Q:1 Differentiate between a star and a planet. What is the magnitude of a star and how the color of stars is correlated with their temperatures? (5)

Ans:

1) Introduction:

In the vast canvas of the cosmos, stars and planets stand as celestial entities, each with its unique characteristics and cosmic role. Stars shine brightly through the alchemy of nuclear fusion, while planets, nestled within the cosmic ballet of protoplanetary disks, carve their orbits around these radiant luminaries. Beyond these differences, the celestial tapestry further unfolds with the phenomena of stellar magnitude, a measure of brightness and the chromatic palette of stars, where hues reveal the intimate correlation between color and temperature in these cosmic bodies.

2) Differences between star and a planet.

Star	Planet
* Star is a massive shinning sphere of hot gas.	→ Planet is a round body in space that orbits a star.
* A star shines by releasing light produced by nuclear fusion.	→ Planets do not produced light
* Stars revolve around the centre of their galaxy.	→ Planets revolve around the star.
* Stars have very high temperature	→ Planets drive heat and energy from sun.
* Ex: Proxima-Centauri, Sun, Pistol star etc	→ Ex: Earth, Venus, Mars, etc

3) Magnitude and Color-Temperature Correlations in stars

. The magnitude of a star is

a measure of its brightness as observed from Earth. The magnitude scale is logarithmic, with lower magnitudes indicating brighter objects.

The color of a star is closely related to its surface temperature.

- Blue stars are hotter with temperature exceeding $-30,000\ ^{\circ}C$
- White stars have temperature between $10,000 - 30,000\ ^{\circ}C$
- Yellow stars, like sun, have temperatures around $5,500\ ^{\circ}C$
- Red stars are cooler, with temperature less than $3,500\ ^{\circ}C$.

Conclusion:

Stars and planets differ in their formation, light emission, motion, temperature. The magnitude of a star measures its brightness and the color of a star is correlated with their surface temperatures, with hotter stars appearing blue and cooler stars appearing red.

Q: 2 Briefly describe the most popular and accepted theory about the origin of the Universe. (5)

Ans:

1) Introduction:

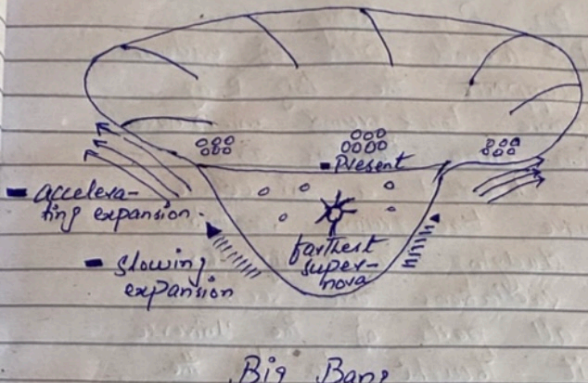
The most widely accepted theory about the origin of the Universe is "Big Bang Theory". The "Big Bang Theory" is the leading explanation about how the Universe began. At its simplest, it talks about the Universe as we know it starting with a small singularity, then inflating over the next 13.7 billion years to the cosmos that we know today.

2) Big Bang Theory:

Most astronomers believe that the Universe began in a Big Bang about 13.7 billion years ago. At that time, the entire Universe was inside a bubble that was thousands of times smaller than a pinhead

and it was named as singularity. It was hotter and denser. Then it suddenly exploded. The Universe was both Time, space, matter all began with the Big Bang. In a fraction of second, the Universe grew from smaller than a single atom to bigger than galaxy and kept on growing at a fantastic rate.

As the Universe expanded and cooled, energy changed into particles of matter and anti-matter. These two particles largely destroyed each other but some survived Move stable particles called protons and neutrons started to form when Universe was one-second old Over the next three minutes, the temperature droped bellow 1 billion °C. It was now cool enough for protons and neutrons to come together, forming hydrogen and helium nuclei.



Evidence for the Big Bang:

By analyzing the spectrum of light from a star or galaxy, astronomers can tell how fast it is moving, and whether it's moving away from Earth or towards Earth. If an object is moving away from Earth, it's light shifts to longer, redder wavelengths, an effect known as red shift. If an object is moving away from Earth, it's light shifts shorter, blue wavelengths, an effect known as blue shift. Red shift support

the Big Bang Theory.

A second piece of evidence that supports the Big Bang is cosmic background microwave radiation Arno Penzias and Wilson detected a ~~m~~ cosmic microwave background radiation while studying radio signals. These radiations are recieved from all parts of the Universe and it thought to be the heat left over from the original expansion or Big Bang.