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Mock Exam I:

General Science and Ability.

(Part II)

Section - I

Q no. 4:- ~ (b) ~

Units of Human Cell.

Cell is basic unit of living organisms?

Human cells are **Eukaryotic** and have prominent nucleus with other membrane bound organelles, performing their specific function.

Units (organelles) of Human Cell

Units of cell are formed by interaction of various types of molecules <sup>performing</sup> specific functions.

**Example:** Cell membrane is made of phospholipids, proteins and Glyco proteins.

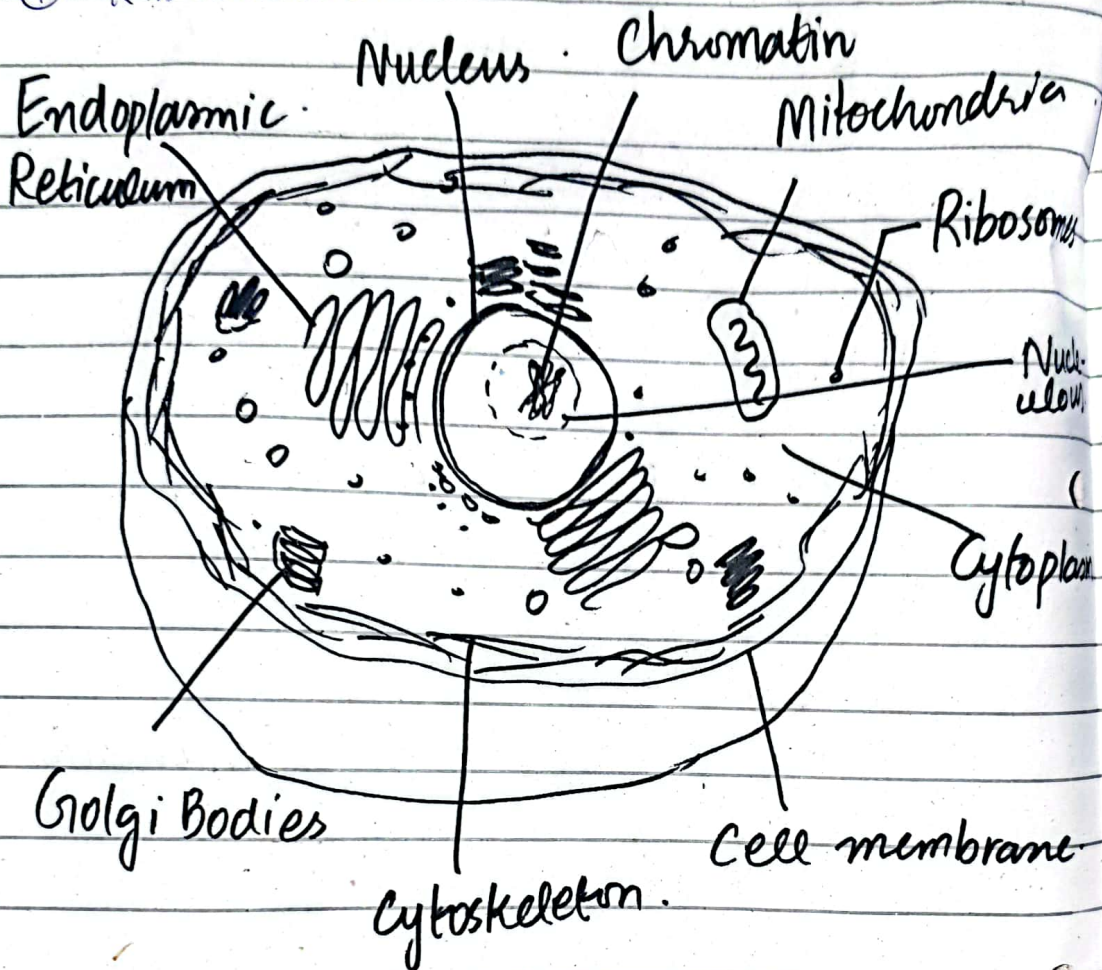
Following are major units of cell:

- ① Cell membrane
- ② Nucleus
- ③ Mitochondria
- ④ Endoplasmic Reticulum.

⑤ Lysosomes

⑥ Cytoskeleton

⑦ Ribosomes



•- Cell membrane: The outer covering of cell is called cell membrane. It maintain <sup>and regulate</sup> intracellular and extracellular environment separated.

