

1. Define the term "load factor" in aviation.
2. Describe what a glide hodograph is and its significance in aviation.
3. Name the various types of stability in airplane.
4. What is the static margin in the context of aircraft longitudinal stability?
5. Write the expression for stability criteria in static longitudinal stability?

6.
 - i.) Explain what is meant by the degree of freedom of a rigid body in space. How does it relate to the static stability of an aircraft?
 - ii.) Differentiate between static stability and dynamic stability in the context of aircraft motion.

Explain the concept of "balanced field length" during take-off estimation. When is it applicable, and how is it determined for an aircraft?

7. State the basic equilibrium equation in aircraft design. How does this equation relate to the stability criterion for an aircraft?

Explain the significance of the stick-fixed neutral point concerning an aircraft's response to power changes. How does it vary with different aircraft configurations?

8. Explain the term "load factor" in the context of pull-up and push-over maneuvers.

Define neutral point and Derive the expression for Stick fixed neutral point.

- 9 Differentiate between "range" and "endurance" in the context of airplane performance.
- 10 Define the term "static margin" in aviation, highlighting its significance in relation to an aircraft's longitudinal stability.
- 11 How are the degrees of freedom of rigid bodies in space related to the concepts of static and dynamic stability in aviation?
- 12 What is meant by the term "airplane tail efficiency," and how does it impact the overall performance and stability of an aircraft?
- 13 Describe tail volume ratio of an airplane.

15 What is the purpose of a V-N diagram in aviation? Explain how it is used to represent the safe operating limits of an airplane.

How does an aircraft's weight and speed influence the limitations on pull-up and push-over maneuvers? Provide an example scenario to illustrate the impact of these factors.

16 i.) Distinguish between static and dynamic stability. Graphically represent a system which is statistically stable but dynamically unstable.
ii.) Explain the need for stability in an airplane and purpose of controls.

Show the criteria for longitudinal static stability. Derive an expression for the wing, tail and fuselage contribution to the pitching moment of an aircraft about center of gravity.

17 Discuss the concept of "landing ground roll" and its importance in landing estimation. How does it differ from the total landing distance, and what factors affect it?

18 Define neutral point and Derive the expression for Stick free neutral point.