

## (Part - II)

### Section - I

# Question: 2

a. On 18<sup>th</sup> dec 2023 volcano was erupted - - - - -

how volcanoes are erupted?

Volcanoes are simply ~~are~~ opening or vent on earth's crust through underground molten-matter-magma, is erupted due to density variations within volcanoes. When magma reaches on the surface of earth as lava, it cools and hardens in the form of dome or crust. Most volcanoes appear along with the side of tectonic plates.

**Examples :-**

- (i) Pacific Ring of Fire includes two-third of the world's volcanoes.

(ii) Etna Mountain, Italy etc.

Moreover, on 18<sup>th</sup> December 2023, volcanoes were erupted in Iceland after series of small earthquakes

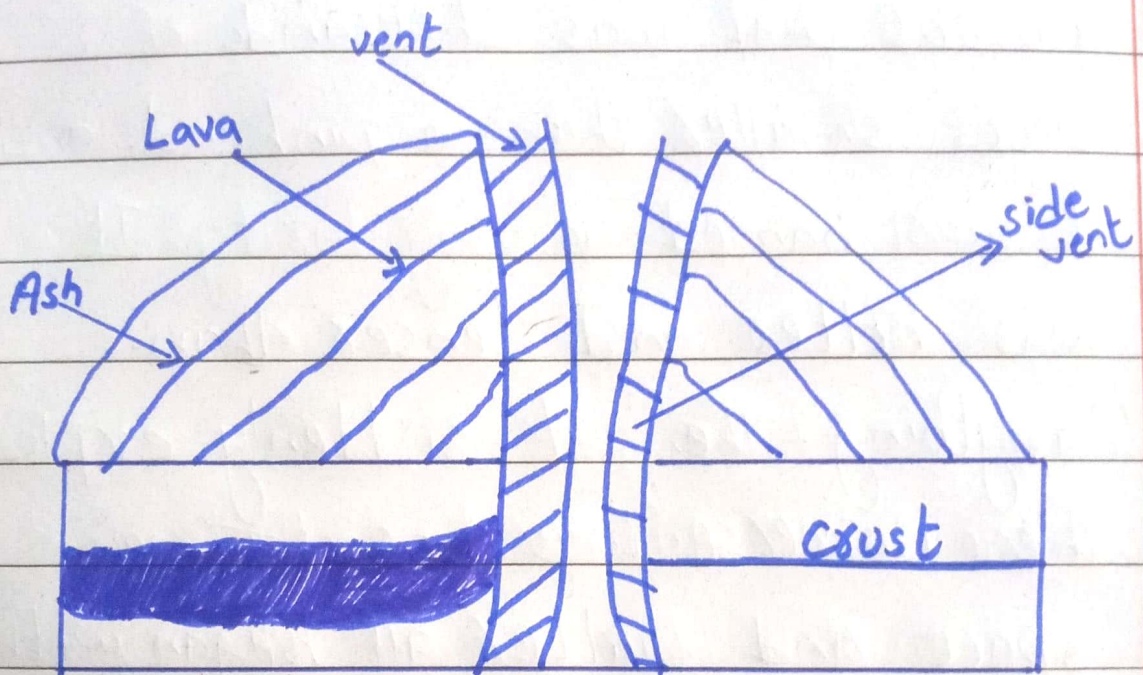


Fig: Volcanic Eruption

(2b)

What is Big Bang and Big crunch? How age of the universe is determined?

## Big Bang:-

According to Big Bang theory, the universe began with 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 than anything. Then it suddenly exploded. The universe was born. Time, space and matter all began with the big bang. In a fraction of seconds, the universe grew from smaller than a single atom to bigger than a galaxy, and it kept on growing.

