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STUDY MASTER OFFICIAL NOTES

EASY TO UNDERSTAND
ACCORDING TO LATEST SYLLABUS & PATTERN

MUST Read for Sure Success.

NOTES AVAILABLE IN HINDI & ENGLISH MEDIUM

"SLOW PROGRESS IS BETTER THAN NO PROGRESS"

STAY POSITIVE & DON'T GIVE UP.
GOOD LUCK

INDEX

CH.1 ORIGIN OF EARTH

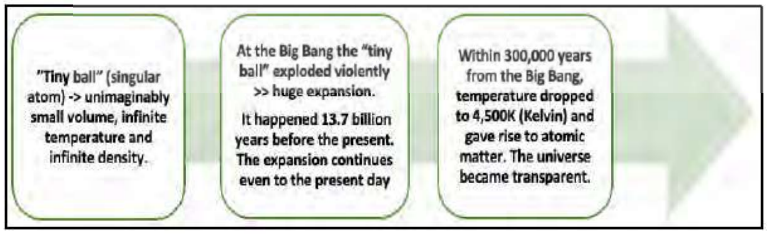
EARLY THEORIES

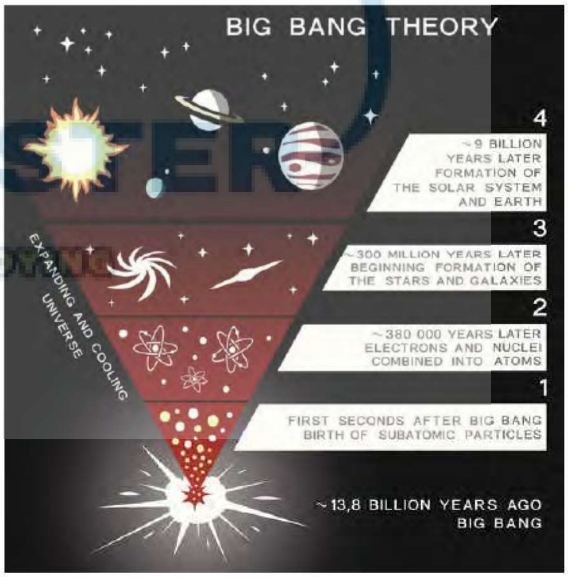
THEORY	BY	DETAILS
Nebular Hypothesis	• By German philosopher Immanuel Kant. • Mathematician Laplace revised it in 1796.	• The hypothesis considered that the planets were formed out of a cloud of material associated with a youthful sun, which was slowly rotating.
	• Again in 1950 somewhat revised by Otto Schmidt in Russia and Carl Weizascar in Germany.	• They considered that the sun was surrounded by solar nebula containing mostly the hydrogen and helium along with what may be termed as dust. • The friction and collision of particles led to formation of a disk-shaped cloud and the planets were formed through the process of accretion.
Planetesimal hypothesis	• 1900, Chamberlain and Moulton • Supported by- Sir James Jeans and later Sir Harold Jeffrey	• Considered that a wandering star approached the sun. • As a result, a cigar-shaped extension of material was separated from the solar surface. • As the passing star moved away, the material separated from the solar surface continued to revolve around the sun and it slowly condensed into planets.

MODERN THEORIES:

BIG BANG THEORY:

