Maximum Rate Turns

**Objective**
To carry out a balanced, maximum rate, level turn using full power.

**1. Principles of Flight**
- **Maximum Lift**
  - \( L \propto \text{AoA} \) and Airspeed
  - Max \( C_L \) at start of stall warning or edge of buffet

**Airspeed**
- Max rate turns limited by \( V_A \)
- \( V_A \) is the speed at which you can make abrupt and extreme control movements and not overstress the aeroplane’s structures
- Found in Flight Manual
- Affected by weight

**2. Considerations**
- **Entry above \( V_A \)**
  - Smooth roll in, delay power until decelerated to \( V_A \)
- **Entry below \( V_A \)**
  - Lead with power or at same time as roll in

**3. Airmanship**
- \( V_A \) is _____ kts
- Smooth control movements
- Minimum altitude

**4. Aeroplane Management**
- RPM limit
- C of G limits

**5. Human Factors**
- 360° turn to minimise disorientation
- Physical G limits during turn, generally ≤ 2G

**6. Air Exercise**

**Entry**
- Choose reference altitude and prominent reference point
- Check speed relative to \( V_A \)
- Apply full power, roll in smoothly, balance with rudder
  - will need more rudder than usual

**Maintaining**
- \( \text{LAI} \)
- Attitude differences due side by side seating
- Maintain first note of stall warning with backpressure
- Attitude maintained with AoB
- With stall warning sounding if altitude is being gained or lost, alter AoB

- Through 30° AoB increase backpressure to maintain altitude
- Stop at the stall warning (light buffet)
- Check ailerons and rudder
- Maintain backpressure and AoB

**Exit**
- Anticipate roll out by 30°
- Smoothly roll wings level with aileron, balance with rudder, and relax the backpressure to re-select the level attitude
- Delay power reduction
- Through _____ kts, reduce power to cruise rpm