SNS COLLEGE OF TECHNOLOGY

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COIMBATORE-641 035, TAMIL NADU

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-5 AIRCRAFT INSTRUMENTS

Study of Atmosphere

1. **What are the primary layers of the atmosphere?**
   - The primary layers are Troposphere, Stratosphere, Mesosphere, Thermosphere, and Exosphere.
2. **What is the standard lapse rate in the troposphere?**
   - The standard lapse rate is 2°C per 1000 feet.

Flight Instruments

3. **Name any four basic flight instruments.**
   - Altimeter, Airspeed Indicator, Attitude Indicator, and Heading Indicator.
4. **What is the function of the artificial horizon?**
   - It provides the aircraft's orientation relative to the Earth's horizon.

Navigation Instruments

5. **What is the purpose of a magnetic compass in an aircraft?**
   - It indicates the aircraft's heading relative to the Earth's magnetic field.
6. **What is an Inertial Navigation System (INS)?**
   - INS is a navigation system that uses gyroscopes and accelerometers to track position without external references.

Gyroscopes & Accelerometers

7. **What is gyroscopic rigidity?**
   - It is the property of a spinning gyroscope to maintain its orientation in space.
8. **What does an accelerometer measure?**
   - It measures linear acceleration along different axes.

Air Speed Indicators

9. **What is indicated airspeed (IAS)?**

- IAS is the speed shown on the airspeed indicator, not corrected for altitude or pressure variations.

10. **What is the purpose of the Pitot tube in an airspeed indicator?**

- It measures the dynamic pressure of the airflow to determine airspeed.

TAS - True Airspeed

11. **What is True Airspeed (TAS)?**

- TAS is the actual speed of the aircraft relative to the air mass, corrected for altitude and temperature.

12. **How does altitude affect TAS?**

- TAS increases with altitude because air density decreases.

EAS - Equivalent Airspeed

13. **What is Equivalent Airspeed (EAS)?**

- EAS is the calibrated airspeed corrected for compressibility effects at high speeds.

14. **Why is EAS important for high-speed aircraft?**

- It helps determine aerodynamic forces acting on the aircraft.

Mach Meters

15. **What does a Mach meter measure?**

- It measures the ratio of aircraft speed to the speed of sound (Mach number).

16. **What is Mach 1?**

- Mach 1 is the speed of sound in a given atmospheric condition.

Altimeters - Principles and Operation

17. **What is the principle of operation of an altimeter?**

- It operates based on the measurement of atmospheric pressure.

18. **What are the types of altimeters used in aircraft?**

- Pressure altimeter, Radio altimeter, and Radar altimeter.

19. **Why does an altimeter need periodic calibration?**

- To correct errors due to pressure changes and instrument drift.

20. **What is the standard atmospheric pressure at sea level?**

- 1013.25 hPa or 29.92 inches of mercury (inHg).