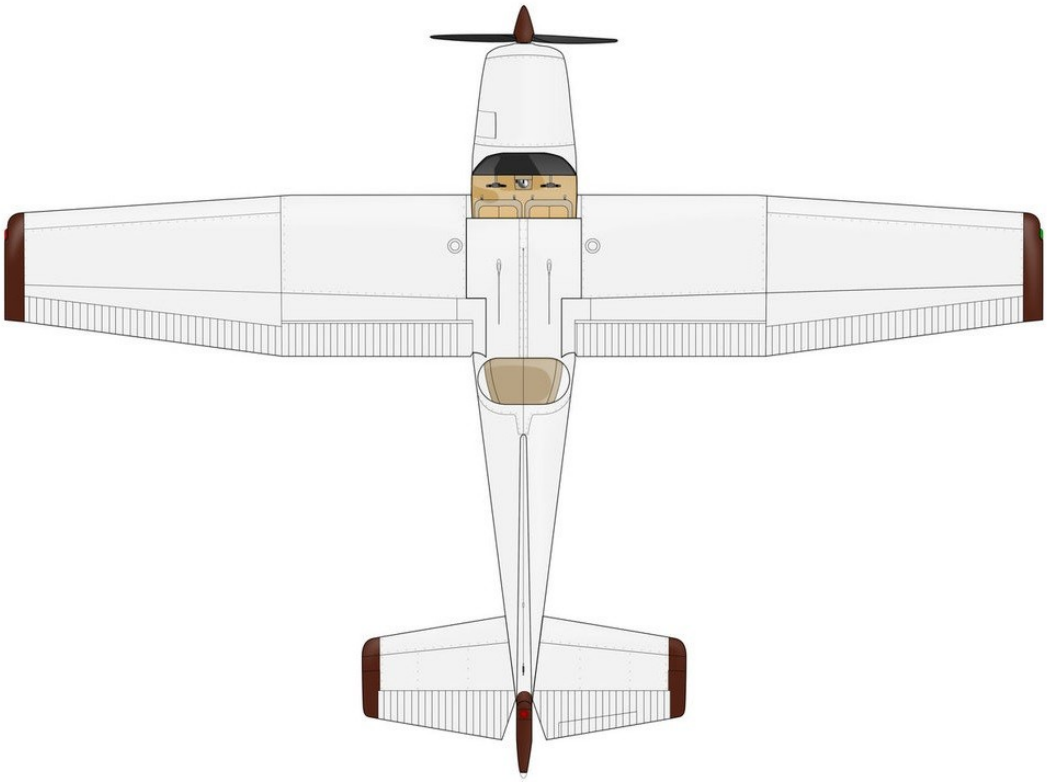
Pathfinder Aviation
SINGLE ENGINE PISTON AEROPLANE ENDORSEMENT



ENGINEERING, DATA AND PERFORMANCE QUESTIONNAIRE

FOR Cessna 172N

Version - 1 January 2017

Name:Tony Morris _____ ARN:1007036_____

Endorsed by: _____ ARN_____
(Signature/Name)

Satisfactorily Completed on: / /

The Endorsement Questionnaire

To qualify for the issue of an aeroplane endorsement you must be able to fly the aeroplane to an acceptable standard as well as demonstrate a level of knowledge that satisfies the person conducting your endorsement that you have completed *'training in the operating limitations, procedures and systems of the type of aeroplane for which the endorsement is sought'.* (CAO 40.1.0. paragraph 4.3 Note 1).

This questionnaire should help you satisfy these knowledge requirements. It will do so in a structured and efficient manner and so enhance safety and help reduce costs.

The document will also serve as a ready reference for you in the future, particularly if you do not fly regularly.

In any case, CASA recommends that both you and your instructor retain a copy of the questionnaire for at least 12 months as proof of completion of training.

How to Answer These Questions

You should use references such as Flight Manuals, Pilot Operating Handbooks and theory texts, and make liberal use of notes and sketches. These should be completed on the applicable page of the questionnaire.

To assist you, the layout of the questionnaire corresponds to the sections of most Pilot Operating Handbooks.