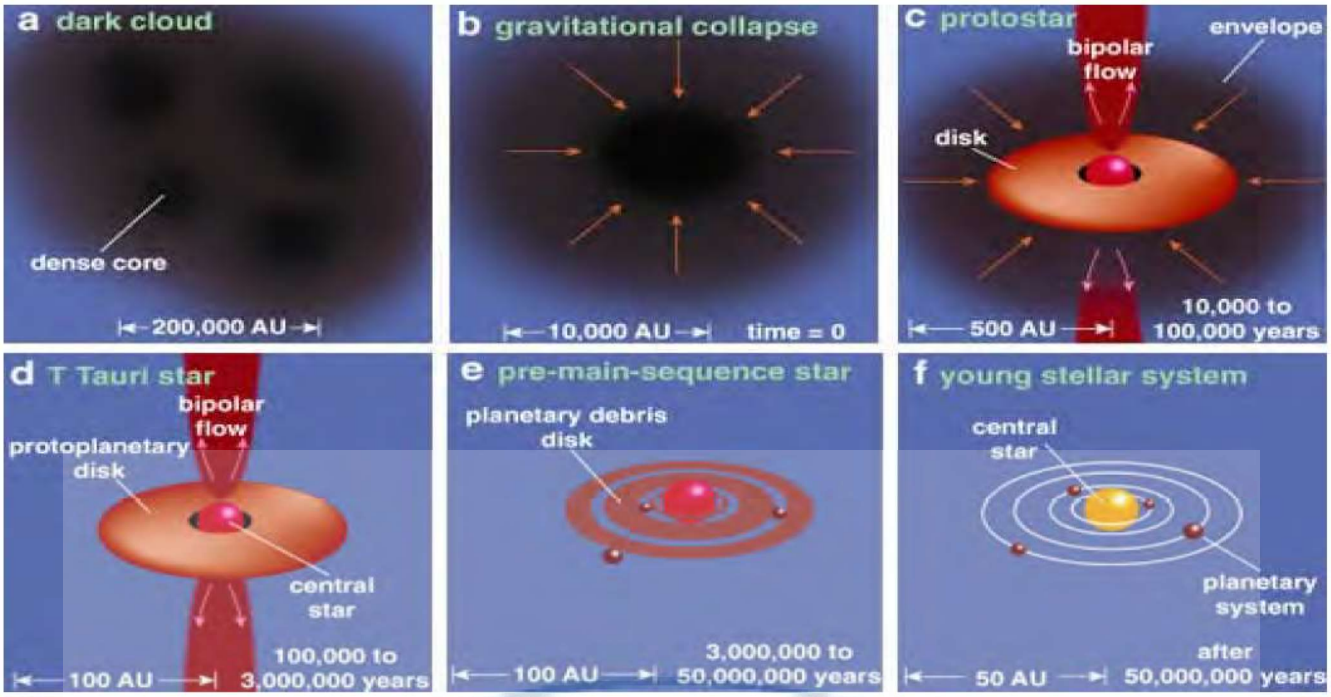
- Also called **Expanding Universe Hypothesis.**
- This theory was propounded by **Georges Lemaître** in late 1920s.
- **Edwin Hubble→** 1920, provided evidence that **the universe is expanding.**
- The expansion of universe means increase in space between the galaxies.
- As time passes, galaxies move further and further apart. The Big Bang Theory considers the following stages in the development of the universe:





STAR FORMATION:

- The distribution of matter and energy was not even in the early universe. These initial density differences in gravitational forces caused the matter to get drawn together.
- These formed the bases for development of galaxies. A galaxy contains a large number of stars.
- A galaxy starts to form by accumulation of hydrogen gas in the form of a very large cloud called **nebula.**
- Eventually, growing nebula develops localized clumps of gas.
- These clumps continue to grow into even denser gaseous bodies, giving rise to formation of stars.

