

UPSC Civil Services Examination

UPSC Notes [GS-I]

Topic: Earth - Origin & Evolution [Geography Notes for UPSC]

The origin and evolution of the earth

Early Theories

Nebular Hypothesis

- Immanuel Kant, a German philosopher gave this theory.
- In 1796, a mathematician Pierre-Simon Laplace reexamined it.
- According to this hypothesis, the planets were molded out of a cloud of material associated with a young sun, which was rotating slowly.

Binary theories

- As per these theories, the sun had a companion.

Revised Nebular Hypothesis

- Revised Nebular Hypothesis was propounded by Carl Weizascar in Germany and Otto Schmidt in Russia.
- They regarded that a solar nebula surrounded the sun and that the nebula comprised of chiefly hydrogen, helium and something called dust.
- The collision of particles and the friction caused a disk-shaped cloud to be formed and then the planets were created via the accretion process.

Modern theories

Big Bang Theory

- Alternatively called the expanding universe hypothesis.
- As per this theory, in the beginning, all matter or substance forming this universe existed at one place as a tiny ball. This tiny ball had an extremely small volume, infinite density and temperature.
- At the Big Bang, this ball blasted fiercely and forcefully and started a substantial process of expansion which continues to this day.
- Now it is accepted that this event took place 13.7 billion years ago.

Origin of Earth

Formation of Planets

The following are regarded as the stages in the planets' development:

- The stars are localised gas lumps inside a nebula.
- A core to the gas cloud as well as a spinning disc of dust and gas are created because of the gravitational force within the lumps.
- After this, the cloud of gas condenses and the matter over the core is changed into tiny rounded objects.
- These small round objects develop into what are called planetesimals by a cohesion process.
- The smaller objects start forming larger bodies by colliding with one another and they stick together because of gravitational force.
- In the last stage, these large number of small planetesimals aggregate to develop into a smaller number of large bodies called planets.