Note that some questions may not apply to the aeroplane type on which you are being endorsed. You should mark these 'N/A' (not applicable).

This questionnaire is comprised of 11 pages and may be copied.

1.General Aircraft Data

(a). What is the make, type and model of the aeroplane?

Make: Cessna

Type: C172

Model: C172N

(b) In which categories is the aeroplane permitted to fly?

Single Engine Aeroplane

2. Airspeed Limitation

(a). List the applicable airspeeds for the aeroplane type:

Vno

128KIAS

Vmax X/W

15KIAS (demonstrated)

Va

97KIAS at MTOW
89KIAS at 1950lb
80KIAS at 1658lb

Vb

Since no Vb published in manual, use Va

Vx

59KIAS

Vy

76KIAS

Vg

65KIAS

Vs

44KIAS
Vs0 = 33KIAS

Vfe

FLAP10 = 110KIAS
FLAP20 = 85KIAS
FLAP30 = 85KIAS

Vne

158KIAS

(b) maximum load factor (flaps up) is + 3.8_____ g and – 1.52____ g; and

(c) maximum load factor (flaps down) is + 3.0_____ g and – 3.0____ g.

3. Emergency Procedures

Detail the emergency procedures for the following situations:

Engine fire on the ground

IF CRANKING ENGINE, CONTINUE CRANKING TO SUCK THE FUEL IN THE INTAKE. IF ENGINE STARTS, RUN AT 1700RPM FOR FEW MINUTES, THEN SHUTDOWN FOR INSPECTION. IF ENGINE DOES NOT START, OPEN THROTTLE, MIXTURE TO CUT-OFF, MASTER/IGNITION/FUEL SELECTOR OFF, OBTAIN FIRE EXTINGUISHER, EXTINGUISH FIRE WITH EXTINGUISHER, BLANKET OR DIRT. INSPECT FOR DAMAGE FROM FIRE.

Electrical fire on the ground

MASTER, AVIONICS AND ALL OTHER SWITCHES OFF. VENTS, CABIN AIR, HEAT OFF. OPEN THROTTLE, MIXTURE TO CUT-OFF, FUEL SELECTOR OFF. OBTAIN CORRECT FIRE EXTINGUISHER to EXTINGUISH FIRE.

Engine fire airborne

MIXTURE TO CUT-OFF, FUEL SELECTOR OFF, MASTER SWITCH OFF, CABIN HEAT AND AIR OFF, ACHIEVE 100KIAS, EXECUTE FORCED LANDING.

Electrical fire in flight

MASTER SWITCH OFF, AVIONICS OFF, ALL SWITCHES EXCEPT IGNITION OFF, CABIN AIR, HEAT, VENTS OFF. USE FIRE EXTINGUISHER IF AVAILABLE.

Cabin fire in flight

MASTER SWITCH OFF, CABIN AIR, HEAT, VENTS OFF. USE FIRE EXTINGUISHER IF AVAILABLE.

Engine failure after take-off

ACHIEVE Vg. MIXTURE CUT-OFF, FUEL SELECTOR OFF, IGNITION OFF, FLAPS AS REQUIRED, MASTER OFF. IF RUNWAY REMAINING, USE RUNWAY, OTHERWISE SELECT LANDING AREA WITHIN 30 DEGREES OF HEADING.

Engine failure in the cruise

ACHIEVE Vg. CARBURRETOR HEAT ON, FUEL SELECTOR BOTH, MIXTURE RICH, IGNITION BOTH (OR START IF PROP HAS STOPPED), PRIMER IN AND LOCKED.

Carbon monoxide detected in the cabin in flight

CABIN HEAT OFF, CABIN AIR ON, CABIN VENTS OPEN, CABIN WINDOW OPEN <= 163KIAS

The optimum glide speed for the aeroplane **65KIAS**

4. Normal Procedures

State, describe or detail:

The start sequence for cold and hot starts;

COLD: CARB HEAT COLD, PRIME UNTIL ONE PUSH WITH PRESSURE THEN LOCK, MIXTURE FULL RICH, THROTTLE QUARTER OPEN, MASTER ON, “CLEAR PROP”, CRANK AND SET 1000RPM.