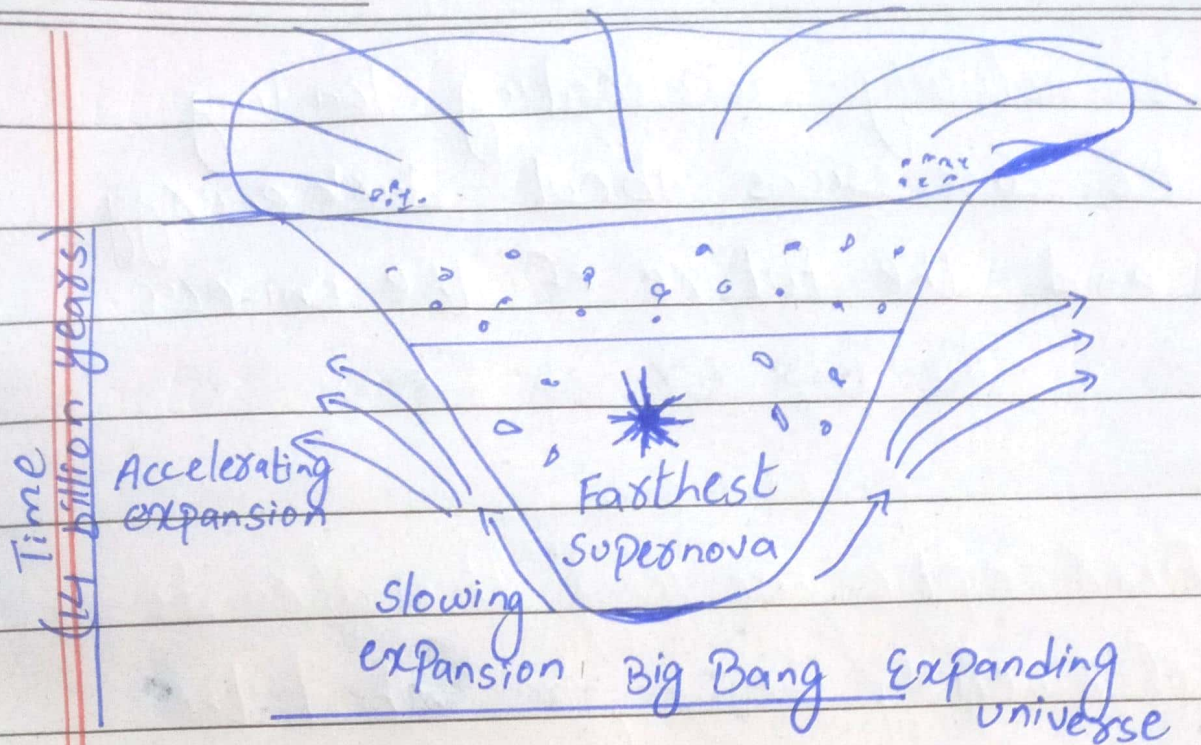


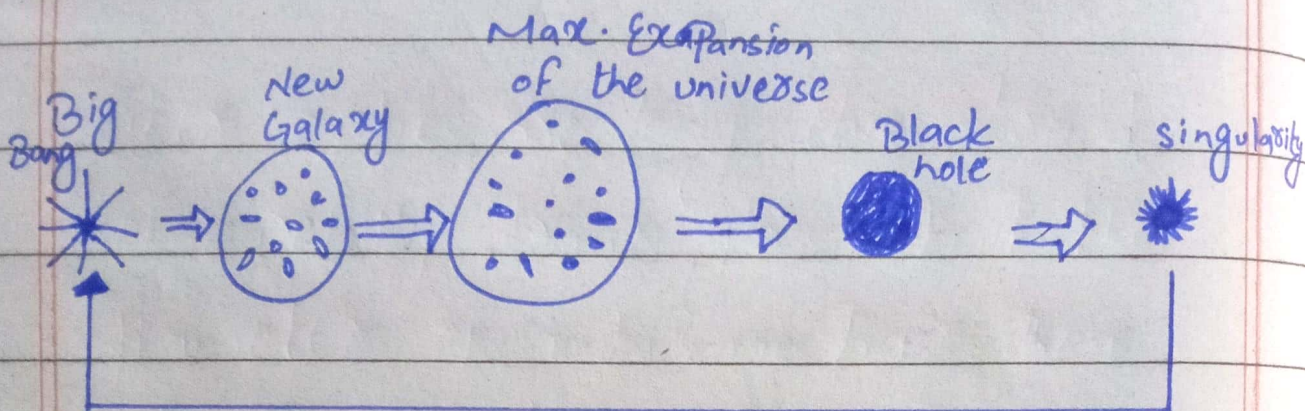
Fig : Big Bang

## Big Crunch Theory :-

Big crunch theory suggests that the universe will eventually stop expanding and reverse back on itself. While there are theories that describe time could also reverse in this scenario, it would require precise fine-tuning and physical principles that are unlikely to exist. According to recent observations, the universe's expansion

is actually accelerating, leading to discussions about dark energy and the future of the universe.