•- Nucleus: Nucleus is brain of cell present at the center, covered with nucleus membrane and have dark area called nucleolus in center.

•- Cytoskeleton: Cytoskeleton is framework of protein that provide

shape to the cell.

• - Ribosomes Ribosomes are protein factories of cell. They are small bodies present attached to ER or freely moving.

• - Mitochondria: Mitochondria is power house of cell. Its site of cellular respiration and generate ATP.

• - Golgi bodies Golgi bodies are stacked shaped regular small bodies that pack the material regulated by cell.

• - Endoplasmic Reticulum: ER is flattened, irregular arranged layered system that involved in protein synthesis and detoxification of harmful substances.

• - Cytoplasm: Cytoplasm is semifluid material in cell also called cytosol. It has various biochemical molecules and provide site for organelles.

• - Chromatin: Chromatin is heredity material of cell. The passes information from one generation to other.

• - Lysosomes: Lysosomes are small clear spherical vesicles, originated from Golgi bodies. They are involved in transport of material and phagocytosis.

~ (c) ~

## Galaxies :-

The gravitationally bound system of stars, planets, small solar bodies, stellar remanent and a huge massive black hole is called Galaxy."

Example:

Milky way, Galaxy M59.

## Features of a Galaxy:

**Black Hole:** The center of galaxy - Galactic center is made of huge spherical dark matter called Black Hole. It generates gravity that ~~all~~ maintain all galactic components.

**Variable Shape:** Galaxies have variable shape and size they may be spiral, irregular, lenticular and elliptical.

**Unit of Universe:** Galaxy is unit of universe and there are billions of galaxies in the universe.

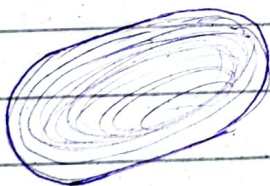
# Types of Galaxy.

Galaxy are classified on the bases of their shape.

## Major Galaxies

Elliptical

They are elliptical in shape with flat top and bottom sides.

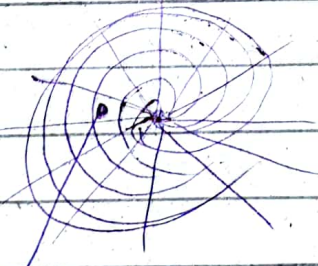


Example:

M 59

Spiral

They are spiral in shape with spiral arms originated from center.



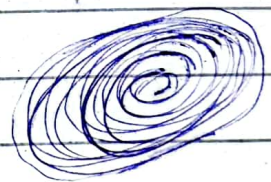
Sun

Example

Milky Way

Lenticular

They are intermediate between spiral and elliptical shape galaxies.



Example:

M-94

## Rare Galaxy:

Irregular shaped Galaxy: Some scientist recognize other galaxy that

have no proper shape called irregular galaxy.

Absence of Gravity: Due to absence of <sup>strong</sup> Gravity in irregular shaped galaxy, its not recognized by some scientist.

**Are galaxies moving or at rest:**

Yes, galaxies are moving around the black hole at very high velocity.

The movement of galaxies are seen by Hubble's Telescope (NASA)

**Evidence of galaxies motion:**

**Hubble law:**

According to this law,

$$v = H_0 \cdot d$$

This equation derived from General Theory of relativity, by Einstein describes the movement of galaxies here's,

$v$  = velocity of galaxies movement.  
 $d$  = distance travel by galaxy.

$H_0$  = Hubble's constant and this constant determines the motion/movement of Galaxy and expansion of universe.

### Hubble's Red Shift concept:

When any Galaxy moves towards the Milky Way (Sun) it releases ~~light~~ long wavelength that appears red called Red Shift. But if the Galaxy moves away from the Milky Way (Sun) it releases short wavelength that appears blue called Blue Shift concept.

