

PART-II
(Section - A)

Q.No.2

Structure of Universe
according to Big Bang Theory.

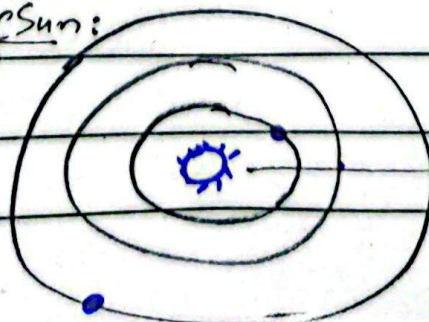
Big bang theory is the most accepted theory of the origin of the universe. In universe, there are number of objects that constitutes it. Following is the structure of the universe.

1) Stars and clusters of Stars:

Stars are main parts of the universe's composition. They are bodies which actually play a role in regulating solar systems.

There are many examples including Regel, Vega, Sun, and Aldebaran.

Example of Sun:



Sun in the
Solar System.

2) Galaxies and clusters of galaxies:

There are galaxies in the universe. Discoveries of new galaxies is the quest of current scientific world.

Example: Milkyway Galaxy, Andromeda.

3) Planets and celestial bodies:

Planets, including earth, remains key part of the structure of universe and also other celestial bodies. Example; Asteroids, Moon, and Jupiter etc.

4) Dark Energy, Dark matter, and ordinary matter:

'Dark energy', 'Dark matter', and 'ordinary matter' composes 70%, 25%, and 5% of the universe.

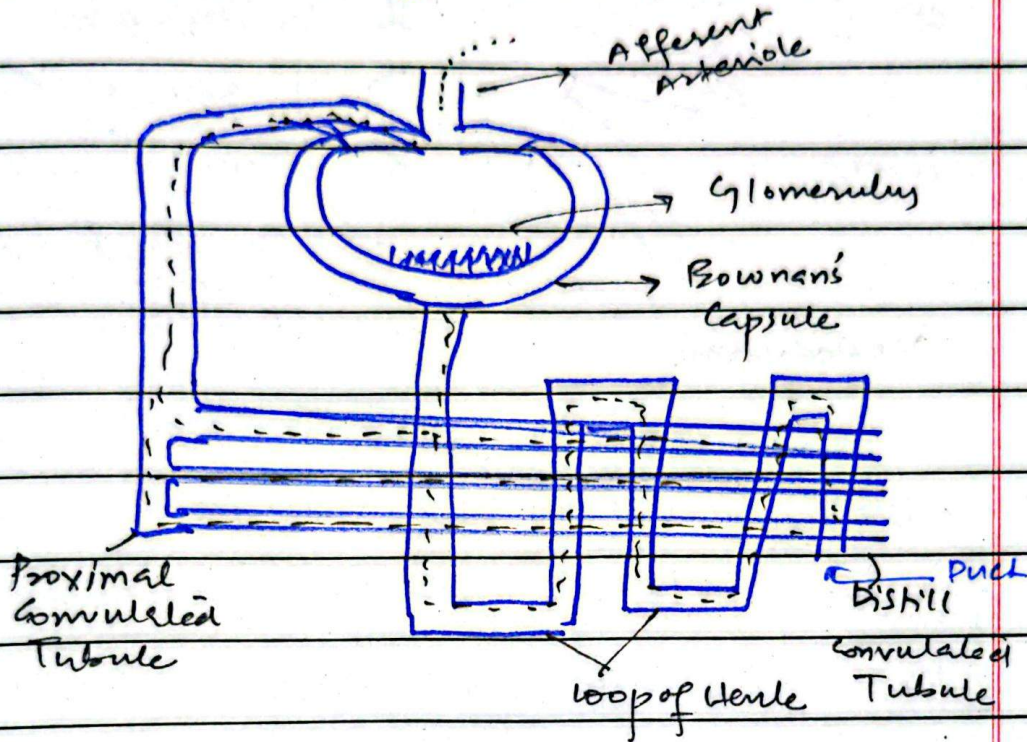
5) Black holes:

Recently, in 2019, Event Horizon Telescope discovered the blackholes as key component in the universe.