## The Big Crunch Theory



## How the age of universe determined?

There are different methods for measuring the age of the universe.

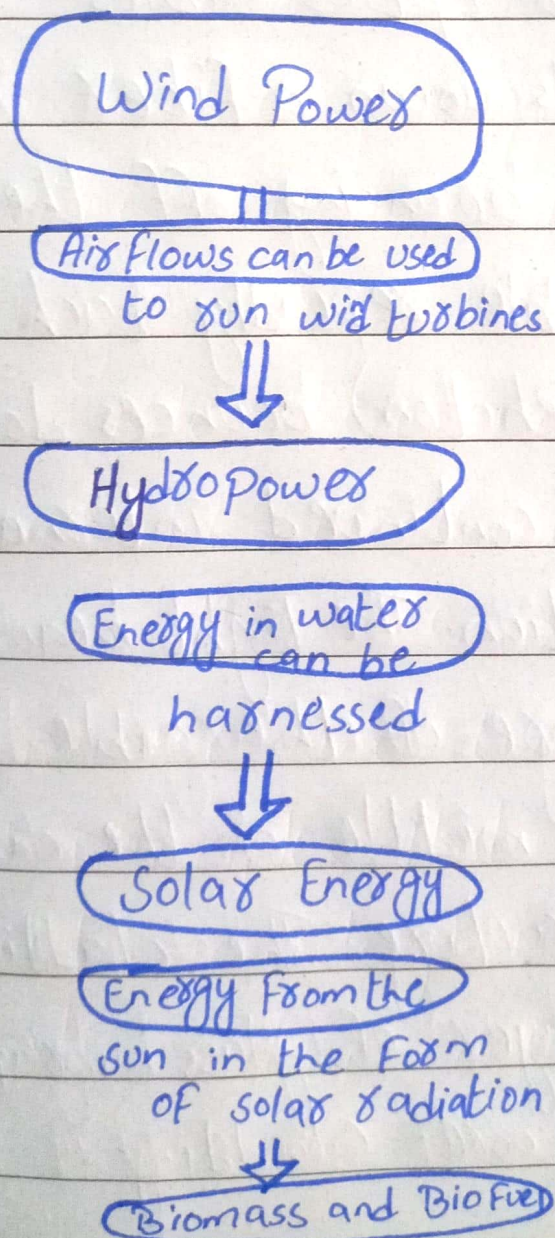
According to research, the universe is approx. 13.8 billion years old. Astronomers determine this by using two different methods:

1. Age of galaxies from travel time of the light
2. Age of the universe from expansion.

# Discuss any five sources of Renewable Energy.

Renewable energy is collected from resources which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat.

Sources of Renewable energy:-



It is derived from  
living organisms

(2d)

