

NCERT MOST IMPORTANT QUESTIONS CLASS – 11

GEOGRAPHY CHAPTER- 2 THE ORIGIN AND EVOLUTION OF EARTH

Question 1.

What is the opinion of present day scientists about the origin of moon?

Answer:

In 1838, Sir George Darwin suggested that initially the earth and the moon formed a single rapidly rotating body. The whole mass became a dumb-bell shaped body and eventually it broke. The material separated from the earth was formed as moon and the place became the Pacific Ocean. It is not accepted now.

The present theory is the “giant impact theory” or “big splat theory”. A large size body of Mars collided with the earth and that portion was separated from the earth. The same portion became as a moon which revolves around the earth. The moon was formed about 4.44 billion years ago.

Question 2.

What are the difference between terrestrial planet and jovian planets?

Answer:

The main differences between the two are summarized below:

- The terrestrial planets were formed in the close vicinity of the planet star where it was too warm for gases to condense solid particles. Jovian planets were formed at a quite distant location.
- The solar wind was most intense nearer the sun, so it blew off lots of gas and dust from the terrestrial planets. The solar winds were not all that intense to cause similar removal of gases from the Jovian planets.
- The terrestrial planets are smaller and their lower gravity could not hold the escaping gases. Jovian planets are bigger and have high gravity.

Question 3.

Inner planets are terrestrial while outer planets are Jovian. Why?

Answer:

Inner planets are terrestrial while outer planets are Jovian because the terrestrial planets are smaller and their lower gravity could not hold the escaping gases. Jovian planets are bigger and have high gravity. Moreover, the solar wind was most intense nearer the sun, so it blew off lots of gas and dust from the terrestrial planets. The solar winds were not all that intense to cause similar removal of gases from the Jovian planets.

Question 4.**How did earth develop its different layers?****Answer:**

During the formation of the moon, due to the giant impact, the earth was further heated up. It is through the process of differentiation that the earth forming material got separated into different layers. 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.

Question 5.**Differentiate between inner planets and outer planets.****Answer:**

The difference between inner planets and outer planets inner planets outer planets

Inner Planets	Outer Planets
1. Mercury, Venus, Earth and Mars are called Inner Planets	1. Jupiter, Saturn, Uranus, Neptune and Pluto are called Outer Planets
2. They are found between belt of asteroids and the sun	2. They are found after the belt of asteroids
3. They are also called terrestrial planets	3. They are called Jovian planets
4. Smaller in size	4. Larger in size
5. High density	5. Low density
6. Solid rocky state	6. Gaseous state
7. They are warm	7. They are cold

Question 6.**Explain how did life evolve on the earth?****Answer:**

The origin of life as a kind of chemical reaction, which first generated complex organic molecules and assembled them. This assemblage was such that they could duplicate themselves converting inanimate matter into living substance. The record of life that existed on this • planet in different periods is found in rocks in the form of fossils. The microscopic structures closely related to the present form of the blue algae have been found in geological formations much older than some 3,000 million years. It can be assumed that life began to evolve sometime 3,800 million years ago.

Question 7.**Explain different phases of evolution of planets.****Answer:**

Evolution of planets can be understood in three stages:

1. Formation of Disc; The stars are localised 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.
2. Formation of Planetesimals: In the next stage, the gas cloud starts and getting condensed and the matter around the core develops into small rounded objects. These small rounded objects by the process of collision develop into what is called planetesimals. Larger bodies start forming by collision and gravitational attraction causes the materials to stick together. Planetesimals are a large number of smaller bodies.
3. Formation of Planets: In the final stage, these large number of small planetesimals accrete to form fewer large bodies in the form of planets.

Question 8.

Explain the earliest theory associated with the origin of the earth.

Answer:

A large number of hypotheses were put forth by different philosophers and scientists regarding the origin of the earth. One of the earlier and popular arguments was by German philosopher Immanuel Kant. Mathematician Laplace revised it in 1796. It is known as Nebular Hypothesis. According to this theory there was a hot and rotating gas cloud called Nebula in the space. From Nebula there was a gradual loss of heat due to its rotation which resulted in cooling of its outer surface. This gradual cooling caused contraction in size of Nebula, but its speed increased due to angular momentum. The outer layer was separated from the remaining part of Nebula.

The centre of Nebula became 'Sun' and the planets were formed of the smaller units. The lighter material gases and the heavier dust particle gave the fact of inner and outer planets. In 1950, Otto Schmidt in Russia and Carl Weizasear in Germany somewhat revised the 'nebular hypothesis', though differing in details. 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.

Question 9.

Explain the modern theory associated with evolution of the earth.

Answer:

In modern theory the evolution of the earth is associated with Big Bang Theory. It was put forth by Edwin Hubble in 1920. In the beginning, all matter forming the universe existed in one place in the form of a 'tiny ball' with an unimaginably- small volume infinite temperature and infinite density. At the Big Bang "tiny ball" exploded violently. This led to a huge" expansion. it is now generally? accepted that the event of big. bang took place 13.7 billion years before the present. The expansion continues even to the present day. As it grew, some energy' was converted into matter. There was particularly rapid expansion within fractions of a second' after the bang. Thereafter, the expansion has slowed down. Within first Big Bang event, the first atom began to form.

Within 300,000 years from the Big Bang, temperature dropped to 4,500k and gave rise to atomic matter. The universe became transparent. The expansion of universe means increase in space between the galaxies. An alternative to this was Hoyle's concept of steady state. It considered the universe to be roughly the same at any point of time. However, with greater evidence becoming available about the expanding universe, scientific community at present favours argument of expanding universe.

Question 10.

Explain the collision and accretion I hypothesis associated with the evolution of the earth.

Answer:

Collision hypothesis and accretion hypothesis are described below in short.

1. Collision Hypothesis: It was given by Sir James and Harold Jeffrey.

According to this theory, a large nebula 'wandering in the space came very close to smaller nebula (Sun) and its huge upsurge of matter on the surface of smaller nebula. The matter was detected from the smaller nebula and on cooling condensed into planets.

2. Accretion Hypothesis: It was given by? Schmidt and Carl Weizascars.

- According to them, solar system started out as a cloud of gas and dust drifting in a space called nebula. This gaseous cloud exploded violently to form supernova. The exploitation left the vast spinning cloud and gases and thus to collapse under its own gravity and develop as denser core.
- The denser core became larger and hotter and began to burge. Later it developed into protostar which finally evolved as 'infant Sun.
- Away from its central surface, particles of dust began to clump together and converted into first smaller fragments of rocks and then becoming larger bodies which were called planetesimals which collided with one another to form rocky inner planets like Mercury, Venus, Earth and Mars and the remaining were outer planets.