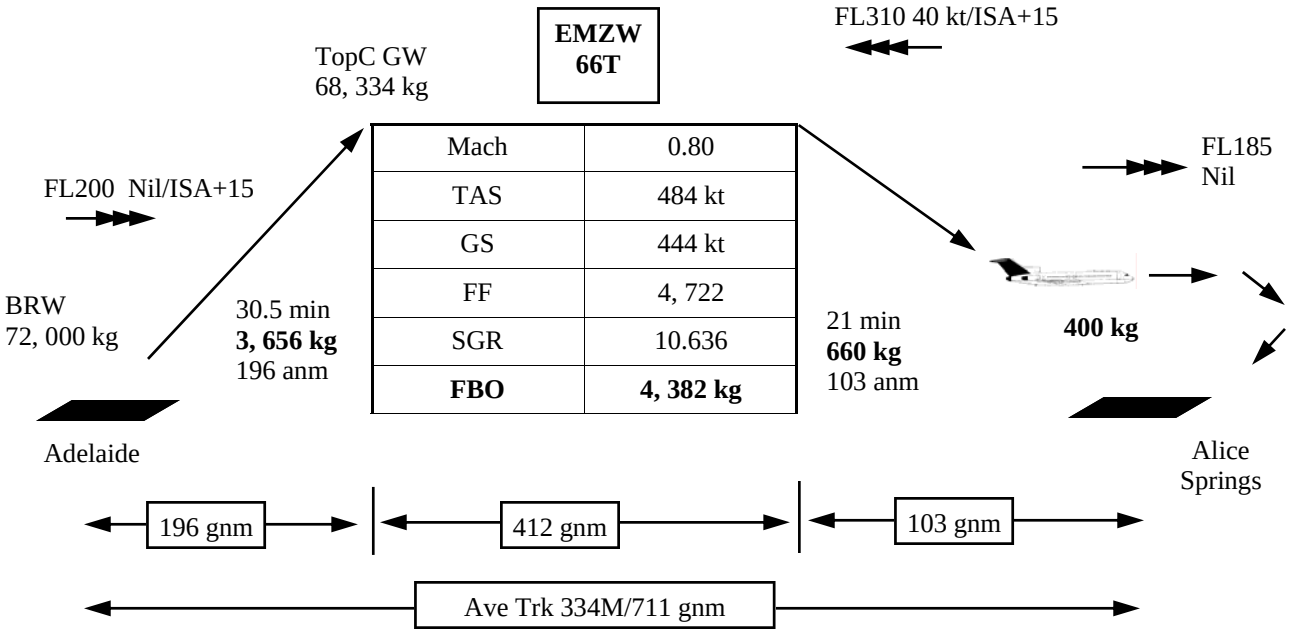
Step 8. Find EMZW OUT and BACK by dividing the Fuel in the BOX by 4.

Step 9. Find data OUT Normal Ops/FL310, and data home FL230 1 Inop.

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 Perth to the PNR 1 Inop.
In this case 502 nm from Perth.
Answer 'a' best !

Q 15.

Refer B727 manual page 5-3 (Tailskid Extended).



Mach	0.80
TAS	484 kt
GS	444 kt
FF	4, 722
SGR	10.636
FBO	**4, 382 kg**

Flight profile

Points to note:

- For tailskid extended altitude capability, increase the proposed TopC GW by 9, 000 kg before entering the altitude capability tables on page 2-14. This is to take account of the extra drag effecting altitude capability.
- Approx climb fuel from BR to TopC with a tailskid extended is 3, 500 kg.
- Tailskid extended adds 25% to the climb time/fuel/distance.
- Cruise TAS is as given, but the fuel flow must be increased by 10% to account for the extra drag caused by the tailskid being extended.
- No increase to descent or approach data.
- Block fuel, is flight fuel + 250 kg for taxi IN/OUT. **In this case 9, 348 kg.** ***Answer 'e' best !***

Q 16.

Refer B727 manual pages 4-4 and 5-4.

GW	60, 000 kg
FL250	1, 070 kg/hr
FL220	**1, 088 kg/hr**
FL200	1, 100 kg/hr

1, 088 x 3 = 3 Eng N/Ops ISA FF 3, 264 kg/hr.

Gear Down FF @ ISA = 1.5 x 3, 264 = 4, 896 kg/hr.

Gear Down FF @ ISA-5 = 4, 896 x .99 = **4, 847 kg/hr.**

Answer 'd' best !

Q 17.

In the CASA exam, you will NOT have time to calculate 3 accurate flight plans (ie: 1 for normal ops, 1 for 1 Engine Inop ETP ops, and 1 for Depressurised ops. You will be better advised to keep it brief and simplistic. Using rough SAR data for the three scenarios without correcting for wind should get the right answer.

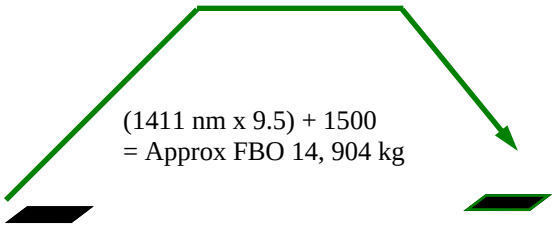
- Depressurised ops SAR is 12.5 kg/nm.
- 1 Inop SAR is 10.7 kg/nm.
- Normal ops SAR for Mach 0.79 is 9.5 kg/nm.

From the outset, it can be identified that Depressurised ops fuel will NOT work out to be the most as in this configuration you can plan to use Alice Springs airport if you lose the cabin pressure. There are two possible Dep ETP's, one between Adelaide and Alice Springs, and one between Alice Springs and Darwin. Of the two, the most fuel demanding is usually the one in the last flight stage (ie: between Alice Springs and Darwin).

