

Advanced Aerospace Engineering Principles

Aerospace Engineering · Practice Test · 8 Questions

1. In subsonic flight, what does the Kutta condition mathematically dictate at the trailing edge of an airfoil?

- A) The flow velocity must approach zero
- B) The flow must leave the trailing edge smoothly such that velocity is finite
- C) The pressure must equal the stagnation pressure
- D) The boundary layer must be fully turbulent

2. Which structural phenomenon occurs when an aircraft wing undergoes oscillations due to the interaction of aerodynamic, elastic, and inertial forces?

- A) Creep
- B) Flutter
- C) Buckling
- D) Fatigue

3. For a rocket to achieve escape velocity from Earth, its kinetic energy plus its gravitational potential energy must be equal to what value?

- A) The thrust-to-weight ratio
- B) Zero
- C) The specific impulse
- D) The orbital inclination

4. Which dimensionless parameter represents the ratio of inertial forces to viscous forces in fluid flow?

- A) Mach number
- B) Prandtl number
- C) Reynolds number
- D) Froude number

5. In jet engine thermodynamics, what is the primary function of the diffuser section located before the combustion chamber?

- A) To increase the static pressure by slowing the incoming airflow
- B) To atomize the fuel for ignition
- C) To accelerate exhaust gases to supersonic speeds
- D) To cool the turbine blades

6. According to the thin airfoil theory, what is the theoretical slope of the lift coefficient versus angle of attack curve in per radian?

- A) ?
- B) 2?
- C) 4?
- D) 1

7. Which specific impulse (Isp) unit is used to measure the efficiency of rocket propellant, and what is its standard SI unit?

- A) Newtons (N)
- B) Seconds (s)
- C) Joules (J)
- D) Meters per second squared (m/s^2)

8. What is the 'Coriolis effect' in the context of ballistics and long-range aerospace flight?

- A) The bending of a path due to the rotation of the reference frame
- B) The reduction of drag at high altitudes
- C) The heating of the leading edge during re-entry
- D) The separation of airflow on a curved surface