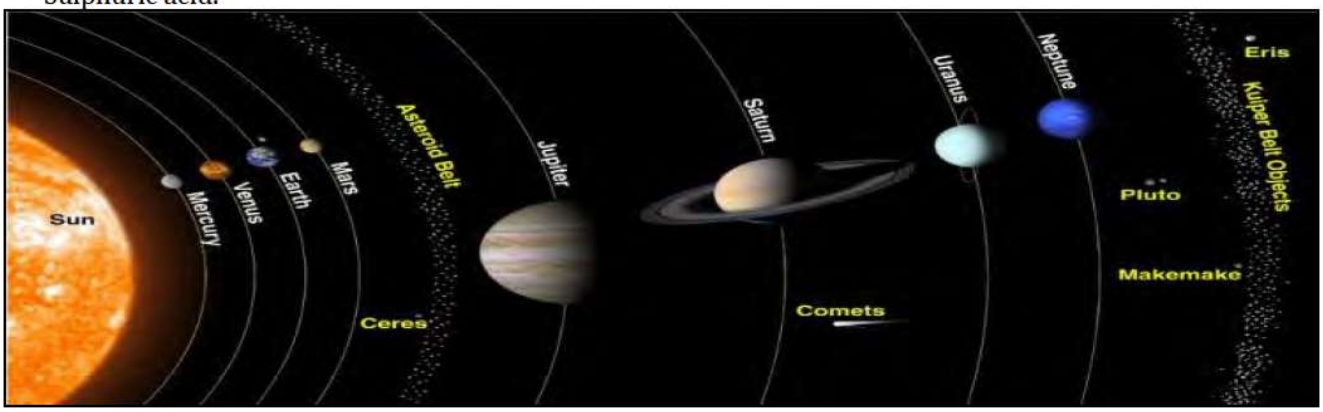


FORMATION OF PLANETS

- The stars are localized lumps of gas within a nebula. The gravitational force within the lumps leads to the formation of a core to the gas cloud and a huge rotating disc of gas and dust develops around the gas core.
- **In the next stage**, the gas cloud starts getting condensed and the matter around the core develops into small rounded objects. These small-rounded objects by the process of cohesion develop into what is called planetesimals. Larger bodies start forming by collision, and gravitational attraction causes the material to stick together. Planetesimals are a large number of smaller bodies.
- **In the final stage**, these large number of small planetesimals accrete to form a fewer large bodies in the form of planets.

OUR SOLAR SYSTEM

- Our solar system consists of the **sun (the star), 8 planets,** 63 moons, millions of smaller bodies like asteroids and comets and huge quantity of dust-grains and gases.
- The **Sun is the central star** of our solar system. There are eight planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (**M**y **V**ery **E**fficient **M**other **J**ust **S**erved **U**s **N**uts!!)
- Mercury is the smallest and the nearest planet to the Sun.
- **Venus** is considered as **'Earth's-twin'** because its size and shape are very much similar to that of the earth. It is probably the hottest planet because its atmosphere contains 90-95% of carbon dioxide with clouds of Sulphuric acid.



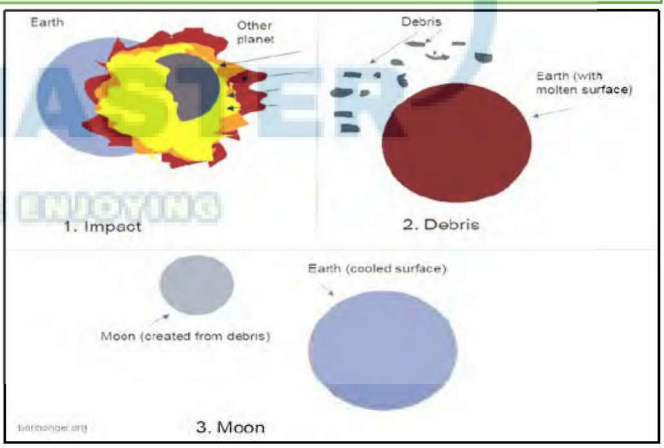
- **Jupiter is the Largest planet** of the solar system. Its atmosphere contains hydrogen, helium, methane and ammonia.
- The tilt of rotational axis of **Venus** and **Uranus** is so great that these planets actually **rotate in a direction that is opposite to the other planets.**
- **Pluto** is a **dwarf planet.**

These planets are divided into:

1. **Inner or Terrestrial planets** which have higher densities and a solid rocky surface. These are Mercury, Venus, Earth and Mars. The terrestrial planets were formed in the close vicinity of the Sun where it was too warm for gases on the surface to condense to solid particles. The intense solar wind near the sun blew off lots of these gases and dust from the surface of the terrestrial planets. That's why the terrestrial planets have a rocky surface.
2. **Outer or Jovian planets** which have lower densities. These are Jupiter, Saturn, Uranus and Neptune. The solar winds were not all that intense to cause similar removal of gases from the Jovian planets. That's why the Jovian planets have gaseous surface.

