Aircraft Stability

1. What is meant by these three states of static stability?
    a. Positive static stability
    b. Zero static stability (neutrally unstable)
    c. Negative static stability
2. What is meant by these there states of dynamic stability?
    a. Positive dynamic stability
    b. Neutral dynamic stability
    c. Negative dynamic stability
3. What is controllability as it relates to an aircraft?
4. What is maneuverability at it relates to an aircraft?
5. Propeller-driven aircraft (primarily single engine prop aircraft) have a 'left turning tendency' particularly at take-off or with high power, low speed maneuvers. What forces cause the left-turning tendency?
6. What are the principle means of providing stability around the
    a. Pitch (lateral) axis?
    b. Roll (longitudinal) axis?
    c. Yaw (vertical) axis?
7. What are the advantages and disadvantages of –
    a. a center of gravity that is near the forward most limit?
    b. a center of gravity that is near the aft-most limit?
8. Regarding spiral instability:
    a. What are the two stabilizing forces that play a role in an aircraft having spiral instability and what are their relative strengths (on a "weak to strong" scale) compared to the range of strengths for any stabilizing characteristic on any aircraft?
    b. Why are some aircraft designed to have at least some degree of spiral instability? Hint: What tendency towards instability would you get if the relative strengths of the two forces that contribute to spiral instability were reversed?
9. What are Phugoid oscillations?
10. What (in general terms) is Aircraft-Pilot Coupling?