**Conclusion:** The Hubble Red Shift concept and Hubble constant are proof of galaxies <sup>are</sup> in motion.

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~(d)~

# Main Parts of Sun and Earth

## Main parts of Earth

There are Three main parts of Earth

- ① Crust
- ② Mantle
- ③ Core

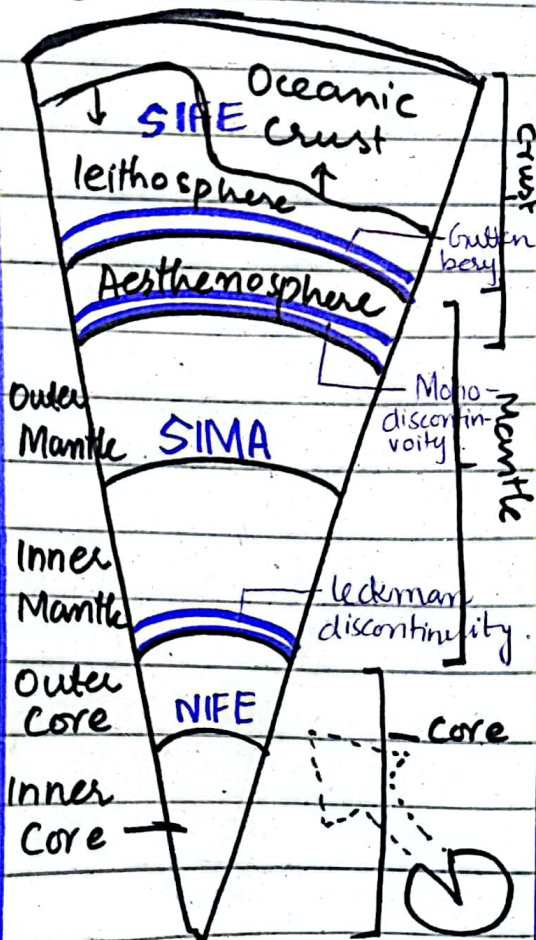


Fig: Main parts of Earth

## Main Parts of Sun

There are Three major zones of sun.

- ① Convection zone
- ② Radiative zone
- ③ Core

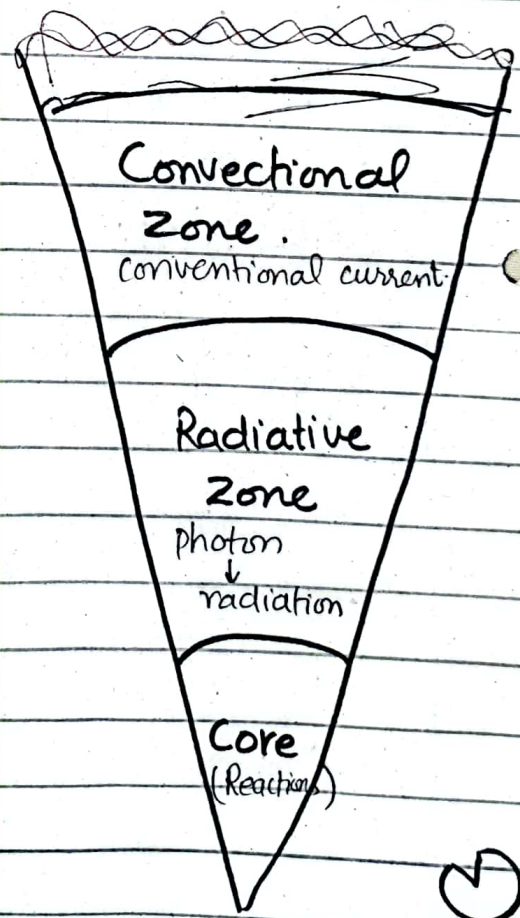


Fig: Main Parts of Sun.



## Main parts of Earth

### Crust:

Its the outer most part of Earth. Its hard in nature and contain high amount of Silicon and Oxygen. It is divided into two types

- ① Oceanic Crust
- ② Continental Crust

It is also called SIAL due to Silicate and Aluminates enrichment

### Mantle:

Below the crust lies semi solid area called asthenosphere then solid area

## Main parts of Sun.

### Conventational zone:

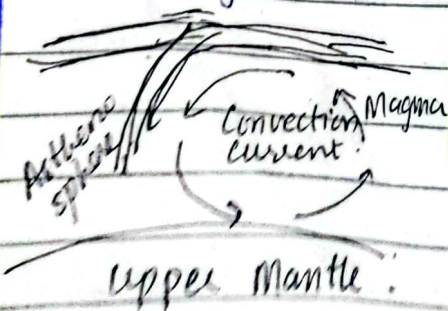
Its outer most part of Sun. Above the Conventational zone lies Sun atmosphere and under convection zone lies Radiative zone. It connect the temperature at Radiative zone with atmosphere by Convectional currents. It has some dark spots that have less temperature due to Solar cycle called Sun spots.

