

1 Direction

1. In a three figure group, express the following directions:
 - (a) North: 000
 - (b) South: 180
 - (c) East: 090
 - (d) West: 270
 - (e) Northeast: 045
 - (f) Southwest: 315
2. Runways are numbered according to their magnetic track. They are abbreviated to a 2 figure group. For example, the southerly runways at Sydney are 16. Because there are parallel runways, they are identified as runways 16 Left and 16 Right.
 - (a) Essendon airport has a runway with a magnetic heading of 257° . What would that runway be designated? **26**
 - (b) Mackay Airport in Queensland has its northern runway magnetic heading as 319° . What would this runway be designated as? **32**
 - (c) Rockhampton's southern runway, heading is 148° . What would this runway be designated? **15**
 - (d) What is the reciprocal of runway 13 at Moorabbin? **31**
3. In order to reference the position of other traffic or features outside the cockpit we use the clock code. Straight ahead is known as "12 O'Clock" and directly behind is our "6 O'Clock". Above the horizon is high; behind the horizon is low.
 - (a) If we are told to lookout for aircraft traffic at our "9 O'Clock", which window should we look out of? **Left**
 - (b) What about our "3 O'Clock". **Right**
4. Heading is the direction in which the aircraft is pointing, or the angle, measured in degrees clockwise from magnetic north to the longitudinal axis to the aircraft. Simply, the heading can be described as the direction that the aircraft's nose is pointing.

If North is expressed as 360, what is—

 - (a) South **180**

- | | |
|----------|-----|
| (b) East | 90 |
| (c) West | 270 |

2 Time

Aviation uses the 24-hour clock, where midnight is expressed 0000. The four digit number represents hours and minutes. So 5:30 pm is expressed as 1730 and 6:00 am is 0600.

1. In the 4-figure time group, express:

(a) 4.15 am	0415
(b) 4.45 pm	1645
(c) 9.30 pm	2130
(d) 11.40 pm	2340
2. Next we can add the date to this group to make it a 6-figure time-group. An example is 031530. This is 1530 (3.30 pm) on the 3rd of the month. This time group is regularly used in aviation forecasting and aircraft arrival and departure times.

(a) Express the date/time right now in a 6-figure time group.	272130
(b) Express 5.45 pm next Friday.	291745
3. Finally, an 8-figure time group incorporates the month. So midday on Christmas Day is expressed as 12251200.

(a) What was 3 pm yesterday?	201902261500
(b) What is 8.15 am next Tuesday?	201903050815

3 Power

1. A tachometer (revolution counter) measures the speed of a shaft or disc in a motor or machine. The display is shown in RPM (revolutions per minute). The "Tacho" is part of the instrument panel in our airplane.

(a) After we start the engine, what power setting do we aim to stabilize the engine?	2000 RPM
(b) What is the minimum RPM for Take Off?	NA

(c) What is a typical cruise RPM setting? **4800 RPM**

(d) What is the maximum RPM (red line) as per the flight manual?
5800 RPM

2. EGT Gauge – The EGT gauge shows temperature readings from the engine that assists us in achieving the most efficient power setting. When we fly cross-country, we 'lean' the mixture to provide us with the best fuel/air mixture.

(a) From where does the EGT gauge source its temperature to measure? **?**

3. Oil temperature and pressure

(a) When should we check them?

Start, run-up, takeoff roll, pre-landing

(b) Starting a cold engine, are we expecting high or low oil pressure?

High pressure (oil will be more viscous)

(c) Do we need oil pressure after start?

Oil pressure should increase within 10 seconds

(d) List two ways to reduce oil temperature in flight.

Set power to 70 KIAS

(e) Carburettor heat

Located next to the throttle quadrant, the carburetor heat selector allows heated (unfiltered) fresh air from around the exhaust manifold to prevent carburetor icing. A preflight check should show an RPM drop of approximately **N/A** RPM.

i. In flight, if rough running of the engine is encountered and carburetor ice is suspected, what do we expect to occur when we apply carburettor heat. **Power reduction, reduction in icing**

ii. Is a fuel-injected aircraft fitted with carburettor heat?

No. There are no carburetors in a fuel-injected engine

iii. Airspeed indicator. On the following diagram fill in the speed ranges on the arcs with the corresponding meanings.

Position	Meaning
Red line	V_{NE}
Yellow arc	Do not conduct heavy manoeuvres or in turbulence
Green arc	Normal operating range: from V_{s1} , the stall speed at maximum operating weight in clean configuration
White arc	Flap operating speed: between V_{s0} , the stall speed with full flaps and V_{FE} maximum speed for flap extension

4 Rules of the air

1. When two airplanes are approaching head-on, each must alter direction. What direction? **Right**
2. When overtaking another aircraft, who has the right of way? **The overtaking aircraft**
3. Describe how to overtake a slower aircraft in front of you. **Passing to the right**
4. Landing aircraft have right-of-way over aircraft taking off? **TRUE**
5. When two aircraft are on converging headings, the aircraft on the right has right of way **FALSE**
6. When operating at a non-controlled aerodrome, at what height AGL may we turn after take-off?

