



CIVIL ENGINEERING

Energy And Environment

Hand Notes For GATE, IES & PSUs ,ESE, NEET UG, etc...

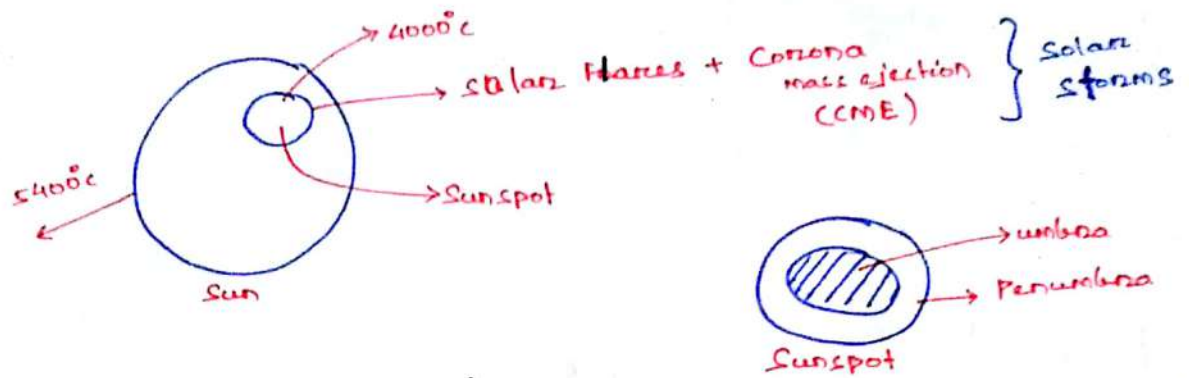
Hand Notes

Page Length : 81

Note : We also providing IIT JEE, Advance, NEET, JEE UG, GATE, IES, PSUs & Competitive Exam Materials [Handnotes, Shortnotes & Books], All Reports [Seminar Reports & PPT]

Goto : www.martcost.com

Global warming & climate change



Sunspot cycle / solar cycle

- It is 11 yrs measure cyclic phenomena under which magnetic flux increases in some of the regions at solar surface which generates very strong magnetic field.
 (actual 22 yrs - 11 yrs major change, 11 yrs minor change)
- Due to high magnetic field, solar flares generated & corona wave electrⁿ takes place which cause "solar storms".
 [It also affects our communication signals]
- Due to this activity, temp. in this area becomes relatively lower than surrounding area & under visible light, this region appears - darker known as SUNSPOT.
- Due to solar sunspots formⁿ, solar radiatⁿ reaches up to earth surface varies & it also affects our global climate.

* Solar Parker Probe - NASA 2018

Solar insolation

It is the amount of solar radiatⁿ that reaches upto earth's surface & it is measured in terms of amount of solar radiatⁿ received per square cm per minute at the earth surface.

- Higher the insolation, more will be the heating

Albedo → Reflectivity of surface

$$(\text{Ice}) \text{ albedo} = \frac{0.6}{(0.5-0.7)}$$

$$0 < \text{Albedo} < 1$$

→ It measures the reflectivity of any surface.

→ It is unitless quantity.

→ It measures on a scale from 0 to 1.

Perfect black surface

Perfect white surface

* Soot - unburnt carbon

Black carbon

↳ In more carbonic fuel value fuel

→ absorbs more heat

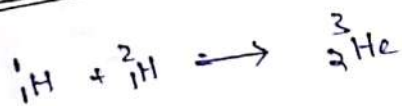
Brown Carbon

↳ in less carbonic fuel value fuel

→ absorbs less heat

↓
as solids remain
15-20 days when mix
with glaciers along
with air

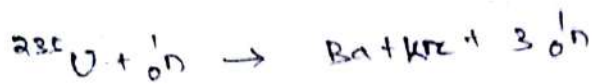
Nuclear Fusion



Ex: Solar reaction, Hydrogen bomb

→ liberates more energy but difficult to control

Nuclear Fission



Ex: Nuclear reactors - Controlled chain reaction.
Nuclear Bomb - Uncontrolled chain reaction.

U-235 - highly fissionable material.
→ Hence better fuel.

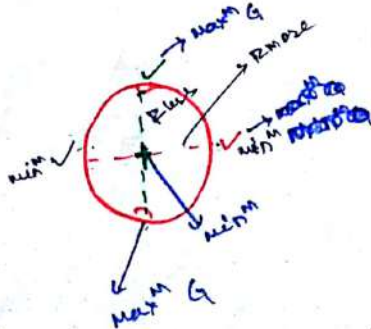
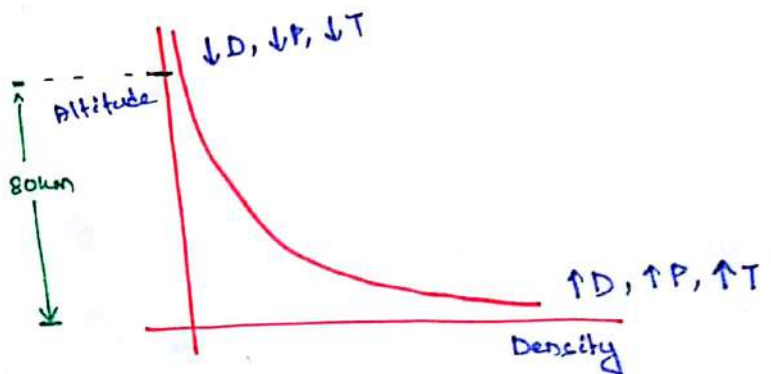
ITER [International Thermonuclear Experiment Reactor]

- It is an international project started in 2006 to develop fusion based reactors.
- Location: France
- India is also member.