### Radiative zone:

The zone in between Convectional zone and core is called Radiative Zone. It consist of high

## Main parts of Earth

called Upper Mantle and then Semi Solid area called Lower mantle. There is high temperature and pressure in Mantle that form Magma. Convictional currents movement occurs in Mantle due to which geographical changes occurs. Its also called SIMA due to high content of Silicates and Magnesium in this layer.



## Main Parts of Sun

energy particles called photons that transfer energy from core to the Convictional zone by movements of photon generating Radiative waves. They are high quanta molecules generated due to reaction taking place inside the core.

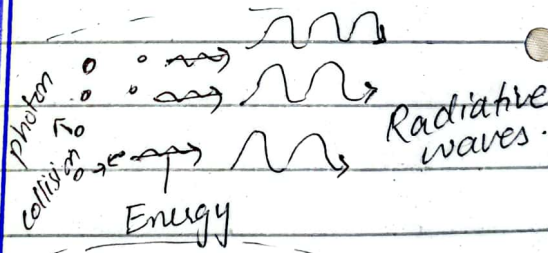


Fig: Hypothetical model of Radiative waves in Sun.

## Main parts of Earth

Core: Core innermost the Earth has high temperature and pressure. It is seen in nature have high concentration of iron and ferrous is part of where energy is generated. divided in two parts.

- ① Inner
- ② Outer

## Main parts of Earth

**Core:** Core is innermost part of the Earth. It has high temperature and pressure. It is semisolid in nature and have high concentration of Silicon and ferrous. Core is part of Earth where Gravity is generated. It is divided into two part.

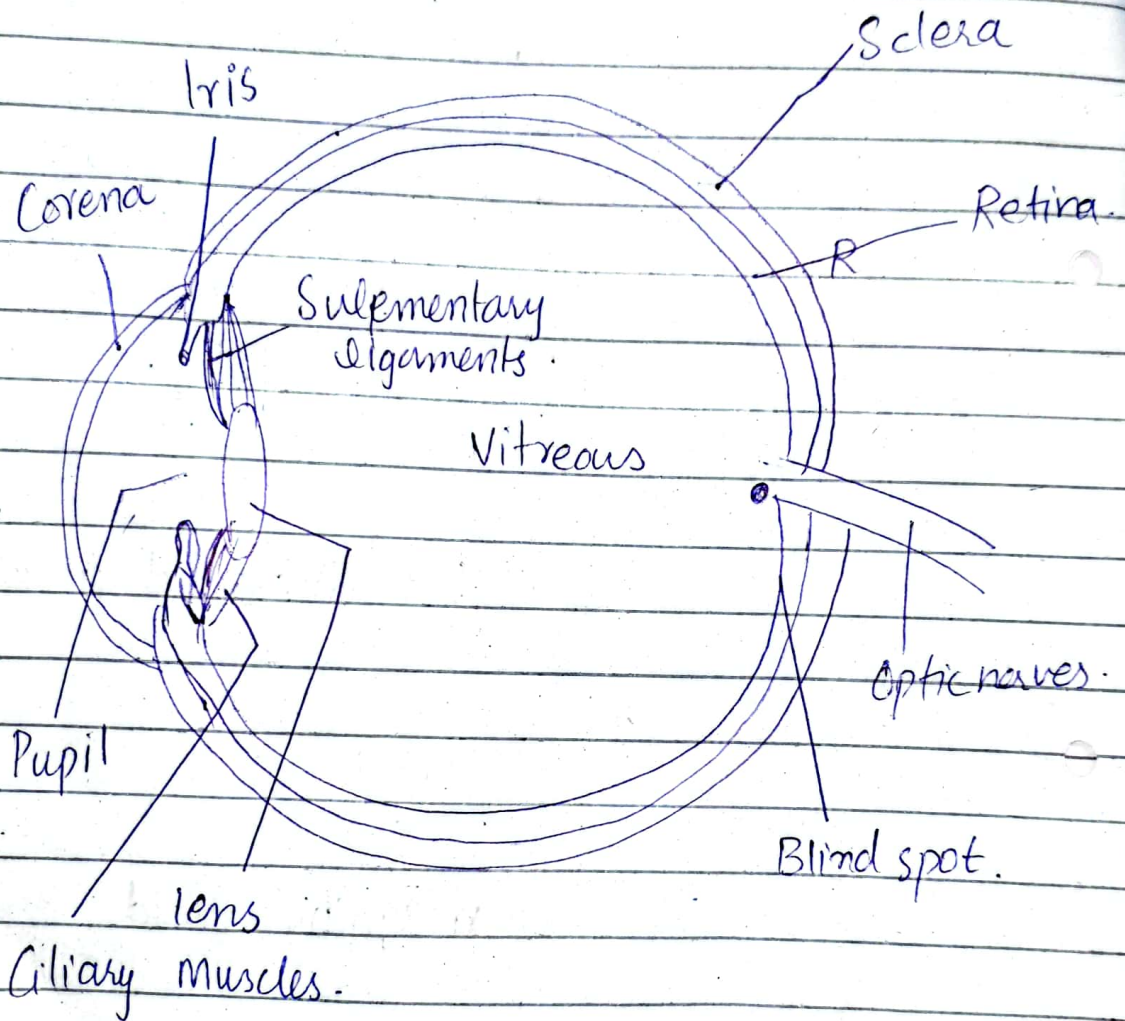
- ① Inner Core
- ② Outer Core.

