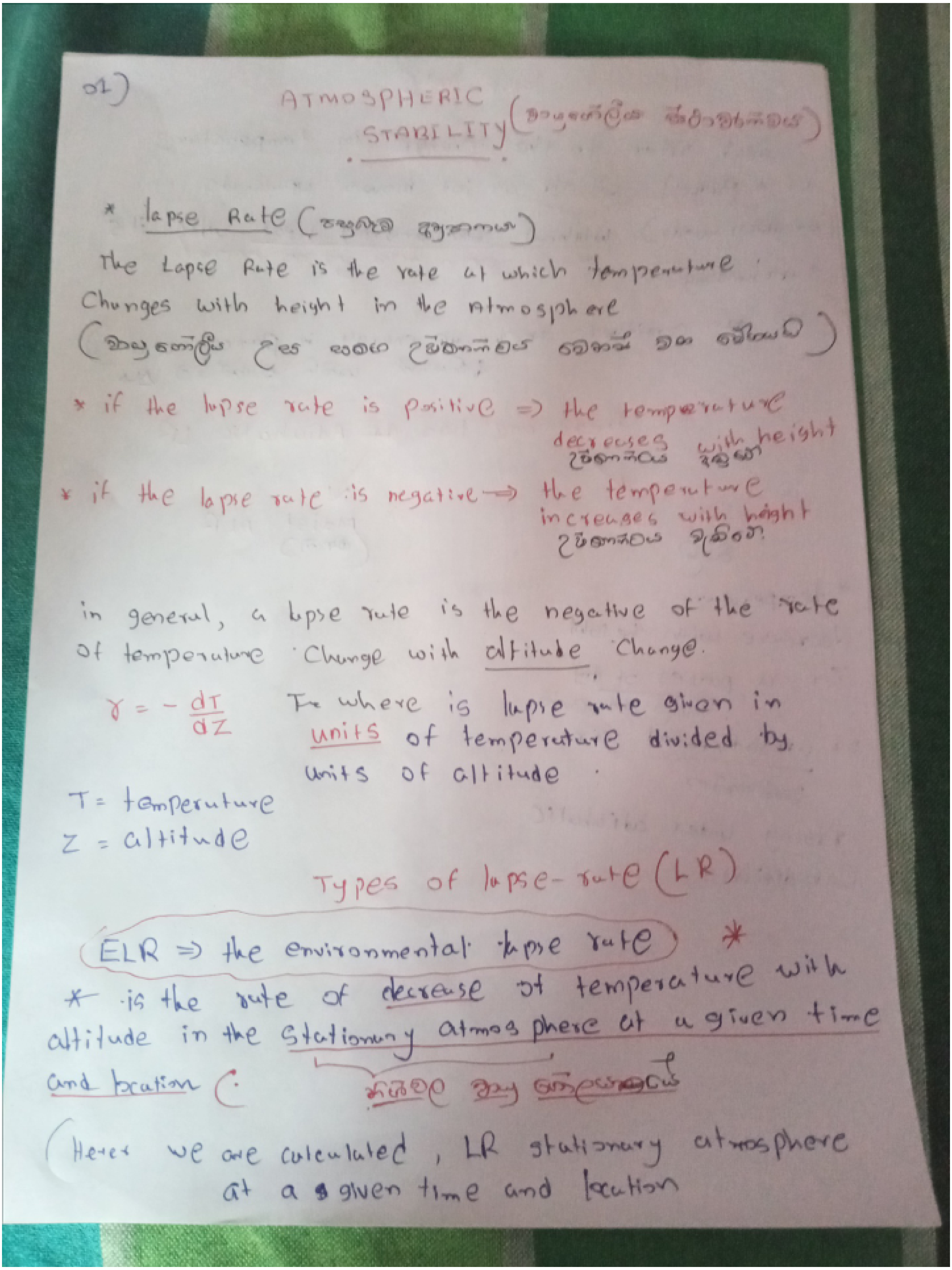
Image



01)

ATMOSPHERIC STABILITY (වායුගෝලීය ස්ථායීතාවය)

* lapse Rate (ක්ෂයවීම ශීඝ්‍රතාවය)

The Lapse Rate is the rate at which temperature changes with height in the atmosphere
(වායුගෝලීය උස සමග උෂ්ණත්වය වෙනස් වන වේගය)

* if the lapse rate is positive => the temperature decreases with height
  උෂ්ණත්වය අඩුවේ
* if the lapse rate is negative → the temperature increases with height
  උෂ්ණත්වය වැඩිවේ

in general, a lapse rate is the negative of the rate of temperature change with altitude change.

