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Core 01- 43D

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1. Write down useful equations to solve the problem. You will need these to perform conversion of units.

**T =**

**= 69 km/s / Mpc**

**1 Mpc = 3.086 x m**

1. Convert your terms into standard SI Units, (km/s 🡺 m/s). These units such as and kg make it easier for others to interpret data and easily follow another individuals work as this is a universal standard which everyone can understand.
2. Input the units you have converted into the equation T =
3. Now that we have our final equation, in order to divide fractions, you must apply one of the fundamental concepts of basic Algebra and multiply by the reciprocal. This in turn yields the same result, but simplifies our calculations. Here, we will focus primarily on solving for the denominator and will later divide 1 by our result as per the formula.

=

Here, we will need to simplify our equation by using the conversion **1 Mpc = 3.086 x m.** Multiplying by 1 Mpc /3.086 x m will cancel out both the Mpc units as well as the meters units (m).

\*=

1. Now that we have our value for, we must follow the formula and divide 1 by our new value by using the same technique of multiplying by the reciprocal in order to divide fractions.

= = 4.47\* seconds

1. Although we have fully completed the formula, it is necessary to think critically and observe what units our answer is actually in and determine if that unit is useful for easy analysis. In this case, the number of seconds within the universe’s age would be far too large and meaningless for anyone to apply to any sort of analysis or real life application. Our primary concern is now converting these seconds to a more appropriate unit of time such as years. We will begin our answer in incrementing intervals of time. (Seconds 🡺 Minutes 🡺 Hours 🡺 Days 🡺 Years)

4.47\* seconds \*

\* In this step, we are accounting for leap years. 1 year in this case is 365.2425 days

Age of the Universe = 1.417\* years **14.17 Billion years**

The Universe’s origin remains a core aspect of our history as its age can enhance differing elements of our societies such as creationism or scientific viewpoints. Questions are constantly raised towards those who follow religion and cite often this evidence as a counterexample to refute the belief of a 6,000 – 8,000 year old world. Knowing the age of the universe can provide us with a starting point, an area in which we can prove based upon logical mathematical calculations which can be easily followed and proven. As Christopher Viney explained within his lecture “Shifting the Origin: The Legacy Copernicus, Galileo and Newton”, the only way to approach any problem or misunderstanding is to begin with an origin point. This means that we can essentially choose our own origin and starting point in order to make the problem solving aspect much easier. It is important to note that although the difference in deriving and creating. The Hubble constant, proposed by Edwin Hubble, was derived from an observable expansion of the Universe, but was based upon what was observed at the time, “...since every piece of matter in the Universe is in some way affected by every other piece of matter in the Universe, it is in theory possible to extrapolate the whole of creation - every Galaxy, every sun, every planet, their orbits, their composition, and their economic and social history from, say, one small piece of fairy cake” (Douglas Adams, The Hitchhikers Guide to the Galaxy). This calculation stems from our unyielding need to reach discovery and attempt to uncover all of the universe, but can raise other questions of how much we can actually know about this 14 billion year old universe. Take for example Carl Sagan’s statement his piece “Can We Know the Universe”, “Our intuition is by no means an infallible guide. Our perceptions may be distorted by training and prejudice or merely because of the limitations of our sense organs, which, of course, perceive directly but a small fraction of the phenomena of the world”. Here, we cannot rely on our intuition or beliefs, but must work towards actually solving questions based upon empirical evidence. In the case of science, seeing is believing (data). In terms of the advantages for science, we can now verify other theories and laws in which depended upon an old universe such as theories of how the Earth’s atmosphere was formed and how mitochondrial cells engaged in symbiosis with other organisms to produce cells from inorganic elements/materials.

Within the realm of religion and faiths, we can ask questions of the significance of this discovery on religious beliefs. This calculation of the universe directly contradicts the belief of a 6,000 – 8000 year old world and can serve the purpose of casting doubt upon the basis of their belief. Now although the universe is proved to be 14 billion years old, we must of course understand that faith is based solely upon faith. Directly countering the scientific viewpoint, many state that seeing is not always a component of believing as many people of the world still share the cultural belief of faith/religions. According to a demographic study done by the Pew Research Study, there are 2.2 billion Christians, 1.6 billion Muslims, 1 billion Hindus, 500 million Buddhists, and 14 Million Jews (Pew Center, 2012). With so many people still choosing to believe in their faiths and origin stories all the while science is still progressing to further understand the natural laws of our world and universe, another fundamental question around metaphysics comes up— do personal beliefs really matter in the large scope? In many cases, these religions are not currently impeding scientific study unlike previous issues within the Catholic Church (Galileo incident, heresy). If there is anything we have indeed learned from the universe, is that we can never be 100% sure of anything. Although this is one fact that everyone can agree with, many often cling to it as evidence when protecting their faiths and beliefs.

*Works Cited*

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