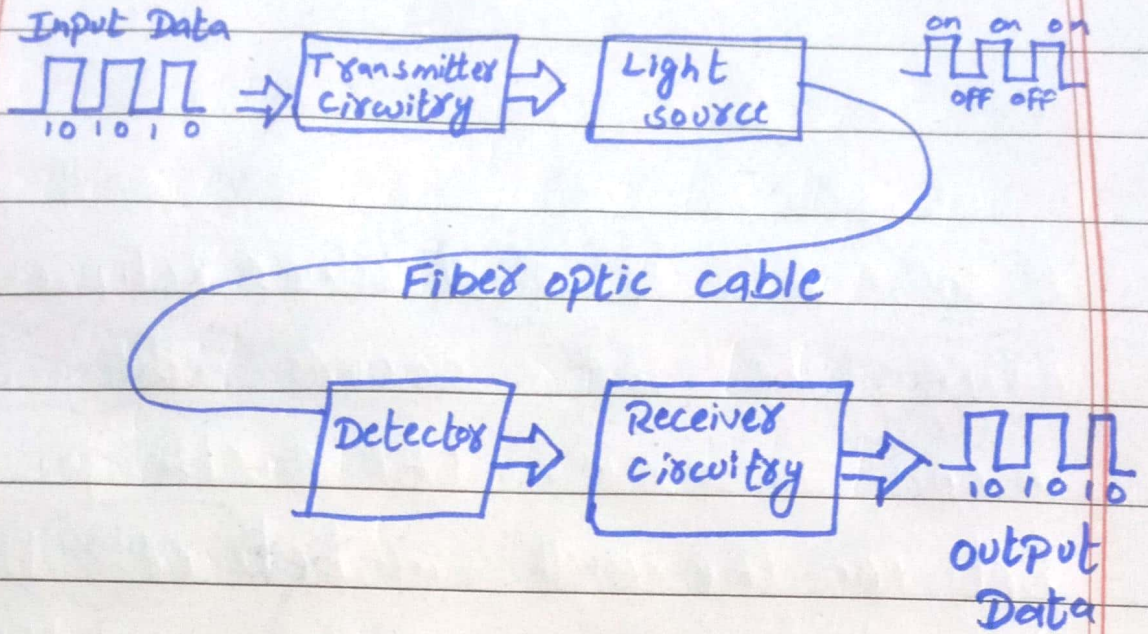
**Optical Fibers :-**

**Working of optical fibers :-**

Fiber optics are long, thin strands of carefully drawn glass about the diameter of a human hair. These strands are arranged in bundles called fiber optics cables.

Light travels down a fiber optic cable by bouncing off the walls of the cable repeatedly. Each light particle (photon) bounces down the pipe with continued internal mirror-like reflection. The light beam travels down the core of the cable. The core is the middle of the cable and the glass structure. The cladding is another layer of glass wrapped around the core. Cladding is there

to keep the light signals inside the core.



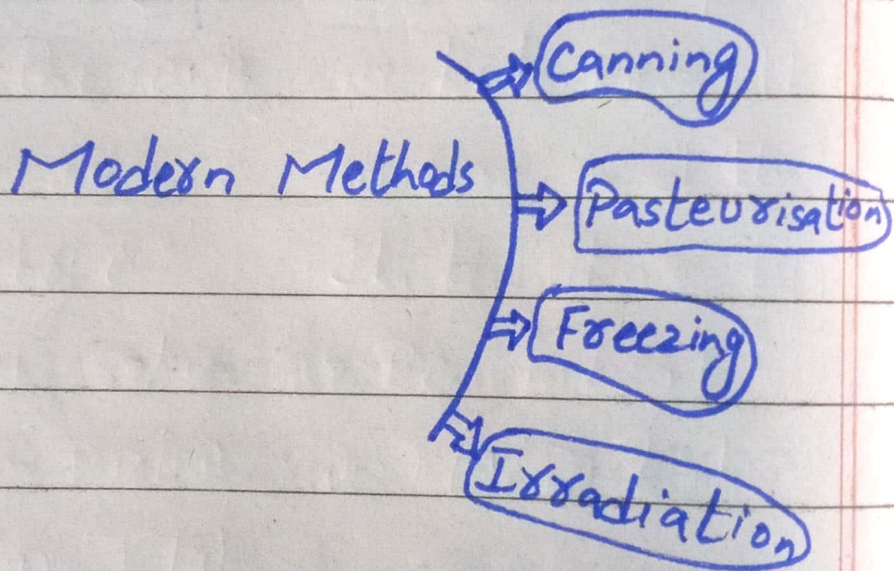
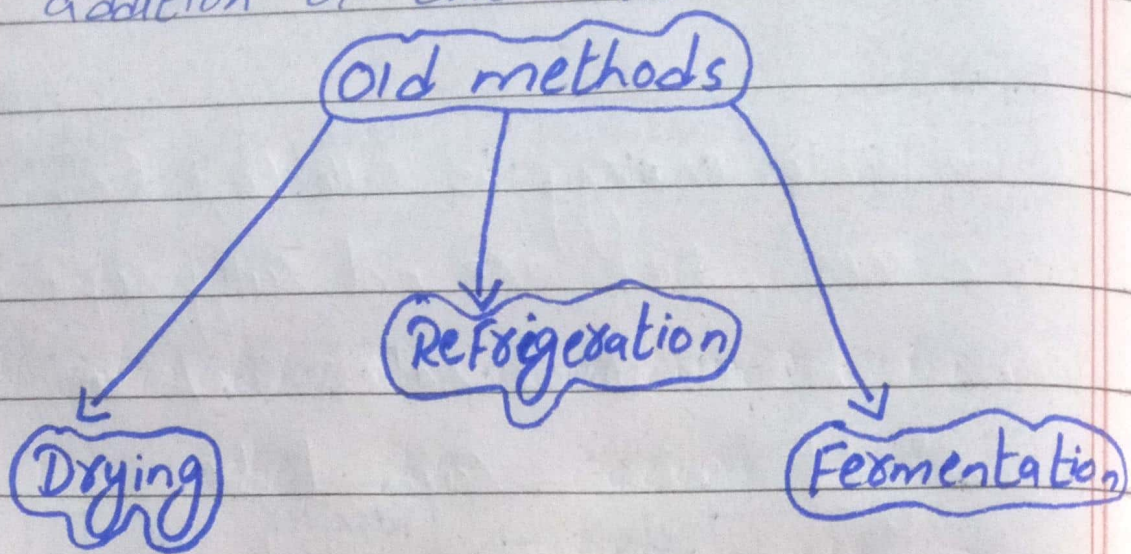
## (Question: 5)

