**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Gr. Level & Sec.\_\_\_\_\_\_\_\_\_\_\_Strand\_\_\_\_\_\_\_Date \_\_\_\_\_\_\_Score\_\_\_\_**

Direction : Read with comprehension and answer the question below.

**Understanding The Universe**

 The Universe is us everything around us. It includes all of time and space. It includes Earth and all of the heavenly bodies in outer space: the planets, the stars, the galaxies, and intergalactic space. It includes all energy and existing matter from the largest stars and galaxies to the smallest subatomic particles.

 Our universe is estimated to be around 10 billion light years (the distance light travels in a year) in diameter. The universe is around 13.8 billion years old. Scientists believe the universe began with an explosion long ago called “The Big Bang”. This belief about the universe’s birth is called the “Big Bang Theory”. The universe continues to this day to expand as a result of the original “Big Bang” explosion. As the original explosion continued to expand and cool over billions of years, subatomic particles formed and collected into the matter ,atoms, planets, stars, galaxies, and heavenly bodies that we know of today. The original explosion of matter and forces that became the universe emerged from a single small point. The original expansion happened at a tremendously fast rate and at a very high temperature. Nanoseconds after the initial explosion , gravity and all the other physical forces were formed. Shortly thereafter, energy transformed into particles of matter . The expansion of the universe is not slowing due to gravity as one might think but instead is accelerating. This surprising acceleration is believed to be due to a mysterious; little understood force called dark energy.

1. How old is the universe ?
2. What do you call the theory of universe’s birth ?
3. Is the universe expanding or contracting ?Justify your answer.
4. How was matter in the universe formed ?
5. How the universe at birth started out ?

A TIME TABLE OF EVENTS AFTER THE BIG BANG

1. The Big Bang Occurred

All interactions, gravity, strong nuclear, weak nuclear, and electromagnetism are unified. The radius of the Universe is less than 10-50 centimeters - A very small area. A spiral galaxy

2. 10-43 seconds later

Gravity separated from the other forces. Inflation, the tremendous expansion of the early Universe. The observable Universe expands to approximately the size of a grapefruit.

 3. 10-35 seconds after the Big Bang

The strong nuclear force separates from electromagnetism and weak nuclear force. Inflation ends. The Universe consists of a hot electron-quark soup. (a quark is a the main type of subatomic particle which makes up protons).

 4. 1 second after the Big Bang Electromagnetism and the weak nuclear force separate. Quarks combine to form protons, and protons and electrons combine to form neutrons. Helium and other light elements form through from these through nucleosynthesis .

5. 1 million years after the Big Bang

The universe becomes transparent as it continues to expand. Matter releases radiation. Several spacecraft have detected these emissions, which are called the cosmic microwave background radiation.

 6. 1 billion years after the Big Bang Protogalaxies begin to form.

7. 3 billion years after the Big Bang Quasars and some radio galaxies (galaxies that emit extremely high amounts of electromagnetic radiation) begin to form.

8. 8 billion years after the Big Bang. Most galaxies, including the Milky Way have formed. The Sun and Solar System form.

 9. 13 billion years after the Big Bang

The present. Although no one was there to witness these events, current evidence suggests that this is the best account of the origin of the Universe. This scenario will certainly change with new discoveries. In other words, don't take the sequence of Universe evolution as fact, it will change!

II. Direction :Make a cartoon of the early universe based on a time table of events after the Big Bang