PARAMETERS	TERRESTRIAL PLANETS	JOVIAN PLANETS
Location	Formed in closed vicinity of parent star → here too warm for gases to condense to solid particles	At distant location
Effect of Solar Winds	It blew off lots of gas and dust from the terrestrial planets. Thus, have rocky surface.	The solar winds were not all that intense to cause similar removal of gases from the Jovian planets.
Size	Smaller → low gravity could not hold escaping gas	Bigger → thick atmosphere
Density	Higher	Lower

THE MOON



- The moon is the **only natural satellite of the earth.**
- Its diameter is only one-quarter that of the earth and it is about 3,84,400 km away from us.
- The **moon is tidally locked to the earth**, meaning that the moon revolves around the earth in about 27 days which is the same time it takes to complete one rotation.
- As a result of tidal locking, **only one side of the moon is visible to us on the earth.**
- Generally it is believed that the formation of moon, as a satellite of the earth, is an **outcome of 'giant impact' or what is described as "the big splat".**
- A body of the size of one to three times that of mars → collided into the earth sometime shortly after the earth was formed → It blasted a large part of the earth into space → This portion of blasted material then continued to orbit the earth → Eventually formed into the present moon **about 4.44 billion years ago.**

Tidal Locking:

- Tidal locking is the name given to the situation when an object's orbital period matches its rotational period.
- The Moon is tidally locked to the Earth, which means that it always shows one face to our planet. Tidal locking is when a body in space orbits another body in a way that the body's year and day are equal in length.
- This means that the body spins around its own axis once for each time it orbits around another, specific body in space.
- By having equal years and days, this orbiting body shows the same side of its face to those looking at it from the other body, or the body that being rotated around.

- We see the same side of the moon, never getting a glimpse of its other side from Earth. This is because the moon is tidally locked to the Earth.
- The moon orbits around Earth every 28 days, and the moon rotates completely around its axis in 28 days.

IMPORTANT TERMINOLOGIES

Asteroid	A small rocky body that orbits the Sun. Most asteroids in our solar system are found in the main asteroid belt, a region between Mars and Jupiter. But they can also hang out in other locations around the solar system. For example, some asteroids orbit the Sun in a path that takes them near Earth.
Comets	Comets orbit the Sun, like asteroids. But comets are made of ice and dust—not rock. Comets usually originate in the **Kuiper belt** which lies beyond the orbit of Neptune.
Meteoroids	Sometimes one asteroid can smash into another. This can cause small pieces of the asteroid to break off. Those pieces are called meteoroids. Meteoroids can also come from comets.
Meteors	If a meteoroid comes close enough to Earth and enters Earth's atmosphere, it vaporizes and turns into a meteor: a streak of light in the sky. Because of their appearance, these streaks of light are sometimes called **"shooting stars"**. But meteors are not actually stars.
Meteorites	Sometimes meteoroids don't vaporize completely in the atmosphere. In fact, sometimes they survive their trip through Earth's atmosphere and land on the Earth's surface. When they land on Earth, they are called meteorites.

EVOLUTION OF THE EARTH:

- It is not possible to know exactly how the earth was formed about 4,500 million years ago. Evidences regarding earth's structure are obtained from volcanic eruptions, earthquake waves, etc.
- Earth has concentric layers → crust, mantle and core.
- Due to the giant impact → The earth was further heated up → Thus gave rise process of differentiation → that the earth forming material got separated into different layers (depending on densities) → Starting from the surface to the central parts, we have layers like the crust, mantle, outer core and inner core.
- From the crust to the core, the density of the material increases.
- Earth is **fifth largest planet** in the Solar System.
- **Blue Planet:** From the outer space, the earth appears blue because its two-thirds surface is covered by water.

INTERIOR OF THE EARTH:

- The structure of the earth's interior is made up of **several concentric layers**.
- Temperature and pressure increase as we go deeper towards the centre of the Earth because of presence of radioactive materials.
- Broadly three layers can be identified:
  1. Crust
  2. Mantle
  3. Core

STRUCTURE OF EARTH:

<table>
<tr><td rowspan="2">CRUST</td><td rowspan="2">Outermost solid part</td><td>Continental Crust</td><td>• Thicker → mean thickness = 30 km & density = 2.7g/cm3
• Rock Type: Granite
• Minerals → Silica + Aluminum = SIAL</td><td rowspan="2">Crust + upper most layer of mantle = lithosphere (10 to 200 km)</td></tr>
<tr><td>Oceanic Crust</td><td>• Thinner → mean thickness = 5 km & density = 3g/cm3
• Rock type: Basalt
• Minerals → Silica + Iron + Magnesium = SIMA</td></tr>
<tr><td></td><td colspan="3">• The mantle extends from Moho's discontinuity to a depth of 2,900 km.</td></tr>
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