

**Student's Name:**

**Instructor: D. S. Dancila**

**AE 3310**  
**Final Exam**

*July 30, 2001*

**Theory**

Closed Book

Time Available: 60 minutes

Answer concisely:

1. In defining the Standard Atmosphere, the altitude variation of what parameter is prescribed? On what basis?
2. What is the difference between a supercharger and a turbocharger?
3. What is the momentum theory expression for the overall efficiency of a propulsion system?
4. What is the difference between a turbofan and a turbojet engine? Sketch.
5. Draw a typical  $\eta_{pr}$  vs.  $J$  curve. What is the definition of  $J$ ?

6. Draw an airplane during a climb and show: climb angle, attitude, angle of attack, thrust angle.

7. What is “thrust required”?

8. What is “load factor”?

9. What is the value of  $\left(\frac{L}{D}\right)_{\max}$  as a function of  $C_{D,0}$  and  $K$ ?

10. What is the value of  $C_L$  at  $\left(\frac{L}{D}\right)_{\max}$ ?

11. What is “turn rate”?

12. What is the relationship between bank angle and load factor in a coordinated, steady, level turn?

13. What is the expression for “specific excess power”?

14. What is the expression for  $V_{stall}$  ?
  
15. The maximum endurance for an airplane is achieved when a certain quantity is an extremum. What is that quantity for a propeller airplane? How about for the case of a jet airplane? Maximum or minimum?
  
16. What is  $V_R$  ?
  
17. What is “maneuver speed”?
  
18. Define “absolute ceiling” and “service ceiling.”
  
19. What is “structural cruising speed”? What is the typical notation for it?
  
20. What is “energy height”?