HOT: SAME AS ABOVE BUT NO PRIME

The RPM used for checking:

- the ignition system;

  1700RPM

- the carburettor heat;

  1700RPM

The maximum RPM drop and RPM differential between magnetos when checking the ignition switches;

MAXIMUM DROP 150RPM, MAXIMUM DIFFERENCE 50RPM

The climb power setting, IAS and fuel flow;

CLIMB AT FULL POWER, IAS DEPENDENT ON DENSITY HEIGHT, FUEL FLOW DEPENDENT ON DENSITY HEIGHT AND CLIMB SPEED. SEE POH SECTION 5-15.

A typical 65% power setting, TAS and fuel flow at 5000 ft pressure height;

110KTAS, 7.4GPH

Using the aeroplane flight manual or POH, calculate the endurance for the aeroplane at 5000ft AMSL (ISA) with 65% power set; and

6 HOURS (POH 5-20)

How the mixture is leaned out in the cruise.

SLOWLY TURN MIXTURE OUT AS EGT INCREASES UNTIL PEAK EGT IS REACHED

5. Weight and Balance, and Performance

Specify the correct values of.

Maximum ramp weight;

2400lb

Maximum take-off weight;

2400lb

Maximum landing weight;

2400lb

Maximum Zero fuel weight;

N/A

Maximum number of adult persons on board (POB);

4

Maximum baggage weight

120lb

Maximum fuel which can be carried with a full load of adult passengers (80Kg/person) and maximum baggage weight;

62.2L

Do any of the weight limitations vary from category to category? If so what are the weight limitations of each category?

Yes.

Using the aeroplane flight manual, determine the take-off weight and balance solution (Maximum take-off weight and C of G position), the max amount of fuel that can be carried and the endurance; for 2 x 80kg POB and 20kg cargo.

Calculate the take-off distance required at maximum take-off weight, 65ft AMSL and OAT 25°C; and the minimum landing distance at maximum landing weight for the conditions at (iv) QNH 1017hPa.
Surface: paved

For actual flight 20171204 YBAF-YGYM-YWND-YBAF

20171212 YBAF-YGYM-[YWND]-YBAF

TODR YBAF

* Type: C172N
* Aircraft: VH-KJR
* BEW: 670.3kg, 1477.7lb
* Fuel: 200L, 53 US gal, 144kg, 318lb
* PAX1: 80kg, 176lb
* PAX2: nil
* BagA: 10kg, 22lb
* BagB: nil
* Surface: Paved
* Slope: nil

* ZFW: `\sum [670.3, 80, 10]      = 760.3kg`, `\sum [1477.7, 176, 22]      = **1675.7lb**`
* AUW: `\sum [670.3, 144, 80, 10] = 904.3kg`, `\sum [1477.7, 318, 176, 22] = **1993.7lb**`

* QNH: **`1017hPa`**
* ELE: **`65ft`**
* TMP: **`27C`**
* PA: `65+30*(1017-1013)=` **`185hPa`**
* *assume `AUW 2000lb`*
* GR PoH: `(((710-650)*0.185+650)-((665-605)*0.185+605))*0.7+((665-605)*0.185+605)=` **`(647.6ft, 198m)`**
* 50ft PoH: `(((1295-1185)*0.185+1185)-((1215-1110)*0.185+1110))*0.7+((1215-1110)*0.185+1110)=` **`(1182.6ft, 360m)`**
* GR CAO20.7.4: `647.6*1.15=` **`(745ft, 227m)`**
* 50ft CAO20.7.4: `1182.6*1.15=` **`(1360ft, 415m)`**

LDR YWND

* Type: C172N
* Aircraft: VH-KJR
* BEW: 670.3kg, 1477.7lb
* Fuel: 129L, 34 US gal, 93kg, 204lb
* PAX1: 80kg, 176lb
* PAX2: nil
* BagA: 10kg, 22lb
* BagB: nil
* Surface: Grass
* Slope: nil

