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DEPARTMENT OF AEROSPACE ENGINEERING

Faculty Name	:	**Mr. N.Venkatesh, AP/ Aero**	Academic Year	:	**2024-2025 (Even)**
Year & Branch	:	**I Aero**	Semester	:	**II**
Course	:	**23AST101 Fundamentals of Aerospace Engineering**			

TWO MARKS
UNIT-1 HISTORY OF FLIGHTS

1. What is an aircraft?

An aircraft is any vehicle capable of flight through the atmosphere. It includes airplanes, helicopters, gliders, balloons, airships, and ornithopters.

2. What was the first known human attempt at flight?

The first known human attempts at flight were inspired by birds, leading to the creation of ornithopters—machines with flapping wings, which were conceptually designed by Leonardo da Vinci in the 15th century.

3. What is a hot air balloon and who invented it?

A hot air balloon is an aircraft that flies using buoyancy created by heating air inside a large envelope. It was invented by the Montgolfier brothers in 1783.

4. How does a hot air balloon generate lift?

A hot air balloon generates lift by heating the air inside its envelope. Hot air is less dense than the cooler air outside, causing the balloon to rise due to buoyant force.

5. What is an ornithopter?

An ornithopter is a flying machine designed to achieve flight by flapping its wings like a bird or an insect. Although many designs were attempted, none were successful in practical human flight.

6. What was the first successful powered airplane, and who built it?

The first successful powered airplane was the **Wright Flyer**, built by **Orville and Wilbur Wright**. It made its first flight on **December 17, 1903**, in Kitty Hawk, North Carolina.

7. What is the difference between a biplane and a monoplane?

- A **biplane** has two wings stacked one above the other, providing more lift but causing higher drag.
- A **monoplane** has a single main wing, reducing drag and allowing for higher speeds.

8. What are the advantages of a monoplane over a biplane?

Monoplanes have **lower aerodynamic drag**, making them faster and more fuel-efficient. They also have a **simpler structure**, making them easier to manufacture and maintain.

9. What role did biplanes play in early aviation?

Biplanes were widely used in early aviation due to their **strong structures** and **high lift capacity**. They were common in World War I for reconnaissance and combat.

10. What was the major breakthrough in aircraft materials after World War I?

The transition from **wood and fabric** to **aluminum alloys** in aircraft construction significantly improved **strength, durability, and performance**.

11. What is the significance of streamlining in aerodynamics?

Streamlining reduces **aerodynamic drag**, allowing an aircraft to fly faster and more efficiently by minimizing resistance from the air.

12. What is the role of the airfoil in an aircraft wing?

An **airfoil** is the cross-sectional shape of a wing that helps generate **lift** by creating a pressure difference between the upper and lower surfaces.

13. How did jet propulsion change aviation?

Jet propulsion, introduced in the 1940s, enabled aircraft to fly at **higher speeds, greater altitudes, and over longer distances**, revolutionizing both military and commercial aviation.

14. What are the main differences between piston engines and jet engines?

- **Piston engines** (used in early aircraft) rely on reciprocating motion and propellers to generate thrust.
- **Jet engines** (modern aircraft) use continuous combustion and high-speed exhaust gases to produce thrust.

15. What is composite material, and why is it used in modern aircraft?

Composite materials, such as **carbon fiber-reinforced polymers**, are used because they are **lightweight, strong, and corrosion-resistant**, improving fuel efficiency and structural durability.

16. How did the development of swept wings improve aircraft performance?

Swept wings reduce **shockwave formation and drag at high speeds**, enabling aircraft to fly **faster than sound** (supersonic speeds).

17. What is the significance of the Boeing 707 in aviation history?

The **Boeing 707**, introduced in 1958, was the first **commercial jetliner**, revolutionizing air travel by making long-distance flights faster and more accessible.

18. What is the purpose of the fly-by-wire system in modern aircraft?

The **fly-by-wire system** replaces mechanical controls with electronic signals, improving **stability, efficiency, and pilot control** in modern aircraft.

19. How did the Concorde achieve supersonic flight?

The Concorde used a **delta-wing design**, **powerful turbojet engines**, and a **slender fuselage** to reduce drag and enable speeds over **Mach 2**.

20. What are the main benefits of using turbofan engines in commercial aircraft?

Turbofan engines provide **higher fuel efficiency, reduced noise, and greater thrust** compared to older turbojet engines, making them ideal for modern commercial aviation.