

10 August, 2025

GSA — revision ch#P1 (Test)

Q:- Describe the big bang theory and its significance in understanding the origin and evolution of the universe. What are some key evidence supporting this theory?

Big bang theory

Big bang theory is one of the most popular and accepted theory of origin of universe.

It was given in 1920. It describes how universe came into existence 13.7 billion years ago. Sometimes it is called big bang theory of expansion due to absence of time and space and not explosion just expansion.

Before expansion:-

- 1- When there was nothing, there was singularity highly dense and very hot.

- 2- Energy and matter were present in Singul^s only in an undifferentiated^{manner}
- 3- Gravity was strong^s enough to hold matter and energy together.
- 4- At that time there was no time and space.
- 5- Somehow two opposing^s forces dominated gravity and sing^sularity began to expand.

After expansion

1. The temperature of sing^sularity started to decrease drastically.
2. formation of atomic sub particles took place, consequently first atom helium came into existence.
3. Time and space also came into existence.
4. With further decrease in temperature other elements started to form.
- 5- with these elements formed connect with each other, laid foundation of constituents of universe e.g. Planets, stars, gases, dust, galaxies, asteroids etc.

Evidence of big bang theory

⇒ Hubble's Law

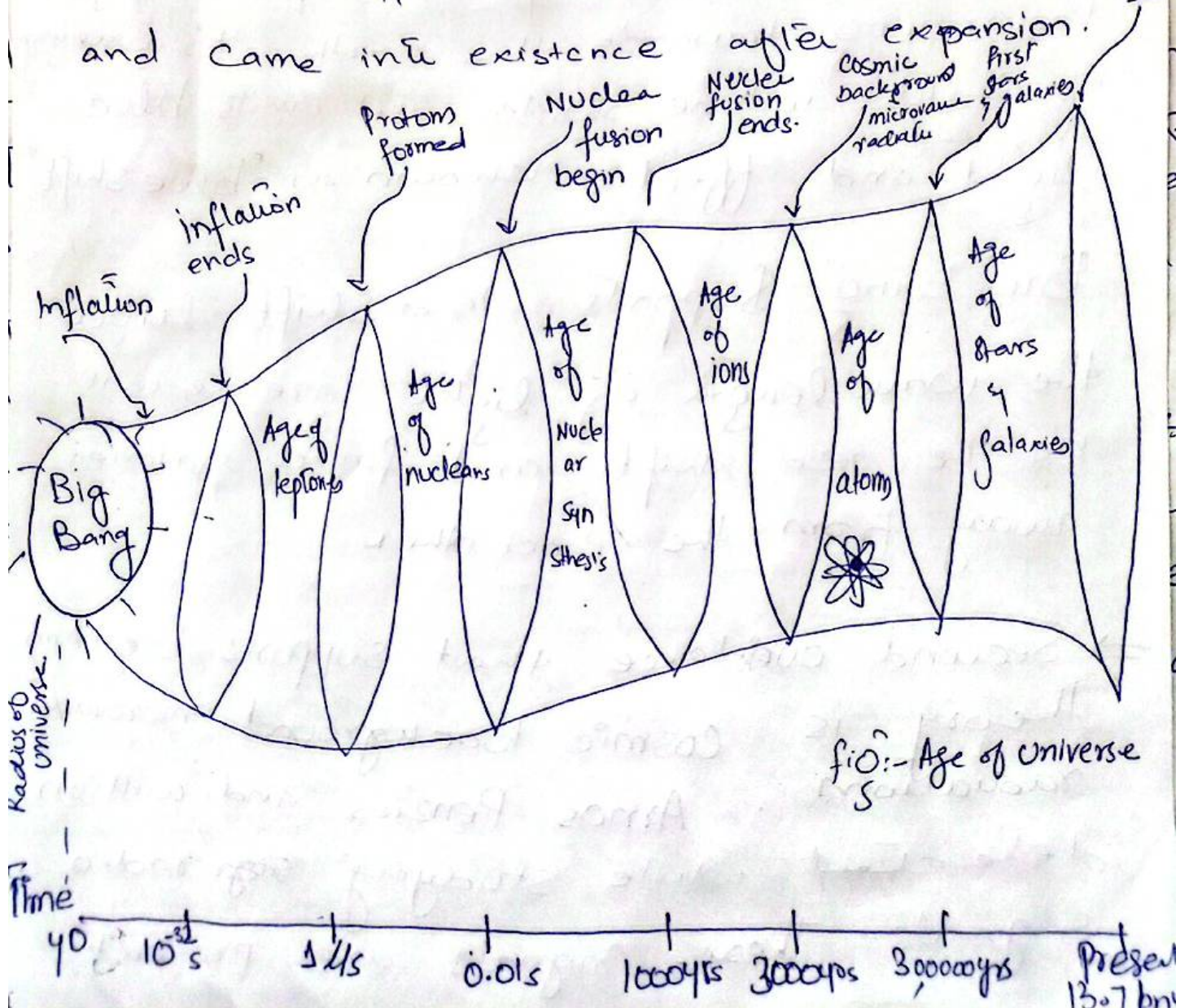
By analyzing the spectrum of light, astronomers can tell how fast an object is moving in Universe. If the object is moving away from earth its light produce longer wavelength and emits red light and effect is known as 'red shift' and if the object is moving towards the earth its wavelength of light will be shorter and emits blue light and effect is known as 'blue shift'.

Big bang supports red shift. longer the wavelength of light greater will be the red shift and faster galaxies away from the each other.

⇒ Second evidence that supports big bang theory is cosmic background microwave radiations. Arno Penzias and Wilson detected while studying radio signals. These signals are present

In every part of universe and is originated from heat left from the original expansion or big bang

⇒ Einstein equation $E=mc^2$ also states that matter and energy can be converted into each other. It also validates big bang that matter and energy were present in an undifferentiated manner in singularity and came into existence after expansion.



GSA (Maths)

Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio of A and B.

$$(5\% \text{ of } A + 4\% \text{ of } B) = \frac{2}{3} (6\% \text{ of } A + 8\% \text{ of } B)$$

we can write it as:-

$$(0.05 \text{ of } A + 0.04 \text{ of } B) = \frac{2}{3} (0.06 \text{ of } A + 0.08 \text{ of } B)$$

By multiply $\times 100$ remove decimal:-

$$(5 \text{ of } A + 4 \text{ of } B) = \frac{2}{3} (6 \text{ of } A + 8 \text{ of } B)$$

$$(5A + 4B) = \frac{2}{3} (6A + 8B)$$

multiply 3 and 2 with equations

$$3(5A + 4B) = 2(6A + 8B)$$

$$15A + 12B = 12A + 16B$$

$$15A - 12A = 16B - 12B$$

$$3A = 4B$$

$$\frac{A}{B} = \frac{3}{4} \quad \text{or} \quad \boxed{A:B = 3:4} \quad \underline{\underline{\text{Ans}}}$$