## Main parts of Sun

**Core:** Core of Sun is its inner most part below Radiative Zone. There are high energy reactions due to He and H gases taking place in Core. It is 25% of whole Sun and its estimate temperature is 15 Million degree Celcius. Core is main origin of energy ~~even~~ to other parts of sun and to the Earth. The strong magnetic field of sun is present in Core that regulates Solar cycles.

~(a)~

## Structure of Eye:



**Myopia:** Myopia is the disorder of vision called Short Sightedness

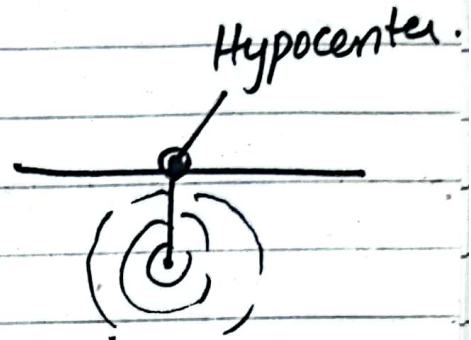
**Hyperoxia:** Hyperoxia is the disorder of vision called long Sightedness.

# Question no. 3

~ (C) ~

## (i) Hypocenter :

The point above/on the surface of earth where the Earth-quake occurs or originated is called Hypocenter.



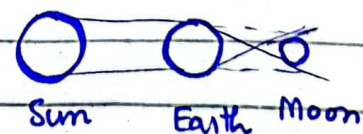
## (ii) Epicenter :

The point within the Earth where the Earth quake is originated is called Epicenter. It generates strong seismic waves in Earth.



## (iii) Annular Lunar Eclipse

Annular Lunar Eclipse does not occur only when the Moon is between the Sun and Earth. Annular Solar Eclipse occurs. due to the size of Earth.



Size of Earth >  
Size of Moon

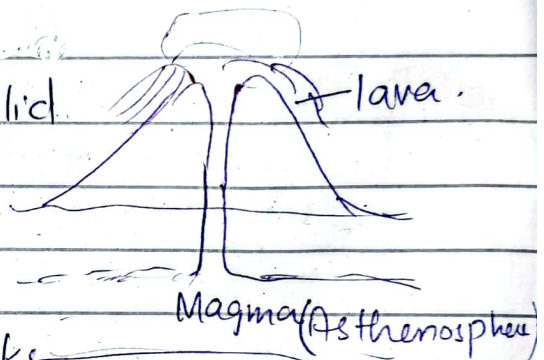
☉ No - Annular Lunar

is larger than Moon so no ring at outer surface of Moon is visible when Earth becomes in center of Sun and Moon. Hence, there is no formation of Annular/Ring so no Annular Lunar Eclipse exist.

### III. Magma :-

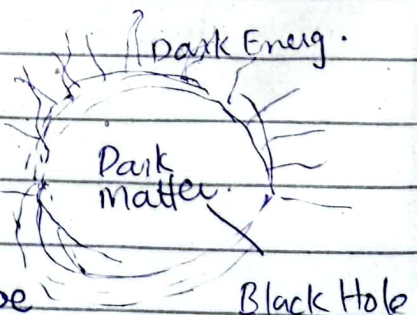
The hot, ~~semi liquid~~ semisolid material formed by high temperature and pressure on metamorphic rocks is called Magma.