* ZFW: `\sum [670.3, 80, 10]      = 760.3kg`, `\sum [1477.7, 176, 22]      = **1675.7lb**`
* AUW: `\sum [670.3, 93, 80, 10]  = 853.3kg`, `\sum [1477.7, 204, 176, 22] = **1879.7lb**`

* DD summer CAO20.7.0: **`2800ft`**
* ELE: **`1050ft`**
* PA: `2800+1050=` **`3850`**
* TMP (ISA): `15-(1050/500)=` **`13C`**
* GR PoH: `(((635-615)*0.85+615)-((615-590)*0.85+590))*0.3+((615-590)*0.85+590)=` **`(617.5ft, 188.2m)`**
* 50ft PoH: `(((1430-1395)*0.85+1395)-((1400-1355)*0.85+1360))*0.3+((1400-1360)*0.85+1360)=` **`(1402ft, 427.3m)`**
* GR CAO20.7.4: `625.8*1.15=` **`(719.7ft, 219.4m)`**
* 50ft CAO20.7.4: `1402*1.15=` **`(1612.3ft, 491.4m)`**

TODR YWND

* Type: C172N
* Aircraft: VH-KJR
* BEW: 670.3kg, 1477.7lb

* Fuel: 129L, 34 US gal, 93kg, 204lb
* PAX1: 80kg, 176lb
* PAX2: nil
* BagA: 10kg, 22lb
* BagB: nil
* Surface: Grass
* Slope: nil

* ZFW: `\sum [670.3, 80, 10]  = 760.3kg`, `\sum [1477.7, 176, 22]  = **1675.7lb**`
* AUW: `\sum [670.3, 93, 80, 10]  = 853.3kg`, `\sum [1477.7, 204, 176, 22] = **1879.7lb**`

* DD summer CAO20.7.0: **`2800ft`**
* ELE: **`1050ft`**
* PA: `2800+1050=` **`3850`**
* TMP (ISA): `15-(1050/500)=` **`13C`**
* *assume `AUW 2000lb`*
* GR PoH (paved): `(((880-800)*0.85+800)-((815-740)*0.85+740))*0.3+((815-740)*0.85+740)=` **`(823ft, 250.9m)`**
* 50ft PoH (paved): `(((1615-1455)*0.85+1455)-((1500-1355)*0.85+1355))*0.3+((1500-1355)*0.85+1355)=` **`(1512.1ft, 460.9m)`**
* *delta* 50ft/GR: `(1512.1ft, 460.9m)-(823ft, 250.9m)=` **`(689.1ft, 210m)`**
* GR PoH: `(823ft, 250.9m)*1.15=` **`(946.4ft, 288.5m)`**
* 50ft PoH: `(689.1ft, 210m)+(946.4ft, 288.5m)=` **`(1635.5ft, 498.5m)`**
* GR CAO20.7.4: `(946.4ft, 288.5m)*1.15=` **`(1088.36ft, 331.8m)`**
* 50ft CAO20.7.4: `(1635.5ft, 498.5m)*1.15=` **`(1869.3ft, 573.3m)`**

LDR YBAF

* Type: C172N
* Aircraft: VH-KJR
* BEW: 670.3kg, 1477.7lb
* Fuel: 83L, 22 US gal, 60kg, 132lb
* PAX1: 80kg, 176lb
* PAX2: nil
* BagA: 10kg, 22lb
* BagB: nil
* Surface: Grass
* Slope: nil

* ZFW: `\sum [670.3, 80, 10]  = 760.3kg`, `\sum [1477.7, 176, 22]  = **1675.7lb**`
* AUW: `\sum [670.3, 60, 80, 10]  = 820.3kg`, `\sum [1477.7, 132, 176, 22] = **1807.7lb**`

* QNH: **`1017hPa`**
* ELE: **`65ft`**
* TMP: **`27C`**
* PA: `65+30*(1017-1013)=` **`185hPa`**
* GR PoH: `(((590-570)*0.185+570)-((570-550)*0.185+550))*0.7+((570-550)*0.185+550)=` **`(567.7ft, 173m)`**
* 50ft PoH: `(((1360-1325)*0.185+1325)-((1325-1295)*0.185+1295))*0.7+((1325-1295)*0.185+1295)=` **`(1322.2ft, 403m)`**
* GR CAO20.7.4: `567.7*1.15=` **`(652.9ft, 199m)`**
* 50ft CAO20.7.4: `1322.2*1.15=` **`(1520.5ft, 463.4m)`**