a) Different methods of Food preservation?

Food preservation is any of a number of methods by which Food is kept from spoilage after harvest or slaughter. Among the oldest methods of preservation are drying, refrigeration, and fermentation. Modern methods include canning, pasteurisation,



Freezing, irradiation, and the addition of chemicals.



(b)

**Milky way:-**

Milky way is the large, disk-shaped galaxy that includes our solar system.

A spiral galaxy is shaped like a disk, usually with a bulge in the centre with arms that spiral

outwards as the galaxy rotates.

Main features of Milky way Galaxy

are:-

- (i) The Milky way is about 100,000 light years in diameter.
- (ii) This spiral galaxy formed about 13.7 billion years ago.
- (iii) Sun takes roughly 250 million years to orbit around the Milky way.

**How dark matter is related to Galaxy? Give different parts of Galaxy.**

Dark matter makes up most of the mass of galaxies and galaxy clusters, and is responsible for the way galaxies are organized on grand scales. Dark energy, meanwhile is the mysterious influence driving the accelerated expansion of the universe. Milkyway and Andromeda

are the examples of galaxy.

(c)

### Solar Eclipse

(i) A solar eclipse happens when the moon passes in between the earth and the sun.

(ii) It has three types of solar eclipse  
 (i) Partial  
 (ii) Annular, Total

(iii) The longest duration is around 7 and a half minutes

### Lunar Eclipse

A lunar eclipse occurs when the earth passes in between the moon and the sun.

It has two types:  
 (i) Penumbral  
 (ii) Total/Partial

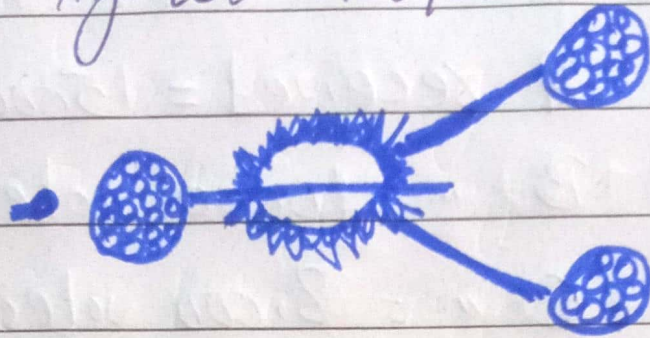
The time period is almost half / an hour

(d)