$\gamma = -\frac{dT}{dZ}$ where γ is lapse rate given in units of temperature divided by units of altitude.

T = temperature
Z = altitude

Types of lapse-rate (LR)

ELR => the environmental lapse rate *

* is the rate of decrease of temperature with altitude in the stationary atmosphere at a given time and location (:

නිශ්චල වායු ගෝලයේ

(Here we are calculated, LR stationary atmosphere at a given time and location

Adiabatic lapse rate

which refer to the change in temperature of a parcel of air as int moves upwards
වායු පාර්සලයක
(or downwards) without exchanging heat with its surroundings
පරිසරය සමග තාප හුවමාරු නොකර

(we can consider ~~ch~~ change energy in parcel of air)
අභ්‍යන්තර ශක්ති වෙනස් වීම ΔU

there are two ~~ddi~~ Adiabatic LR

Dry ALR
වියළි

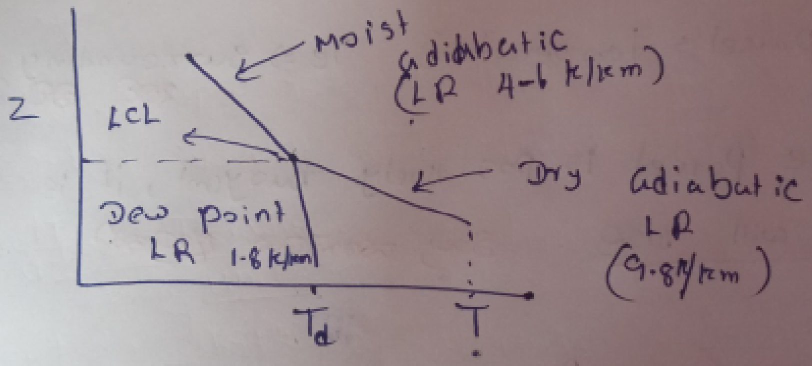
Moist ALR
(තෙත)

* temperature decrease with height for a parcel of dry
වියළි වාතයක
or unsaturated air
අසංතෘප්ත
rising under adiabatic conditions

② (LCL) ⇒ lifting condensation level
එසවීම් ඝනීභවන ඝනීභවනා මට්ටම

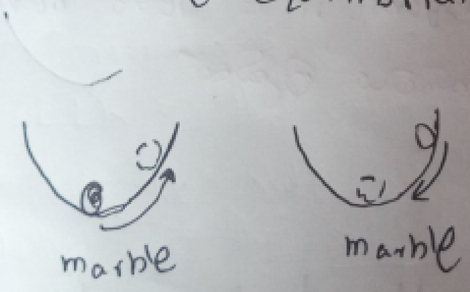
if the air parcel is lifting further beyond the LCL water vapor in the air parcel will begin condensing forming cloud droplets
වායු පාර්සලයක් LCL මට්ටම ඉක්මවන්නේ නම් වායු පාර්සලය තුල ජලවාෂ්ප ඝනීභවනය වේ, වලාකුළු බිංදු සාදයි

< Super Saturation > සුපිරි සන්තෘප්තිය
temperature falls below $\underbrace{\text{dew point}}_{\text{පිනි ලක්ෂ්‍යය (තුෂාරාංකය)}}$



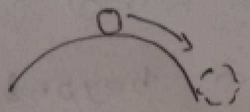
Stability

Stable equilibrium (ස්ථායී සමතුලිත භාවය)



if marble pushed up side of bowl and let go it will return to original position

unstable



not return to original position

* How does this relate to the atmosphere

when the atmosphere is stable, a parcel of air will want to return to its original position after being raised or lowered

