編號：　198　系所：航空太空工程學系在職專班　　科目：航空工程概論（專班）

本試題是否可以使用計算機：☑可使用　，　☐不可使用　（請命題老師勾選）

1. 地球表面之大氣分幾層? 各層的特點是什麼? 大氣的熱力學狀態參數有哪些? (10%)

2. 低音速流動氣體和超音速氣流流動的特點分別爲何? (10%)

3. 試述升力和阻力產生的物理原因，阻力的分類有哪些? (10%)

4. 何謂一架飛機的絕對升限與服務升限，它們是如何決定出來的? (10%)

5. 何謂飛機的最大平飛速度與最小平飛速度? 它們是根據什麼關係決定的? (10%)

6. (15%)
   (a) What are the major aerodynamic coefficients of a wing?
   (b) How are these aerodynamic coefficients defined?
   (c) What are the major influence factors for the aerodynamic coefficients?

7. (15%) Consider an airplane of speed V in a level turn of radius R and with a roll angle ϕ. Define the lift load factor $n = L/W$. Show that the turn radius can be expressed as:

$$R = \frac{V^2}{g\sqrt{n^2 - 1}} \qquad \text{(Note: } W = mg\text{)}$$

8. (20%) Explain briefly the following concepts about materials and structures:
   (a) stresses and strains,
   (b) strength and stiffness,
   (c) durability and damage tolerance.