## Nuclear Fission and Fusion?...

Nuclear Fission:-

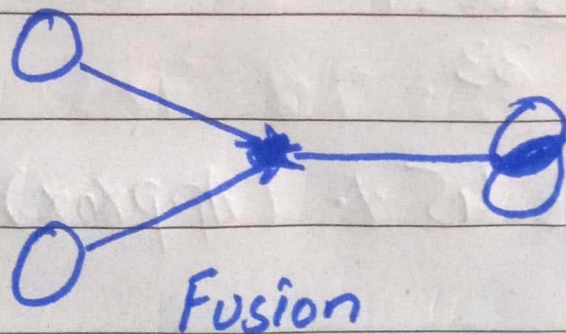
Fission is the splitting of a heavy, unstable nucleus into two lighter nuclei.



Fission

Fusion:-

Fusion is the process where two light nuclei combine together releasing vast amounts of energy.



# (Section-II)

## (Question: 6)

a) Three candidates - - - - -

Sol:-

Let, A received = 15,000 votes

B " = 10,000 votes

C " = 8,000 votes

Winner is = 15,000 votes

$$\text{Percentage of winning candidate} = \frac{15,000 \times 100}{33,000}$$

$$= \frac{15,000}{33,000} \times 100$$

$$= \frac{1500}{33}$$

$$= 45\% \text{ (Approx)}$$

Rough work

45.45

33		1500
		132
		180
		165
		150
		132
		180
		165

b) Angles are in the ratio of 3:4:5  
 Let the angles be  $3x$ ,  $4x$ ,  $5x$   
 $3x + 4x + 5x = 180^\circ$  (sum of angles of triangle)

$$12x = 180$$

$$x = 15$$

$$3(15) + 4(15) + 5(15) = 180^\circ$$

$$45^\circ + 60^\circ + 75^\circ = 180^\circ$$

$$180^\circ = 180^\circ$$

c) Boys = 4, Girls = 6  
 Boys =  $x$ , Girls = 102

$$\frac{4^2}{6^3} = \frac{x}{102}$$

$$\frac{2}{3} = \frac{x}{102} ; \quad 2 = \frac{x}{102} \times 3$$

$$2 = \frac{x}{34}$$

~~$$2 \times 102 = 102x$$~~

~~$$3$$~~

~~$$\frac{102}{3} = x$$~~

$$x = 32 \times 2$$

$$x = 64$$

$$\frac{102}{3} = 34$$

d) The ratio between the present age of A and B is 6:7

Ages of A and B can be represented as  $6x$ ,  $7x$

After 5 years, the ratio = 7:8

$$\frac{(6x+5)}{(7x+5)} = \frac{7}{8}$$

$$48x + 40 = 49x + 35$$

$$40 - 35 = 49x - 48x$$

$$5 = x$$

$$x = 5$$

present age of A =  $6x = 6 \times 5 = 30$  yrs

" " B =  $7x = 7 \times 5 = 35$  yrs

### (Question: 8)

9. The three consecutive numbers:

Let,  $a$ ,  $a+2$ ,  $a+4$

$$a + a + 2 + a + 4 = 273$$

$$3a + 6 = 273$$

$$3a = 273 - 6$$

$$3a = 267$$

$$a = 89$$

Hence, three consecutive odd numbers are 89, 91, 93

d) Let the ages of Sara, Ali and their mother be  $x, y$  &  $z$

$$6x = z \quad (i)$$

$$2x = y \rightarrow (ii)$$

$$x + y + 2 + 3 + 3 + 3 = 72$$

$$x + y + 2 + 9 = 72 \rightarrow (iii)$$

Putting values of  $z$  and  $y$  in equ. (iii)

$$x + 2x + 6x + 9 = 72$$

$$9x + 9 = 72$$

$$9x = 72 - 9$$

$$9x = 63$$

$$x = 7$$

$$\frac{2x = y}{2(7) = y} \Rightarrow y = 14$$



Date: \_\_\_\_\_

$$6x = 2$$

$$6(7) = 2$$

$$2 = 42$$

Age of Sara  $x = 7$  years

Age of Ali  $y = 14$  years

Age of their mother  $z = 42$  years

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