වායු ගෝලය අස්ථායී වූ විට

* when the atmosphere is unstable, a parcel will ~~na~~ want to continue on its path away from its original position if pushed upward, downward

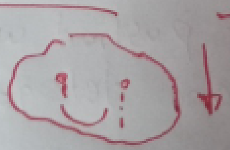
Tp ⇒ parcel's temperature   Te ⇒ surrounding environment
අවට වට පිටාව

$T_p > T_e$ the parcel is positively buoyant, it is less dense and will rise   අඩු, ඝනත්වය ඉහළට

$T_p > P_e$

$T_p < T_e$ the parcel is positively buoyant it is less dense and will ~~x~~ sink

ඝනත්වය වැඩියි



$T_p < T_e$

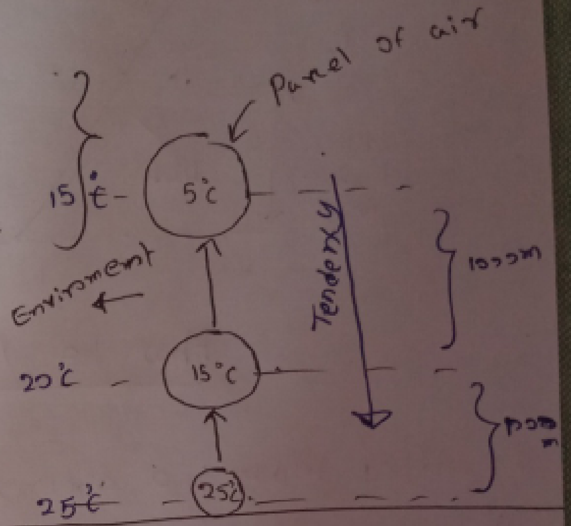
$T_p = T_e$ The parcel is ~~netu~~ neutrally ~~by~~ buoyant it will not rise or sink   මොකුත් නොවේ