6. Fuel System, Fuel and Fluids

State or describe/sketch for the aircraft on the following page:

The correct grade of fuel;

100LL avgas

Approved alternate fuel;

MOGAS

Location of fuel tanks and drain points; one on each wing root, one underneath (front, right)

(d) the total and usable fuel in each tank; 54 US gal, 50 US gal

(e) the position of the fuel tank vents; left wing leading edge

(f) whether the engine has a carburettor or fuel injection system; carburettor

The priming system and its use;

manual primer, pump until full backpressure is felt

Location of the fuel boost/auxiliary pump and when it should be used;

N/A (gravity fed)

What conditions apply to tank selection for take-off, landing and cruise;

BOTH

When refuelling to less than full tanks, what restrictions apply and how is the quantity checked;

Fuel is dipped after refuelling to determine quantity.

The location and capacity of the hydraulic fluid reservoir;

N/A

The correct grade of oil for the aeroplane;

W100

The minimum oil quantity before flight;

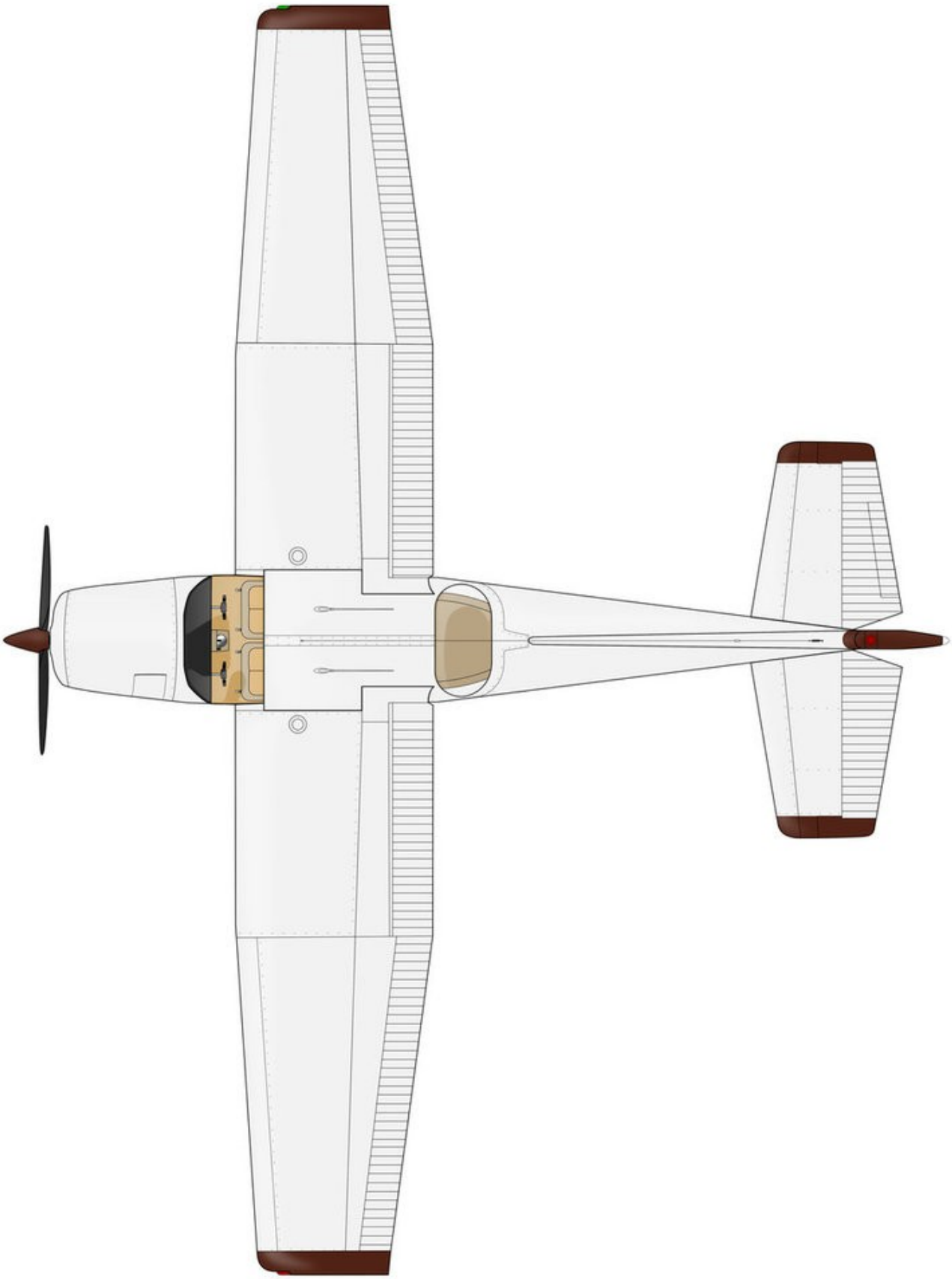
4 US quarts

The maximum quantity of oil;

7 US quarts

The maximum, minimum and normal engine oil pressures.

Minimum: 25psi, Maximum: 115psi, Normal: 25-115psi



7. Engine and Propeller Details

Answer the following:

What is the make/model of the engine?

O-320-D2J Lycoming

What is the power output, and number of cylinders?

160hp, 4 cylinders, horizontally opposed

What is the take-off power setting and time limit?

Full power, No limit

What is the Maximum Continuous power?

N/A

8. Airframe

What type is the undercarriage system (fixed/retractable/tricycle/conventional)

fixed tricycle

Which control surfaces can be trimmed?

Rudder, elevator

Describe the flap actuating system.

Electric, 3 stage

Describe the flap indicating system.

Indicator near flap switch

What is the flap operating range?

0/10/20/30

Sketch the location of all exits.

Left and right doors

Describe/sketch the location of.the landing, taxi lights; fresh air intakes; and fuel caps.

* landing/taxi lights centre front, above air filter, below prop spinner

* leading edge of each wing root

* fuel caps: top of each wing root