500 ft

7. At a Class D aerodrome, if the previous aircraft is landing, it must be clear of the runway prior to you touching down. **TRUE**
8. May we smoke in an airplane? **No.**
9. Can we smoke whilst refuelling? **No if closer than 15 m**
10. Alcohol consumption. As per CAR 256/CASR99/MFT DAMP, the consumption of alcohol by flight crew is prohibited for a period of at least how many hours prior to departure? What are some other drug and alcohol considerations? **8 hours**

5 Class D radio procedures

1. When contacting Moorabbin tower to report ready for circuits at 17L, what do we say?

Moorabbin Tower, <callsign>, for circuits, <dual/solo>, ready, 17L.

2. What is our downwind call for a touch and go?

<callsign>, turning downwind, touch-n-go.

3. What do we say when we are going around? Is it priority to advise the tower of this?

<callsign>, going around. Not a priority.

4. What are your actions if you lose sight of traffic you're following?

<callsign> traffic not sighted

5. Who provides traffic separation at Moorabbin?

Pilots and ATC

6. State the purpose of the following radio switches:

(a) Avionics master: **Turn on all avionics and radios**

(b) Squelch control: **N/A**

(c) Transmit button: **Open mic for broadcast**

7. Write examples of

(a) DISTRESS

**MAYDAY MAYDAY MAYDAY, UNIFORM UNIFORM DELTA
UNIFORM UNIFORM DELTA UNIFORM UNIFORM DELTA.
2 MILES TO THE SOUTH OF MOORABBIN, 1500 FT. ENGINE
FAILURE. RETURNING TO THE AIRPORT**

(b) urgency **PAN-PAN PAN-PAN PAN-PAN, UUD UUD UUD. MID
DOWNWIND MOORABBIN, 1000 FT. UNABLE TO DEPLOY
FLAPS. INBOUND TO LAND.**

(c) Radio failure

i. Fly the plane.

ii. Squawk 7600.

iii. Continue transmitting, prefixing with TRANSMITTING BLIND.

- iv. Monitor ATIS.
- v. Overfly at 1500 ft. Observe traffic pattern. Enter circuit via crosswind.
- vi. Look for instructions from the tower.

6 Emergencies

1. What do we do in case of engine fire at startup?
 - (a) Release starter
 - (b) Close fuel selector
 - (c) Throttle idle
 - (d) Magnetos off
 - (e) Retain fire extinguisher.
 - (f) Harness off, hatches off, evacuate.
 - (g) Call 000
2. Engine fire at cruise?
 - (a) Heating off
 - (b) Fuel selector: off.
 - (c) Throttle: full
 - (d) Magnetos: once fuel consumed—off.
 - (e) Select landing area.
 - (f) Land ASAP.
 - (g) Evacuate.
3. Engine failure in circuit:
 - (a) Fly best glide speed (70 KIAS).
 - (b) Choose most suitable runway, aiming for 1/3 down the runway unless sure can reach field, taking into account wind.
 - (c) Declare mayday, communicate intentions.
 - (d) Land. Power to idle once landing field within range.
4. Normal lift-off speed? **55 KIAS**
5. Best glide speed? **70 KIAS**

7 Engine ice and handling

1. List some methods of keeping the engine within operating limits.
Avoid violent changes of power, especially after a steep descent. Do not exceed maximum RPM times. Use mixture control if available
2. What controls the fuel/air ratio being delivered to the airplane?
Mixture or throttle
3. Describe the method of applying full power on take-off.
Push forward over 4 seconds, applying right rudder. Monitor RPM, engine temps, airspeed
4. How do you level off to cruise?
Lower the nose. Wait for airspeed to increase. Reduce power to 4800 RPM. Trim
5. Throttle on approach
Adjust power on base to control height; adjust power on final to control speed
6. Where are power setting, oil temperature, and EGT displayed in the cockpit.
Main avionics panel

8 Climbing

1. What is the best rate of climb (V_y) in the Sling 2? **72 KIAS**
2. What is the best angle of climb (V_x) speed? **65 KIAS**
3. When would we use the best rate of climb speed? **Takeoff leg; complying with ATC instruction**
4. What would we use the best angle of climb? **Obstacle clearance**
5. What effect does a headwind have on rate of climb? **None.**

9 Descending

1. What would happen to flight path if we decreased our power on descent yet held a constant airspeed?

Attitude would decrease

2. And if we lowered flap?

Attitude would decrease

10 Lift and drag

1. Define the lift formula and then simplify it to the pilot's lift formula.

$$L = C_L \times \frac{\rho}{2} V^2 S$$

2. Complete the following table:

	Lift		Total drag
Airspeed	↑	↑	↑
	↓	↓	↓
AoA	↑	↑	↑
	↓	↓	↓
FLAP	↑	↓	↓
	↓	↑	↑

11 Power

When we increase power the slipstream effect will also increase.

1. What if any flight controls will be affected?

Rudder

2. When we increase power our attitude will change.

Pitch down

3. Why does control effectiveness improve with a higher IAS?

Control are determined by deflecting air