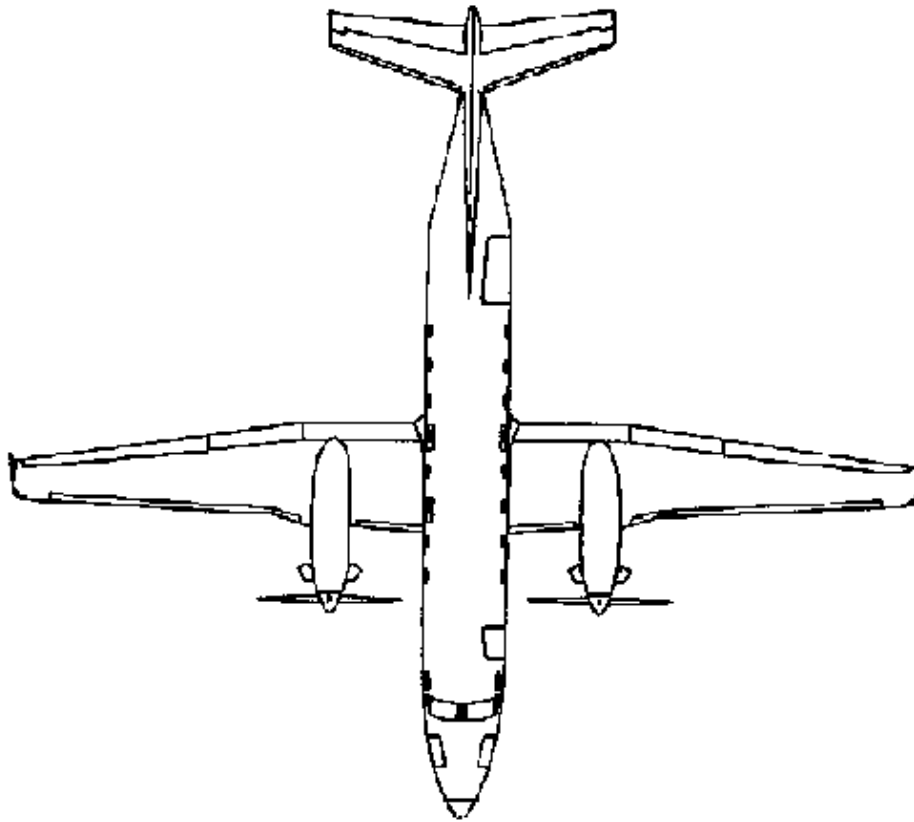


Appendix E to CAAP 5.23-1(1)

**MULTI-ENGINE TURBO-PROP AEROLANE ENDORSEMENT**



**ENGINEERING, DATA AND PERFORMANCE QUESTIONNAIRE**

**FOR** \_\_\_\_\_  
(Aeroplane make & model)

Version 2 -April 2007

**Name:** \_\_\_\_\_ **ARN:** \_\_\_\_\_

**Endorser:** \_\_\_\_\_ **ARN:** \_\_\_\_\_

(Signature/Name)

## **The endorsement questionnaire**

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

This questionnaire will assist you to fully satisfy these knowledge requirements, thereby enhancing safety and reducing industry costs.

The questionnaire will also be a useful ready reference for you in the future, particularly if you do not fly regularly.

In any case, the Civil Aviation Safety Authority (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 (POH) and theory texts, and make liberal use of notes and sketches on the applicable questionnaire page.

To assist you, the layout of the questionnaire corresponds to the sections of most POH.

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

The questionnaire is comprised of 17 pages and may be copied.

**General Aircraft Data**

1. (a) What is the make, type and model of the aeroplane?  
(b) In which category (categories) is the aeroplane permitted to fly?