What is the wing span of the aeroplane?

36ft

9.Ancillary Systems

What systems are hydraulically operated?

Brakes

What procedures are followed when a hydraulic system failure is suspected?

Discontinue taxi. If brakes have low pressure on application, pump the brakes.

What are the sources of electrical power?

Alternator for charge, battery for storing excess current. Engine runs on magneto system

What is the DC system voltage?

28V DC

Can an external power source be used? If so, what is the procedure?

N/A

Where are the battery and external power receptacle located?

On the left side of engine compartment

How long can the battery supply emergency power?

Depends on load.

Following an alternator/generator failure in flight, which non-essential electric services should be switched off?
Lights in day, surplus navaids, land flapless in case of go-around with no electrical power

If a stall warning device is fitted, is it electrical or mechanical?

Pneumatic

How is the cockpit ventilated?

Air vents on each wing root leading edge, single vent on right side, windows

How is the cockpit heated?

Switch in the cabin, directs air heated from exhaust manifold

Show the location of the following safety equipment:

- fire extinguisher

  Between the two front seats when fitted
- ELT

  Glove box
- Torches

  N/A
- survival equipment

  ELT, Water in BagA
- first aid kit

  in the cabin

10. Flight Instruments

Where are the pitot head(s), static vent(s) and any water drain points for the pitot/static system located?

Pitot is in the middle of the left wing, static port left side of front fuselage, no drain points

Is there a pitot heat system fitted?

Yes.

Is there an alternate static source fitted?-if so

(i) where is this located?
Yes, switch is beneath the throttle

(ii) what is the purpose of this system?
If the primary static source becomes blocked

(iii) if used, what effect does it have on the pressure instruments?
Errors on pressure-fed instruments

Which flight instruments are operated electrically?
Turn coordinator

Which flight instruments are gyroscopically operated?
DG, AI, Turn coordinator

Which instruments are operated by vacuum?
DG, AI

END OF QUESTIONNAIRE