Alice Springs is NOT an airport that we can use for the 1 Engine Inop case, as we need a "SUITABLE" airport for this. So 1 Eng Inop will require a RETURN to Adelaide, or continued flight ON to Darwin. You should carry whichever airport (Adelaide or Darwin) requires the most weather holding fuel. In this case it is 2, 000 kg. Do NOT carry the INTER for both airports, as you can only go ON or HOME, not both. The ETP 1 Inop will be about halfway between Adelaide and Darwin.

For Normal ops, the flight is assumed to proceed without failure from Adelaide to Darwin. We apply whatever holding applies to the destination airport only, no others. This includes Darwin weather, traffic, or works in progress (WIP) fuel.

Refer to diagrams for the various approx fuel requirements, and remember that you always assume normal ops out to the ETP !

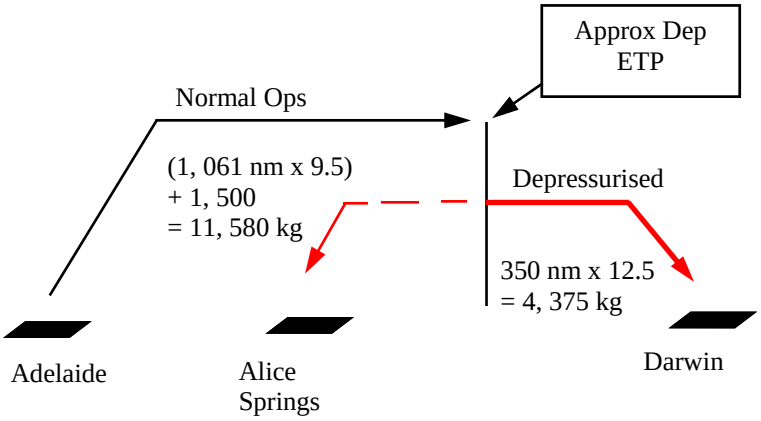


Normal Ops

Normal Ops Fuel Summary

Item	Kg
Approx FBO	14, 904
10% V/Res	1, 490
FR Norm Ops	3, 300
Traffic	1, 333
Wx Hold	2, 000
Taxi OUT	150
Taxi IN	100
Min FOB at Ramp	**23, 277**

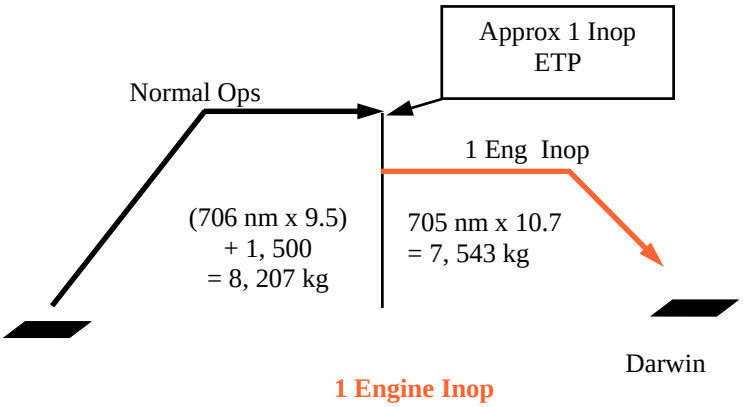
Q 17 continued ...



Depressurised Ops

Depressurised Ops Fuel Summary

Item	Kg
Approx FBO	15, 955
V/Res	Nil
F/Res Dep Ops	2, 250
Traffic	Nil
Wx Hold	Nil
Taxi OUT	150
Taxi IN	100
Min FOB at Ramp	**18, 455 kg**



1 Engine Inop

1 Engine Inop Fuel Summary

Item	Kg
Approx FBO	15, 750
V/Res	1, 575
F/Res 1 Inop	1, 500
Traffic or WIP	NOT Required
Wx Hold (YPAD)	2, 000
Taxi OUT	150
Taxi IN	100
Min FOB at Ramp	**21, 075**

From the above it shows that Normal ops requires more fuel than either 1 Engine Inop, or Depressurised operations. ***Answer 'd' best.***

Postscript:
If we disregard the wind for all three operations, then the relative fuel requirements will stay the same as if we calculated an accurate ETP, and did an accurate flight plan for each.
These types of questions attract approximately 3 marks, so you have about 9 minutes to find an answer, if you are to finish the exam on time.

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Q 18.

Refer to B727 manual page 2-14.

Command knowledge:
The best altitude capability is obtained using the lowest forward cruise Mach number, which for typical altitudes used by the B727 (low to mid 30's) is M 0.79., or LRC.
No cruise speed or FL was mentioned, and only the direction (WEST), BRW and ISA deviation were given.
The approx normal ops TopC GW will typically be 3, 000 kg lighter than the BRW (77, 000 kg in this case).
Mach 0.79 cruise gives the highest arrival weight in this case.
Consult page 2-14/ISA+5 column as shown, using WEST IFR levels of FL350 and FL310.

Step 1. Refer page 2-14.

	Mach	ISA +5
FL350	0.79	75, 500 kg
FL310	0.79	87, 800 kg

With the approx TopC being heavier than the max arrival GW, FL350 is NOT available.
The TopC GW is less than the maximum arrival GW for FL310, so FL310 is available.

Step 2. Find climb fuel burn off data for BRW 80, 000 kg/FL310/ISA+5 on pages 2-8/2-9. It is 3, 050 kg.

Step 3. So TopC GW is 80, 000 - 3, 050 kg = **76, 950 kg. Answer 'a' best !**

End of Flight Planning Exam 5 working file.