**Airspeed Limitation**

2. List the applicable airspeed for the aeroplane type:
  - (a)  $V_{NO}$  (normal operating)
    - (i)  $V_{MAX X/W}$  (maximum crosswind);
    - (ii)  $V_A$  (design manoeuvre speed);
    - (iii)  $V_X$  (best climb angle);
    - (ix)  $V_S$ ; (stall speed)
    - (x)  $V_Y$  (best climb rate); and
    - (xi)  $V_{FE}$  - flap extension.
  - (b)  $V_B$  Turbulence penetration speed:
    - (i)  $V_{LO}$ , (landing gear operation up);
    - (ii)  $V_{LE}$  (landing gear extended);
    - (iii)  $V_{LO2}$  (landing gear operation down); and
    - (iv)  $V_{NE}$ . (never exceed speed).
  - (c) Maximum landing light operating speed;
  - (d) Maximum load factor (flaps up) is +      g and -      g; and
  - (e) Maximum load factor (flaps down) is +      g and -      g.

**Emergency Procedures**

3. Detail the emergency procedures for the following situations if applicable:

- (a) Engine fire on the ground;
  
- (b) Engine failure after take-off,
  
- (c) Engine failure in the cruise;
  
- (d) Engine fire airborne;
  
- (e) Electrical fire on the ground;
  
- (f) Electrical fire in flight;
  
- (g) Cabin fire in flight;
  
- (h) Rapid depressurisation;
  
- (i) The optimum glide speed for the aeroplane is \_\_\_\_\_kts;
  
- (j) Propeller over-speed; and
  
- (k) Emergency under-carriage extension.

**Normal Procedures**

4. State, describe or detail:
  - (a) The cruise power setting, indicated air speed (IAS) and fuel flow for the aeroplane;
  
  - (b) The climb power setting, IAS and fuel flow for the aeroplane;
  
  - (c) A typical power setting, true air speed (TAS) and fuel flow at 20000 ft pressure height; and
  
  - (d) Using the aeroplane flight manual, calculate the endurance for the aeroplane at 5000 ft above mean sea level (amsl) international standard atmosphere (ISA) with endurance power set.

**Weight and Balance and Performance**

5. Specify the correct values of:
  - (a) The maximum ramp weight;
  
  - (b) The maximum take-off weight;
  
  - (c) The maximum landing weight;
  
  - (d) The maximum zero fuel weight;
  
  - (e) The maximum number of adult persons on board (POB);
  
  - (f) The maximum baggage weight; and
  
  - (g) The maximum fuel which can be carried with a full load of adult passengers (80 kg/person) and maximum baggage weight.

Do any of the weight limitations in (a) to (g) vary between categories? If so, what are the weight limitations of each category?

(j) Using the aeroplane flight manual, and a typical loading problem posed by the endorser, determine the take-off weight and balance solution (maximum take-off weight and centre of gravity (CG) position), the amount of fuel that can be carried and the endurance;

(k) Calculate the take-off distance required at maximum take-off weight, 2500 ft (amsl) and outside air temperature (CG) 30° C; and

### **Fuel System, Fuel and Fluids**

6. State, describe or sketch on the aircraft diagram:

(a) The correct grade of fuel;

(b) Any approved alternate fuel;

(c) The location of fuel tanks and drain points;

(d) The total and usable fuel in each tank;

(e) The position of the fuel tank vents;

(f) Where the fuel boost/auxiliary pumps are located;