In 2018, NASA launched SOLAR PARKER PROBE MISSION to know more about solar surface & activities.

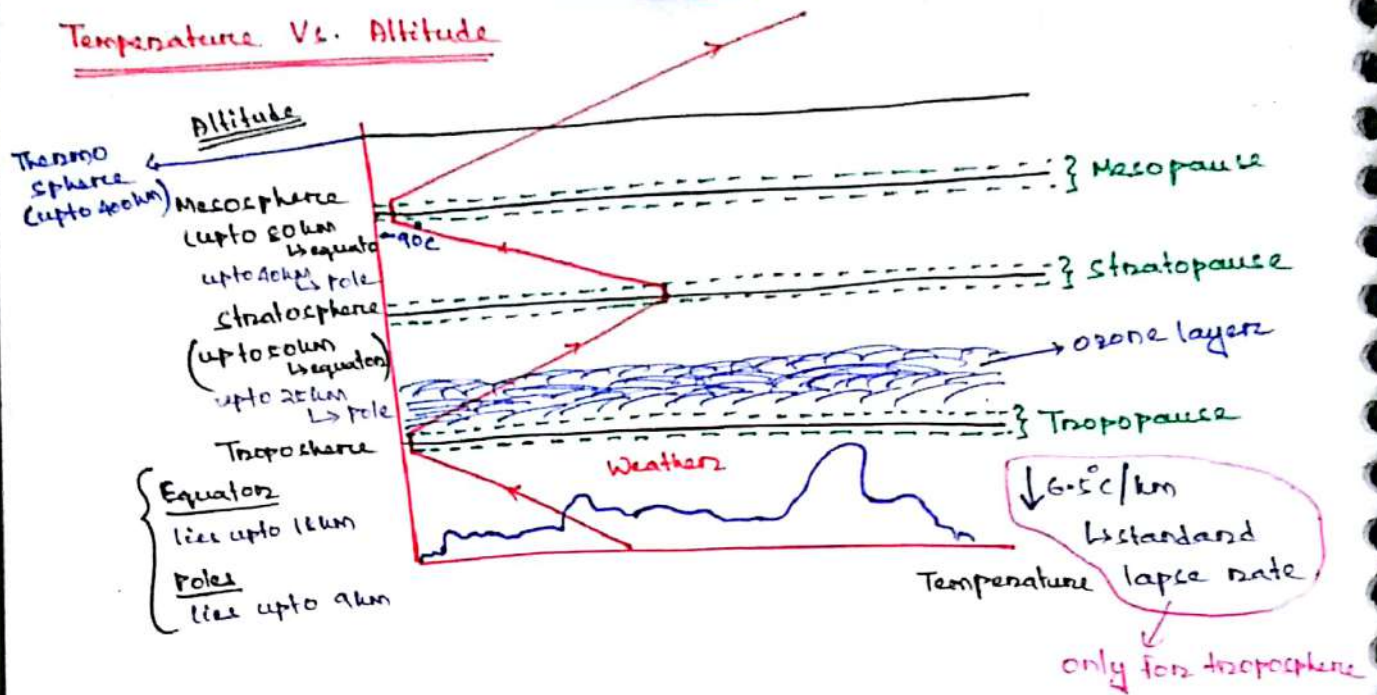
Atmosphere

| | |
|---------------|----------|
| N_2 | 78% |
| O_2 | 21% |
| Argon | 0.9% |
| CO_2 | 0.03% |
| Neon | 0.018% |
| Helium | 0.00532% |



* Gravity is the binding force due to which atmosphere exists & it is nonuniform.
(Max^m at the poles & Min^m at the equator)
because $G \propto \frac{1}{\text{radius of earth}}$

Temperature Vs. Altitude



↓

Radio waves
Micro waves
Infra red
Visible light
UV light
X rays
γ-rays

$$E = h\nu$$

$$E = hc/\lambda$$

$$E \propto \frac{1}{\lambda}$$

* Ionosphere under thermosphere
* Exosphere - up to 600 km

* Fighter jet - stratosphere
↳ speed high
Domestic jet → lowest tropopause boundary
↳ speed low
↳ 30-35 K Feet

About Ozone (O₃)

O₂ is an triatomic oxygen molecule which forms

Ozone layer.

- Ozone is light blue colour, strong smell & toxic gas.
- Ozone is thermodynamically unstable gas & it is very rare in nature. (around 3 molecules out of every 10 million air molecules)