It is present in Asthenosphere of Earth and when Erupted from Volcano its called Lava. Magma is dark reddish in colour.



### (V) - Dark Matter:

Dark Matter is mysterious matter present in Black Hole in Universe. It release Dark Energy. Scientist are trying to



research the properties of these matter but due to strong gravital pul even light can't escape from this matter which makes this discovery impossible, yet.

Our Universe is approximately made of 27% of dark matter, 5% of Dark Energy and left are Galactic bodies, Nebulas and Dust & Energy (NASA)

(d)

Big Bang

Big Crunch

Origin of Universe: It's assumed that universe is originated from a very small particle that's called singularity and expands to the large universe in period of 3.16 billion years.

Ultimate Fate of Universe: Hypothetically, the ultimate fate of universe is a small particle, less than a pins head (ie; where it was originated) over the period of ~~time~~ long time under the action of Dark energy.

# Big Bang

→ Expansion Concept  
 Big Bang explains how the singularity ~~under~~ <sup>over</sup> the long span, fission and fusion reactions, Birth and death of stars gives rise to this universe and its even expanding today.

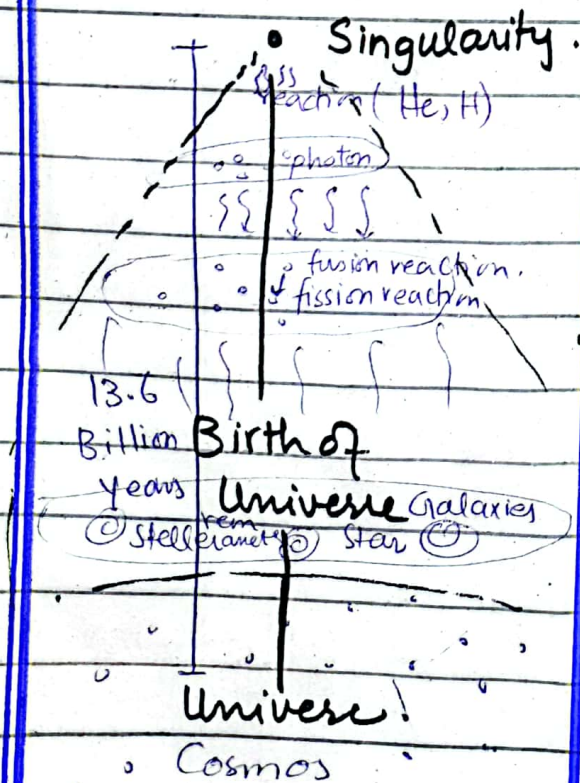


Fig: Big Bang Theory

# Big Crunch

→ Contraction Concept:  
 Big crunch explain that the vastness of universe is stretching with time after the threshold potential of Dark Energy - the universe will start contracting into very small unit.

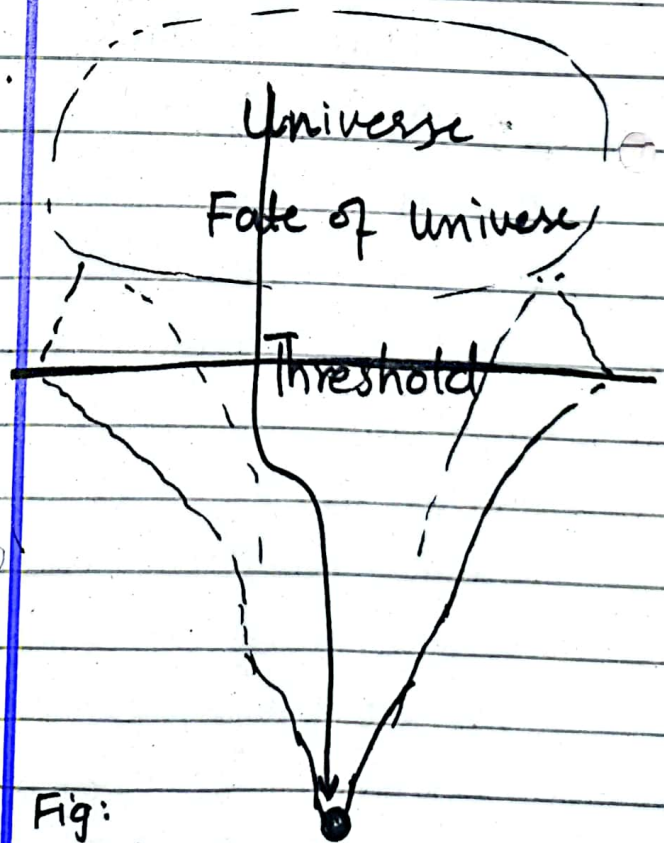


Fig: Close Model of Universe.