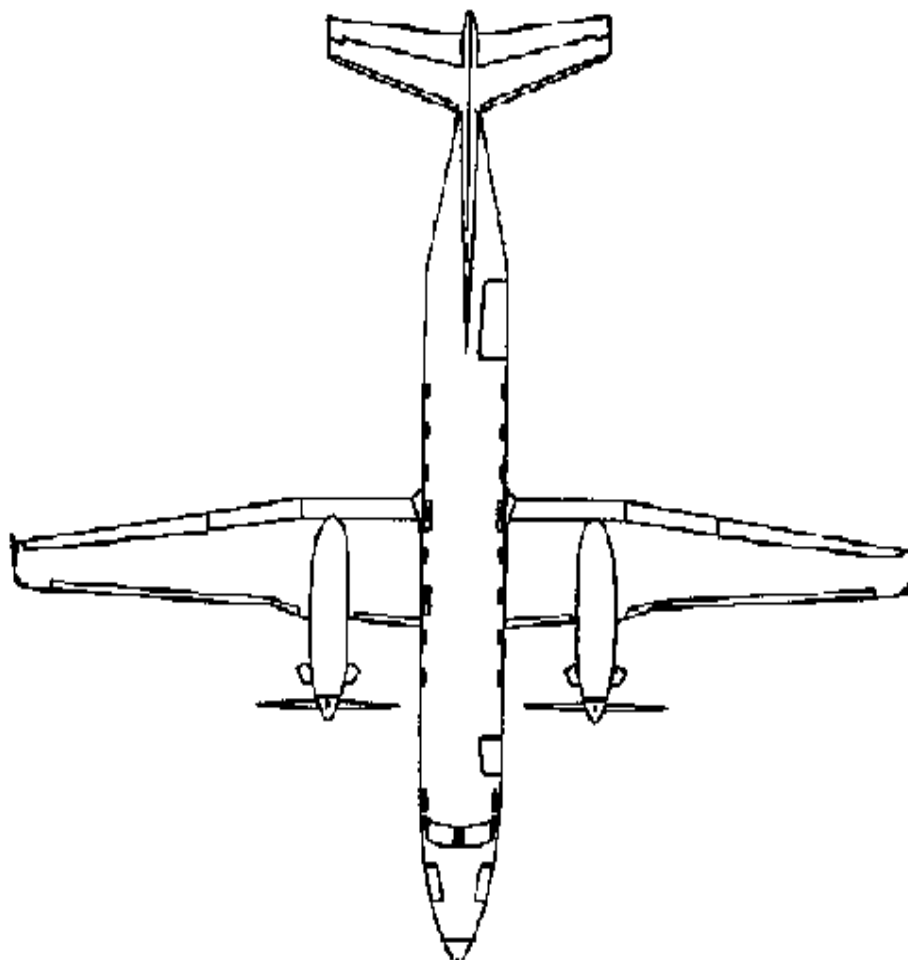
(i) When should these pumps be used?

(g) If applicable, the fuel tank change procedure;

(i) What conditions apply to tank selection for take-off and landing?

(h) When refuelling to less than full tanks, what restrictions apply and how is the quantity checked?

- (i) If applicable, describe the cross feed system;
- (j) If applicable, the minimum and normal hydraulic fluid capacity;
- (k) The correct grade of oil for the aeroplane;
- (l) The minimum oil quantity before flight; and
- (m) The maximum quantity of oil.



## Asymmetric Performance

7. Answer the following questions:

- (a) What IAS is  $V_{MCA}$  in the take-off configuration?
  
- (b) What effect will full flap have on  $V_{MCA}$ ?
  
- (c) What IAS is  $V_{SSE}$ ?
  
- (d) What is the TAS and fuel flow rate with one engine shut down at 1000 ft and 10000 ft amsl on an ISA day?
  
- (e) What is the rate of climb with one engine shut down, propeller feathered, maximum all up weight (AUW), 1000 ft amsl, take-off power, undercarriage and flap retracted, on an ISA day?
  - (i) On an ISA +20° C day?
  
- (f) Which engine is the critical engine?
  
- (g) What is the single engine rate of climb speed ( $V_{YSE}$ ) ?
  
- (h) How does single engine flight affect the range of the aeroplane?



**Turbine Engine**

8. Answer the following questions:

- (a) What is the type and number designation of the engines?
  
- (b) What is the shaft horse-power (SHP) of the engines?
  