⑧ Static Stability

* Enviromental vs adiabutic lapse rates

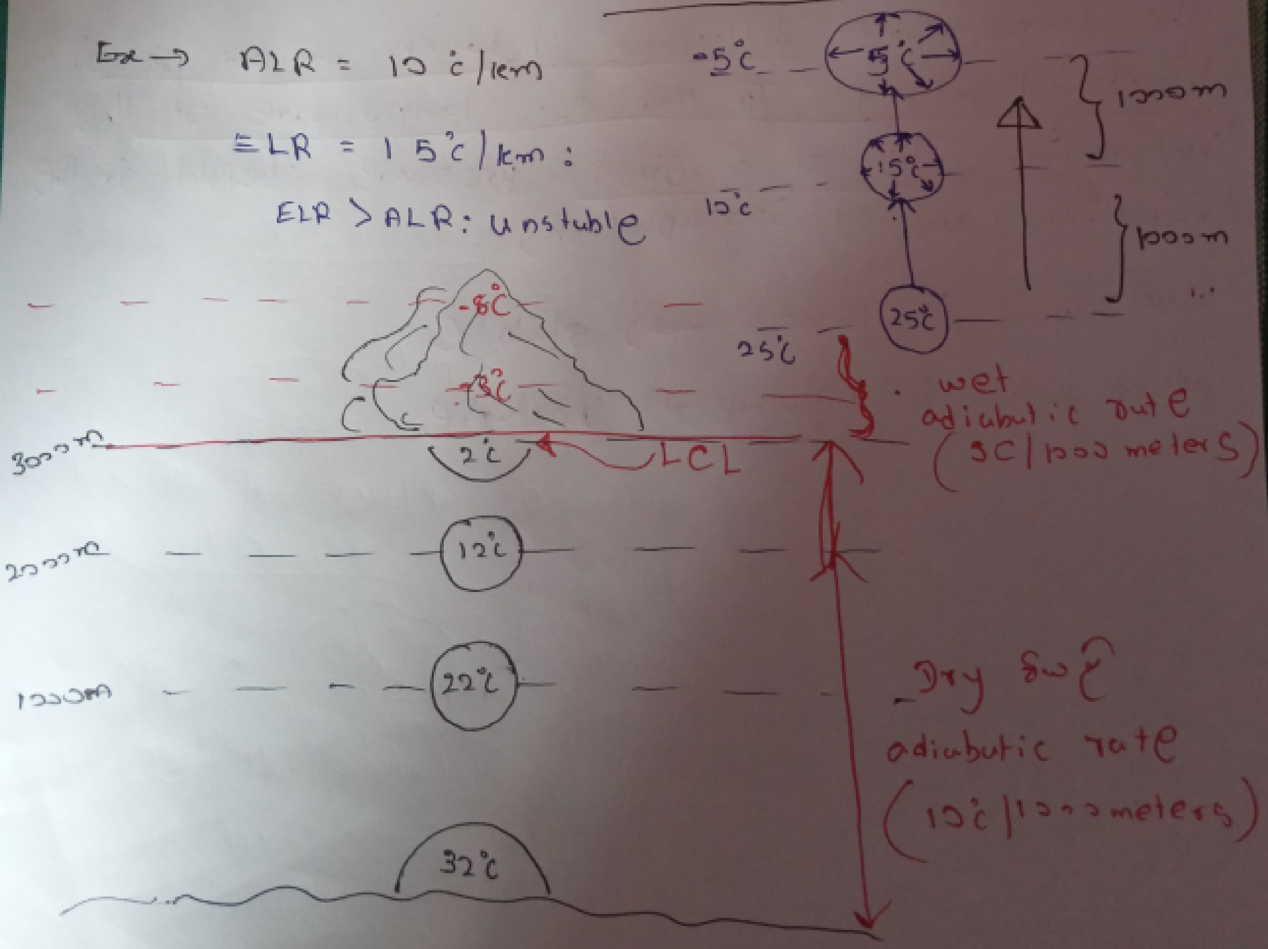
.Rule

* ERL < ALR : stable
* ~~ELR~~ ERL = ALR neutral
* ELR > ALR unstable

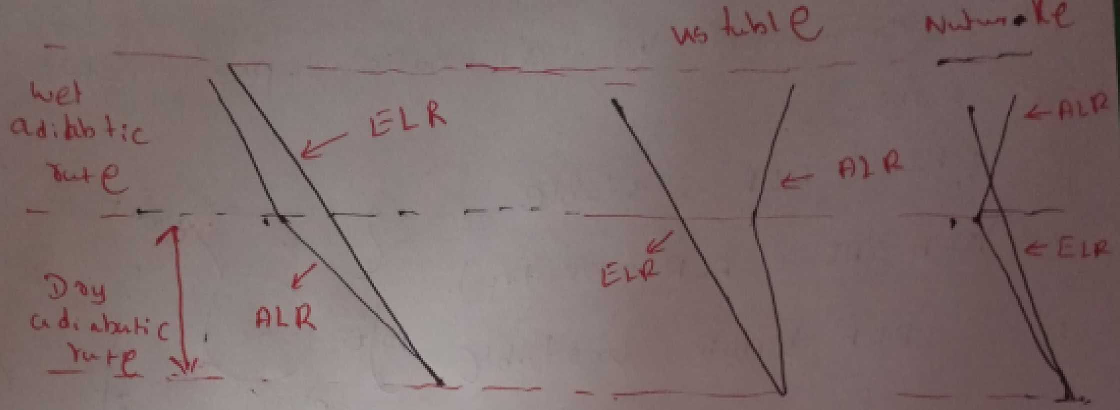


Ex → ALR = 10 °C/km
ELR = 5 °C/km
ELR < ALR : stable

Ex → ALR = 10 °C/km
ELR = 15°C/km :
ELR > ALR: unstable



~~Stabit~~ Stable



How to find stable or ustable

Lifted index: a dimensionless number wich described the temperature difference between an air parcel lifted adiabatically Tp and the temperature of the environment Te at a given pressure height in the troposhere, usually 500 hpa (mb)

when value is positive → stable

when value is negative → unstable