## Big Bang

### Big Bang Theory:

Concept of Big Bang is described in most accepted birth theory of Universe, the Big Bang Theory.

## Big Crunch

### Close/Contracting Model of Universe:

Big Crunch concept is described is one of accepted fate of Universe model called Contracting Universe Theory.

## How age of Universe is measured:

Age of Universe is measured by Cosmos expansion which is ultimately measured from Hubble law.

**Expansion of Universe:** The universe is constantly expanding according to Big Bang Theory of Universe.

### Hubble law:

- According to this law.

$$V = H_0 \cdot d$$

$V$  is velocity of expansion,  $H_0$  is hubble constant and  $d$  is distance of expansion, the value of distance

of expansion determines the time/age of universe.

$d \propto t$

with increasing the distance travel the age of universe is increasing and till 21<sup>st</sup> century universe is 13.6 Billion years old.

## SECTION # 2.

Q no. 6:

(a)

Given,

(r) Radius of cylinder = 8cm

(h) height of cylinder = 15cm

Required,

Volume of cylinder = ?

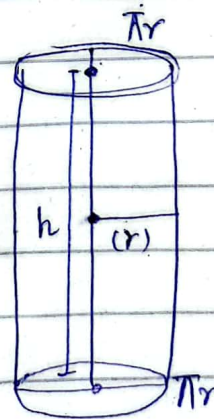
Solution,

$$\text{Volume of cylinder} = \pi r^2 h$$

here,  $\pi = 3.14$ .

Calculations,

$$V = (3.14) (8)^2 (15)$$



Rough work

$$V = 3.14 \times 320$$

$$V = 10048 \text{ cm}^3$$

Hence, volume of  
Cylinder is  $1004.8 \text{ cm}^3$

(b)  
... Angles of each side?

Given:

Dome of rock = Regular  
Octagonal  
shape.

Required,

Angle of each side = ?

Solution:

In regular octagonal shape,

All the sides

are equal and

all the angles are also equal

$\therefore$  Sum of all angle =  $360^\circ$

So,

$$\text{Each angle} = \frac{360^\circ}{8} = 45^\circ$$

Hence, each angle of  
Octagonal Dome of Rock

$$\begin{array}{r} 64 \\ \times 5 \\ \hline 320 \end{array}$$

~~314~~

$$\begin{array}{r} 31.4 \\ \times 32 \\ \hline 628 \end{array}$$

$$\begin{array}{r} 942 \\ \times 8 \\ \hline 7536 \end{array}$$

$$\begin{array}{r} 942 \\ \times 8 \\ \hline 7536 \end{array}$$

$$\begin{array}{r} 418048 \\ \times 8 \\ \hline 3344384 \end{array}$$

$$\begin{array}{r} 8 \overline{) 360} \\ 32 \\ \hline 40 \end{array}$$

$$\begin{array}{r} 40 \\ 40 \\ \hline \alpha \end{array}$$

is of  $45^\circ$ .

(c)

Given,

(l) length of Dal Lake = 4.6 miles.

(d) Depth of Dal Lake = 4.6 miles

(w) Width of Dal Lake = 2.2 miles.

Required,

(A) Surface area of Dal Lake = ?

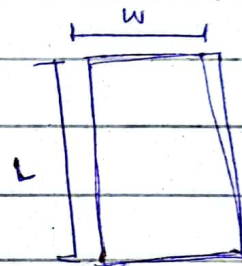
Solution:

$$\text{Surface area of Dal Lake} = L \times W$$

$$= 4.6 \times 2.2$$

$$A = 10.12 \text{ miles}^2$$

Hence, Surface area of Dal Lake is  $10.12 \text{ miles}^2$ .



Top view of Lake.