- (c) Maximum inter-stage turbine temperature (ITT) turbine outlet temperature (TOT) on:
  - (i) Start;
  
  - (ii) Take-off,
  
  - (iii) Climb;
  
  - (iv) Maximum continuous power;
  
  - (v) Idle;
  
  - (vi) Reverse; and
  
  - (vii) Transient;
  
- (d) Maximum  $N_g$  ( $N_1$ ) on take-off,
  
- (e) Maximum propeller speed  $N_p$  ( $N_2$ ) on take-off/climb;
  
- (f) Max torque on:
  - (i) Take-off,
  
  - (ii) Climb;

- (iii) Maximum continuous power;
  - (iv) Idle;
  - (v) Reverse; and
  - (vi) Transient.
- (g) What is the in flight minimum power limit?
- (h) Starter cycle limitations:
- (i) Seconds on            minutes off;
  - (ii) Seconds on            minutes off; and
  - (iii) Seconds on            minutes off.
- (i) What oil pressure illuminates the warning light if fitted?
- (j) Before shutdown, the engine must run at or below \_\_\_\_\_ °C ITT for \_\_\_\_\_(minutes/seconds).
- (k) What is the critical/prohibited revolution per minute (RPM) range and what limitations apply in this range?
- (l) What are the manual ignition time limits?

- (m) When should the anti-icing be activated?
  
- (n) What is the purpose of the over-speed and under-speed governor and what are the settings/range of the governor?
  
- (o) What is the auto-ignition and when is it used?
  
- (p) What are the settings of the condition lever, and what is the purpose of each setting?

### **Propellers**

9. Answer the following questions or describe:

- (a) The propeller system in general;
  
- (b) What is the BETA mode and range?
  
- (c) Over what RPM range in flight does the propeller governor operate?
  
- (d) How is an over-speed/under-speed prevented?
  
- (e) What drives the blade into:
  - (i) fine pitch?
  
  - (ii) coarse pitch?
  
  - (iii) reverse? and

- (iv) feather?
  
- (f) What precautions apply to propeller operations both in the air and on the ground?
  
- (g) How does the auto-feather system feather the propeller?
  
- (h) What is the purpose of the Negative Torque Sensing System (NTS)?
  
- (i) What indications show that the propeller is in the NTS range? and
  
- (j) What actions would correct this unfavourable NTS situation?

### **Airframe**

10. Answer the following:

- (a) What type is the undercarriage system? (fixed/retractable) (tricycle/conventional)?
  
- (b) Which control surfaces can be trimmed?
  
- (c) How are the flap systems activated?
  
- (d) Describe the flap indicating system.
  
- (e) What is the flap operating range?
  
- (f) Sketch the location of all exits on the diagram on page 133;
  
- (g) If a fuel burning heater is installed, describe the method used to turn the heater on and off and state any limitations;
  
- (h) What is the fuel consumption rate of the heater?
  
- (i) Describe/sketch the location of.
  - (i) Landing/taxi lights;

- (ii) Pitot heads;
  - (iii) Fresh air intakes;
  - (iv) Fuel caps; and
- (j) What is the wing span of the aeroplane?

