Q# part ( )

Briefly describe the most popular and accepted theory about the ORIGIN of the universe.

Ans:

## 1. Origin of the UNIVERSE

The most popular theory explaining origin of the universe is Big Bang Theory. It is taken as a starting which along with the evidence (RED SHIFT) of the expanding universe estimates its age as 13.7 billion years.

## 2. The Big Bang (Theory):

It centers around an event called Big Bang. It is was first theorized by George Lemaitre in 1927. It posits that universe began from an almost infinitely dense, primordial atom similar to a supercharged black hole, few millimeters wide. This tiny singularity expanded to unfold the extant universe man has observed yet.

# A. Evidences

## 1. Expanding Universe

The Big Bang theory received first major boost when two years later, E. Hubble observed that universe was expanding. As a corollary, it must have a one, ~~star~~ concentrated starting point.

## 2. Cosmic Microwave Background Waves

Discovered in 1960s, Robert Wilson and two Penzias interpreted CMBR as echoes of the Big Bang, second major boost.

# C. Stages and Epochs

**Two Stages of BB**

| 1. Radiation Era | 2. Matter Era |
|---|---|
| i. Planck Epoch | i. Atomic epoch |
| ii Grand Unified Epoch | ii. Galactic epoch |
| iii Inflationary Epoch | iii. Stellar epoch |
| iv Electroweak epoch | |
| v Quark epoch | |
| vi Hadron epoch | |
| vii Lepton epoch | |
| viii Nuclei epoch | |

Q#

PART ( B )

What is a galaxy? The Earth belongs to which galaxy?

Ans

# GALAXY

## 1. definition

" Extremely large group of stars and associated matter usually revolving around its own center. "

## 2. Classification

Based on their visual morphology, galaxies were categorised into 4 groups by E-Hubbles; namely:

### 1. Spiral Galaxy

Galaxies with spiral arms that sway around the centre at as much speed as hundreds of kilometers per second.

Example: 1. Milky Way Galaxy
2. Andromeda Galaxy

### 2. Elliptical Galaxy

As evident in its name they are elliptical in shape. Sometimes, they are elongated

across one side more than the other, giving it cigar-like appearance.

In size, they can either be:

1. Giant Elliptical; or
2. Dwarf Elliptical depending the extent of spread and number of stars (both overlaps). The former can contain up to a trillion stars, extending 2mn light years across.

Example: 1. M49 and
2. M59.

## 3. Irregular Galaxy

These are miscellaneous, containing deformed galaxies that do not fit any other 3 descriptions. They are great nurseries of new stars because they are filled with huge interstellar dust.

Example: 1. The Small Magnellanic Cloud
The large Magnellanic Cloud

## 4. Lenticular Galaxy

These are lense like in shape. They sit between spiral and elliptical. It is spiral without spiral arms and elliptical with ellipse's shape.

## 3. Galactic Clusters

Galaxies can be alone singular or in groups. Milky Way and Andromeda, for example.

associates with other 3000 galaxies to constitute local Groups. Local Group along with Virgo Cluster form Virgo supercluster which, in turn, is located in an arm of Laniakea deprived in 2004.

## 4. EARTH'S LOCATION

Earth is a speck in the giant galaxy of Milky Way, besides Andromeda Galaxy, in a Minor of the 4 arms called Cygnus Orion Arm.