Level Three Aviation Combined Subjects Study Guide

PO 331 Describe Principles of Flight

M331.01 – DESCRIBE AIRCRAFT STABILITY

Stability

Stability – The tendency of an aircraft in flight to remain in straight, level, upright flight and to return to this attitude, if displaced, without corrective action by the pilot

Static Stability – **Initial** tendency of an aircraft to return to its original attitude

Dynamic Stability – **Overall** tendency of an aircraft to return to its original attitude

Type of Stability	***Axis***	***Factors***
Longitudinal Stability	Lateral Axis	• Horizontal Stabilizer • Center of Gravity
Lateral Stability	Longitudinal Axis	• Dihedral • Sweepback • Keel Effect
Directional Stability	Vertical Axis	• Fin

PO 336 Identify Meteorological Conditions

M336.01 – DESCRIBE PROPERTIES OF THE ATMOSPHERE

Composition of the Atmosphere

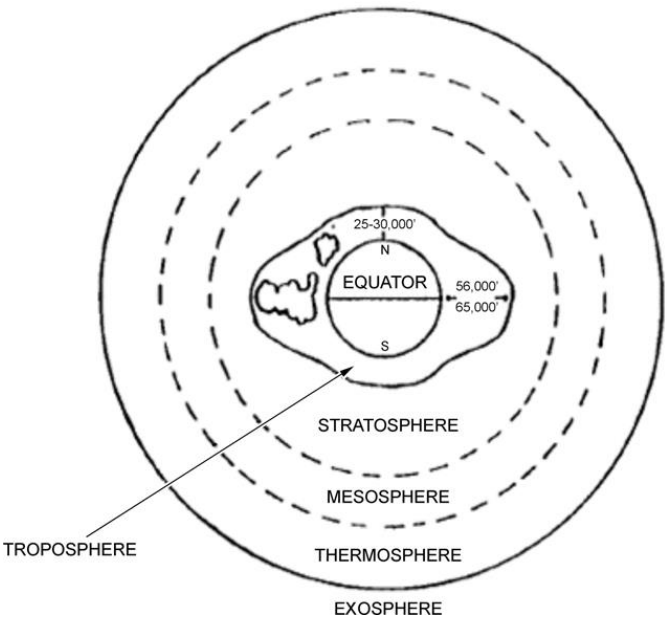
Nitrogen – 78%
Oxygen – 21%
Other – 1%

Divisions of the Atmosphere

Troposphere
Stratosphere
Mesosphere
Thermosphere
Exosphere

*'Where **T**he **S**ky **M**eets **T**he **E**arth'*

**** The **OZONE** is in the Stratosphere*



ICAO Standard for North America

- The air is perfectly dry gas,
- A mean sea level pressure of 29.92" Hg,
- A mean sea level temperature on 15° Celsius, and
- The rate at which temp decreases with altitude is 1.98° Celsius per 1000ft

Properties of the Atmosphere

Mobility – Ability of air to move from one place to another

Capacity for Expansion – Capacity for air to expand and cool for various reasons, thus creating clouds

Capacity for Compression – Capacity for air to compress and sink, decreasing the volume and temperature

M336.02 – EXPLAIN THE FORMATION OF CLOUDS

Types of Formation

Cumulus – Cotton or puffy
Stratus – Flat and uniform

Air Stability

Stable Air	***Unstable Air***
• Poor low-level visibility, • Status type cloud, • Steady precipitation, • Steady winds, which can change greatly with height, and • Smooth flying conditions	• Good visibility, • Cumulus type cloud, • Showery precipitation, • Gusty winds, and • Moderate to severe turbulence

Lifting Agents

Convection – Air is heated through contact with the earth. The sun heats the earth and the air in contact warms up, rises and expands.

Orographic Lift – Occurs when sloping terrain forces the air upward

Frontal Lift – When air masses meet, the warmer air is forced upwards.

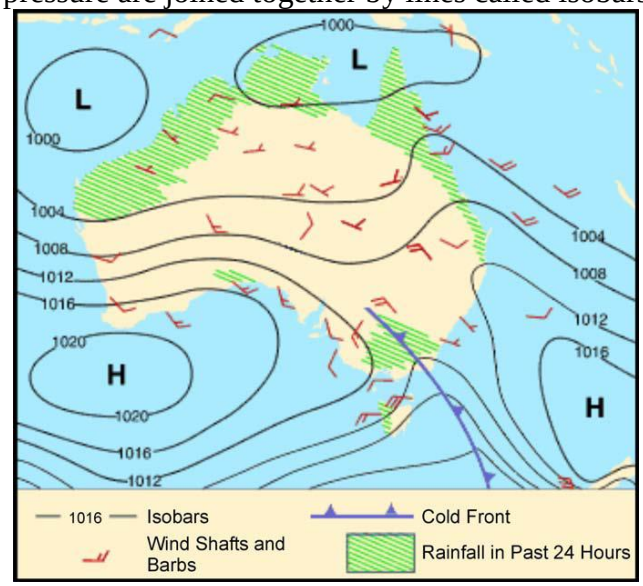
Mechanical Turbulence – Air moving over the ground is affected by terrain and through friction creates eddies.

Convergence – In a low-pressure system, the wind blows towards the centre of the system. The excess air that collects here is forced upwards.

M336.03 – EXPLAIN THE EFFECTS OF AIR PRESSURE ON WEATHER

Pressure Systems

Isobars – Areas of like pressure are joined together by lines called isobars.



Low Pressure Areas - Often called Lows or Cyclones, are areas of relatively lower pressure, with the lowest pressure in the centre.

High Pressure Areas – Often called Highs or Anti-Cyclones, are areas of relatively higher pressure, with the highest pressure in the centre

Wind

Wind – Wind is the horizontal movement of air within the atmosphere.

M 336.04 – EXPLAIN THE EFFECTS OF HUMIDITY AND TEMP ON WEATHER

Humidity

Condensation – Process by which a gas changes into liquid

Sublimation – Process by which gas changes into a solid, without becoming liquid

Dew Point – The temperature to which unsaturated air must be cooled, at a constant pressure, in order to become saturated.

Relative Humidity – The ratio of actual amount of water present in the air compared to amount of water which the same volume of air would hold if it were saturated.