↓  
Rectangular shape.

$$\begin{array}{r} 4.6 \\ \times 2.2 \\ \hline 9.2 \\ 9.2 \times \\ \hline 10.12 \end{array}$$

(d)

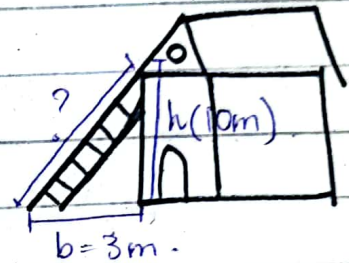
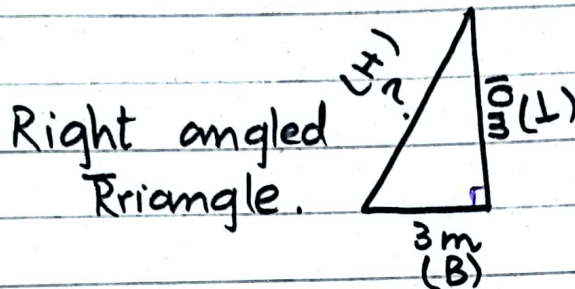
Given,

(a) height of house = 10 m

(b) ~~base~~ distance b/w house &  
ladder = 3 m

Required,

height of ladder = ?



Using Pythagoras Theorem -

$$(H)^2 = (L)^2 + (B)^2$$

$$H^2 = (10)^2 + (3)^2$$

$$H^2 = 100 + 9$$

$$H^2 = 109$$

$$H = \sqrt{109}$$

Hence, the height of ladder is  
 $\sqrt{109}$  m

## Q no . 8

~ (a) ~

1Q :

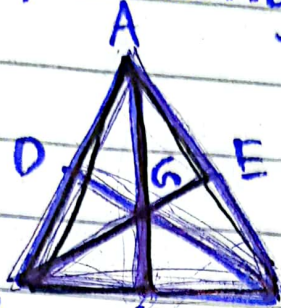
IQ stands for Intelligence Quotient, it is the ability / cognitive ability of human's, intelligence. also called human intelligence

Factors:

**Proper life style and diet:** IQ of person with proper life style for instance rhythmic sleep and wake cycle and balance diet intake is always better than correspondent.

**Inheritance / Genes:** IQ is inherited ability of a person, it is further enhanced by various factors but major contributor (80%) are genes or inheritance.

(b)  
No. of Triangles: ?



No. of Triangle,  $\Delta ABC$

At base BC:  $4 = 3 + 1$

At base AB:  $4 = 3 + 1$

At base AC:  $4 = 3 + 1$

$\Delta ABC = \text{common}$ .

1 triangle ABC is <sup>common</sup> in all bases.

So,

~~Total no. of Triangles =  $4 + 3 + 3$~~

By dividing each side

Dividing AB =  $\Delta DBC + \Delta ADC = 2$

Dividing BC =  $\Delta ABF + \Delta AFC = 2$

Dividing AC =  $\Delta AEB + \Delta AEC = 2$

By adding all triangles,

$$1 + 3 + 3 + 3 + 2 + 2 + 2 = 16.$$

Hence there are total 16 triangles and  
in given figure. 20

~(c)~

Probability of vowel:?

Given, Superintendent.

Req: Probability of vowel (at random).

Sol: SUPERINDENT.

4 Vowel letter.

$$P(\text{vowel}) = \frac{n}{N} = \frac{\text{no. of vowel letter}}{\text{No. of total letters.}}$$

here  $N=11$  ,  $m=4$ .

$$P(\text{vowel}) = \frac{4}{11}$$

Hence, probability of vowels in SUPERINDENT is  $\frac{4}{11}$ .

~(d)~

Distribute 4320 ~~~~



Given,

$$\text{Total amount} = 4320.$$

$$\text{Total distributor} = 3 \left( \begin{array}{l} \text{Zain, Ashraf,} \\ \text{Aslam} \end{array} \right)$$

$$\text{Zain share} = 2 \text{ parts.}$$

$$\text{Aslam share} = 3 \text{ parts}$$

$$\text{Ashraf share} = 7 \text{ parts.}$$

Req, Distributed share of each = ?

Sol Total parts of 4320 = 12

$$\begin{aligned} \text{Share of Zain} &= \frac{2}{12} \times 4320 \\ &= 720. \end{aligned}$$

$$\begin{aligned} \text{Share of Aslam} &= \frac{3}{12} \times 4320 \\ &= 1080. \end{aligned}$$

$$\begin{aligned} \text{Share of Ashraf} &= \frac{7}{12} \times 4320 \\ &= 7 \times 360 \\ &= 2520. \end{aligned}$$

Hence share of Zain, Aslam and Ashraf is 720, 1080 and 1620 respectively.