Aviation History: Scientific Milestones

Aviation History · Answer Key · 25 Questions

1. Which force in aerodynamics acts perpendicular to the direction of motion and is generated primarily by the pressure differential across an airfoil?

A) Drag
B) Thrust
C) Lift
D) Weight

2. What is the primary scientific function of a wing's dihedral angle?

A) Increasing structural stiffness
B) Enhancing lateral stability
C) Reducing wave drag
D) Improving fuel efficiency

3. Who formulated the 'Law of Circulation' that explains the relationship between lift and circulation around an airfoil?

A) Daniel Bernoulli
B) Ludwig Prandtl
C) Frederick Lanchester
D) Nikolai Zhukovsky

4. In the history of jet propulsion, what was the primary innovation of the Whittle engine compared to reciprocating engines?

A) Use of liquid hydrogen
B) Centrifugal compression
C) Pistonless combustion
D) Solid fuel thrust

5. What phenomenon occurs when a fluid's velocity increases and its static pressure decreases, a principle vital to wing lift?

A) Venturi effect
B) Bernoulli's principle
C) Reynolds number impact
D) Boundary layer separation

6. The 'Sound Barrier' is officially breached when an aircraft exceeds what specific condition?

A) The speed of light
B) The speed of sound in the surrounding medium
C) Mach 2.0 exactly
D) The Kármán line

7. What is the purpose of 'winglets' on modern commercial aircraft?

A) To increase maximum takeoff weight
B) To reduce induced drag caused by wingtip vortices
C) To improve pilot visibility
D) To dampen structural vibrations

8. Which engine component is responsible for increasing the pressure of intake air before it reaches the combustion chamber in a turbojet?

A) Exhaust nozzle
B) Compressor
C) Turbine
D) Afterburner

9. The 1903 Wright Flyer utilized what method to achieve lateral control (roll)?

A) Ailerons
B) Wing warping
C) Differential thrust
D) Tail rudders

10. What does the 'Reynolds Number' quantify in aerodynamics?

A) The ratio of inertial forces to viscous forces
B) The maximum velocity of an aircraft
C) The density of air at high altitudes
D) The lift-to-drag ratio

11. What is the term for the angle between the chord line of the wing and the oncoming relative wind?

A) Angle of bank
B) Angle of attack
C) Angle of incidence
D) Pitch angle

12. Which aircraft was the first to fly non-stop across the Atlantic Ocean in 1919?

A) Spirit of St. Louis
B) Vickers Vimy
C) Douglas World Cruiser
D) Curtiss NC-4

13. What is the function of an afterburner in a turbojet engine?

A) To cool the intake air
B) To inject fuel into the exhaust stream for extra thrust
C) To replace the compressor
D) To reverse the airflow for braking

14. What type of wing configuration helps delay the onset of wave drag at transonic speeds?

A) Swept wing
B) Rectangular wing
C) Elliptical wing
D) Constant chord wing

15. Which material, extensively used in modern aerospace, is valued for its high strength-to-weight ratio?

A) Cast iron
B) Carbon fiber reinforced polymer
C) Hardwood
D) Lead alloy

16. What is the primary cause of 'stall' in a fixed-wing aircraft?

A) Engine failure
B) Excessive speed
C) Flow separation over the wing
D) Loss of electrical power

17. Who is credited with the first powered flight of a heavier-than-air aircraft?

A) Samuel Langley
B) The Wright Brothers
C) Alberto Santos-Dumont
D) Louis Blériot

18. What measurement unit describes the ratio of the speed of an object to the speed of sound?

A) Knot
B) Mach number
C) Froude number
D) Reynolds number

19. What is the main role of the 'empennage' on an aircraft?

A) Providing fuel storage
B) Increasing lift
C) Providing stability and control
D) Protecting the engine

20. Which law of motion explains how a jet engine produces thrust?

A) Newton's First Law
B) Newton's Second Law
C) Newton's Third Law
D) The Law of Universal Gravitation

21. What is the 'Kármán line' in aviation and space science?

A) The speed of sound
B) The boundary between Earth's atmosphere and space
C) The maximum altitude of a propeller plane
D) The point where drag equals lift

22. What was the first mass-produced jet-powered fighter aircraft to see operational service?

A) Gloster Meteor
B) Messerschmitt Me 262
C) Lockheed P-80 Shooting Star
D) Heinkel He 178

23. What is 'parasite drag' in aircraft design?

A) Drag caused by lift generation
B) Drag caused by friction and form
C) Drag caused by shockwaves
D) Drag caused by wingtip vortices

24. In propeller design, what does 'pitch' refer to?

A) The angle of the blades

B) The distance a propeller moves forward in one revolution

C) The weight of the blades

D) The rotational speed of the engine

25. Which flight instrument measures the altitude of an aircraft based on atmospheric pressure?

A) Airspeed indicator

B) Altimeter

C) Turn coordinator

D) Variometer