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Q:- Briefly describe the most popular and accepted theory about origin of universe?

Big Bang Theory:-

The most accepted theory about the origin of universe is big bang theory. According to it, universe came into being a 13.7 billion years ago. Before it, whole universe was compacted into a single ball with high density and intense heat termed as singularity. Then, it explodes and small pinhead sized ball is exploded into a large universe which is continuously expanding. Different types of matter and anti-matter came into being which destroy each other when temperature cooled down, atomic nuclei captured electrons and started forming atoms.

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Evidence of Big Bang Theory:

1. Red-Blue shift:-

Red shift and blue shift shows that either the certain galaxy or star is moving towards the Earth or away from it. If it emits the red light, it means it is moving away from the Earth. If it is in blue shift, it shows that it is moving towards the Earth.

2. Cosmic microwave background Radiation:

Cosmic microwave background radiation also provides evidence. Scientists Arnio Peirzinas and Wilson detected the cosmic microwave background radiation while studying radiations. It was known that these are the heat waves from the expansion of universe or big bang.

Fate of Universe:-

Fate of a universe is

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that the entire universe is continuously expanding. These 4 theories explains the fate of universe.

i) Open universe Theory
ii) Flat universe Theory
iii) Close universe Theory
iv) Cyclic universe Theory

Q: **Describe different methods to determine the age of universe?**

Universe came into being some 13.8 billion years ago. It is constantly expanding, there are different methods to estimate the age of universe.

Methods:-

Age of galaxies from travel time of light:

Age of galaxies can be determined from the travel time of light. Galaxies move away from the earth, emits red light are in red shift. And the stars which consisted mostly of hydrogen will have more bright light and when they age, their fuel started run out.

Age of universe from expansion:

Another method to determine the age of universe is to

measure the Hubble constant. It is the measure of current expansion rate of universe.

=> If the universe is flat and consists of matter then $= \frac{2}{3H}$,

=> If the universe has very low density then its extrapolated age is longer $= \frac{1}{H}$

Q. Explain Dark energy and Dark matter?

Dark Energy:-

In 1929, Edward Hubble while studying the galaxies, detected that the distant galaxies emit the longer wavelengths in the red shift of electromagnetic waves and farther the galaxies move, more red light they emit. Hubble determined that universe is expanding continuously. Whenever there is an empty space, universe

expands in that way. So, dark energy is an energy which is intrinsic to empty spaces.

Features of dark energy:-

- Almost 68% of the universe consists of dark energy and appears to be associated with vaccum space.
- Dark energy is evenly distributed throughout the space.
- Even distribution means that Dark energy doesnot have local gravitational effect but have global effect on the universe. This leads to the generation of repulsive forces which resulted into accelratod expansion

Dark Matter:-

Scientists observed that galaxies rotating with such speed that the gravity generated by this matter cannot hold it together. So, there is an extra mass, which is not known by humans,

but is providing a extra gravitational force to the galaxy which hold it in an orbit. This strange matter is called Dark matter, which is not visible yet.

Features of Dark Matter:-

- Unlike normal matter, it does not interact with electromagnetic waves.
- It does not reflect, absorb or emit light.
- Scientists were able to infer it only from gravitation force.
- Places near the Dark matter bend the light passing nearby.
- It makes about 27% of the universe.

Q: How can the sun have such a strong gravitational field if it's made of gases?

Gravitational field depends on the mass of object and distance of it from a particular object

As, the mass of sun is very large approx. 2×10^{30} kg. So, it exerts a very strong gravitational force. Even though, the sun contains gases e.g. He and H_2 but its gravitational force keeps these gases concentrated in the centre which provides the internal pressure to the sun through fusion reaction.

It means that it is the mass of the sun which is responsible for its high gravitational force. Higher the mass, higher its capacity will be to keep the high-space time ~~fibrics~~ fabric around it.