### **Ancillary Systems**

11. Answer the following questions:

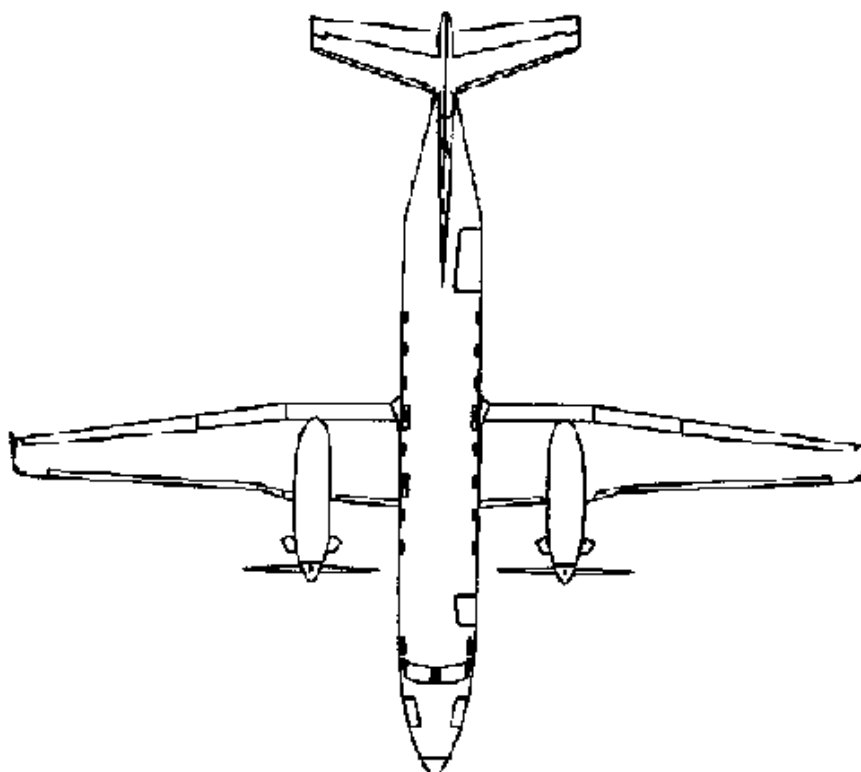
- (a) What systems are hydraulically operated?
- (b) What procedures are followed when a hydraulic system failure is suspected?
- (c) What provision is there for emergency hydraulic systems?
- (d) How many brake applications would be expected from a fully pressurised brake accumulator (if applicable)?
- (e) What are the sources of electrical power?
- (f) What is the DC system voltage?
- (g) Where are the battery and external power receptacle located?
- (h) How long can the battery supply emergency power?
- (i) Can an external power source be used?

- (j) Which, if any, ancillary system(s) would be lost if the left engine was shut down and propeller feathered?
  
- (k) Which, if any, ancillary system(s) would be lost if the right engine was shut down and propeller feathered?
  
- (l) Following an alternator/generator failure in flight, which non essential electrical equipment should be switched off?
  
- (m) How is the cockpit ventilated?
  
- (n) How is the cockpit heated?
  
- (o) Describe the pressurisation system (if fitted);
  
- (p) What is the maximum permitted cabin pressure?
  
- (q) Explain all the methods of disengaging the autopilot.
  
- (r) Under what conditions will the autopilot automatically disengage?
  
- (s) Explain how an electrical trim can be overridden if it runs away; and

(t) What are the symptoms of, and dangers associated with an outlet valve which is jammed closed? and

(u) Show the location of the following safety equipment:

- (i) Fire extinguisher;
- (ii) Emergency locator transmitter (ELT);
- (iii) Torches; and
- (iv) Survival equipment.



**Flight Instruments**

12. Answer the following questions:

- (a) Where are the pitot head(s), static vent(s) and any water drain points for the pitot/static system located?
  
  
  
  
  
  
  
  
  
  
- (b) What type of pitot heat system is fitted to the aeroplane?
  
  
  
  
  
  
  
  
  
  
- (c) Is there an alternate static source fitted? - if so;
  - (i) Where is this located?
  
  
  
  
  
  
  
  
  
  
  - (ii) What is the purpose of this system?
  
  
  
  
  
  
  
  
  
  
  - (iii) If used, what effect does it have on instruments?
  
  
  
  
  
  
  
  
  
  
- (d) What instruments and gauges are alternating current (AC) powered?
  
  
  
  
  
  
  
  
  
  
- (e) What instruments and gauges are direct current (DC) powered?
  
  
  
  
  
  
  
  
  
  
- (f) What is the limit of generator reset attempts?
  
  
  
  
  
  
  
  
  
  
- (g) At what temperature will the battery overheat light illuminate?
  - (i) If illuminated, what action is required?
  
  
  
  
  
  
  
  
  
  
- (h) What does the auxiliary battery provide power for?
  - (i) How is an inverter failure indicated?

End of Questionnaire: Satisfactorily completed on        /        /