

Big Bang Theory: Notes for UPSC Science and Technology

The Big Bang Theory is a very important concept for the UPSC exam science and technology segment. A lot of research is going on in this field by both Indian and global scientists, to find out exactly how the universe began billions of years ago. In this article, you will read about the Big Bang Theory in brief for the IAS exam.

What is the Big Bang Theory?

The Big Bang Theory is an astrophysical model of the universe which can be observed by human senses. The theory gives details about the origins of the universe from its early formations to its modern-day evolutions.

The Big Bang Theory explains how the universe expanded from an initial state of extremely high density and high temperature by offering a detailed explanation of observed phenomena, radiation, an abundance of light elements and large-scale structures.

What does the Big Bang Theory state?

The Big Bang Theory states that the universe began to cool down sufficiently in order to allow the formation of particles that would later become atoms after its initial phase of expansion. Primordial elements - Hydrogen, Helium and Lithium - condensed through gravity that formed early stars and galaxies. In simpler terms, it can be stated that the universe inflated into cosmic system 13.8 billion years ago to form the galaxy and the solar system as we know it.

What is the common misconception about the Big Bang Theory?

The most frequent misunderstanding regarding the Big Bang Theory is that it gives the complete origin of the universe but it does not describe the energy, time and space involved in the creation of the universe. It only explains how the universe emerged from its initial high-temperature state. It would be false to draw parallels to everyday objects when trying to explain the Big Bang Theory, especially where size is concerned. The theory only describes the size of the observable universe and not the universe as a whole.

Accurate derivation requires the use of general relativity, and while treatment using simpler Doppler effect arguments gives nearly identical results for nearby galaxies, interpreting the redshift of more distant galaxies as due to the simplest Doppler redshift treatments can cause confusion.