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b.) Urinary System and Working of Nephrons:

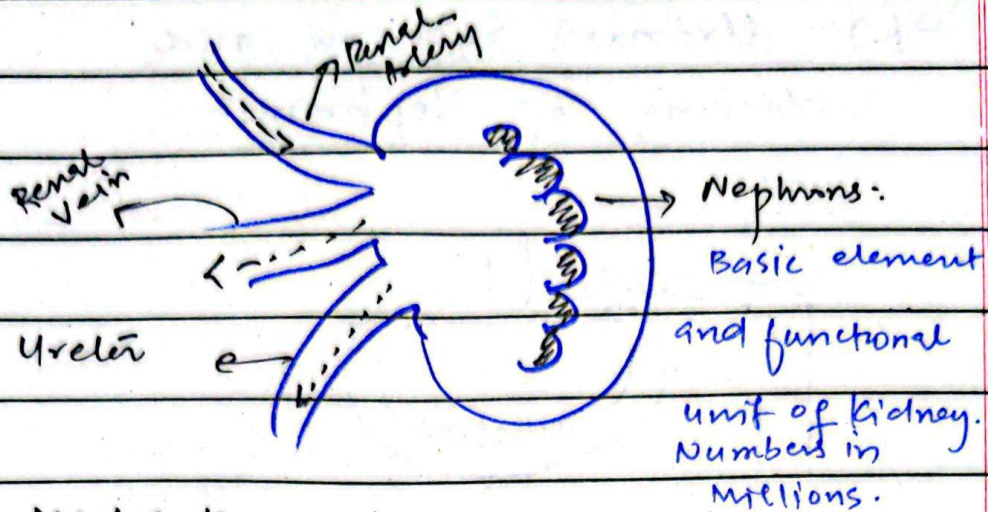


Mechanism:

Waste comes from
Afferent arteriole and filtered by
glomerulus (capillaries supported by
Bowman's capsule). After filtration
Efferent arteriole facilitates passage.
Further, calcium, vitamins, and
minerals are again absorbed under
the action of (PCT) and (DCT).

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Mechanism:

Renal Artery brings the waste, filtered blood is passed through renal vein. Ureter helps the passage of remaining waste.

C) Un-balanced Diet:

Un-balanced diet means disproportional intake of primary and secondary nutrition. This includes taking irregular amounts of carbohydrates, proteins, fats, vitamins, and minerals. While balanced diet refers to taking just enough amounts to sustain life and help functioning of vital organs at optimal level.

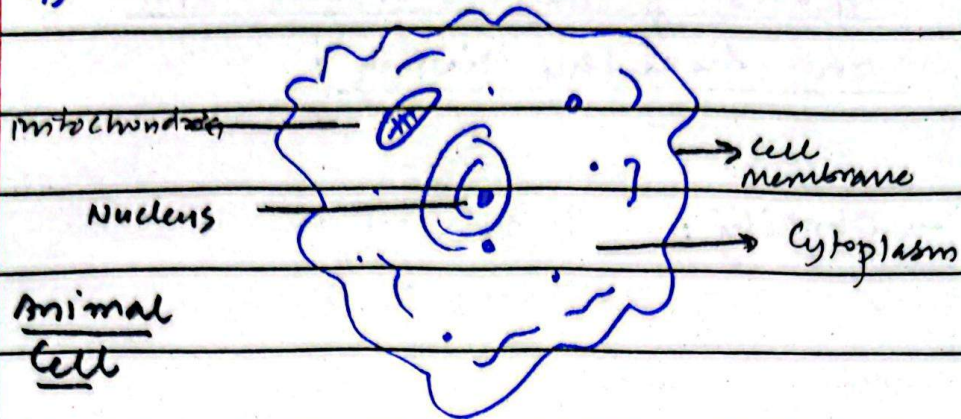
• Effects of Un-balanced Diet on healthy living:

- **Obesity:** Taking fats and carbohydrates in unusually large amounts result in obesity.
- **Heart Issues:** 'Plaque buildup' in arteries and veins due to fat (excessive) increases pressure on heart.
- **Kidney damage:** More intake of fat soluble vitamins including vitamin D can result in kidney stones.
- **Drowsiness and Dizziness:** Taking vitamins in excessive amount results in dysfunctionality of vital organs.
- **Functionality of liver compromised:** Increased amount of fat soluble vitamins increases the load on kidney.
- **Weakness:** Deficiency of all the nutrients results in weakness and compromised lifestyle.
- **Weak Immune System:** Overall weakness and deficiency weakens the immune system.

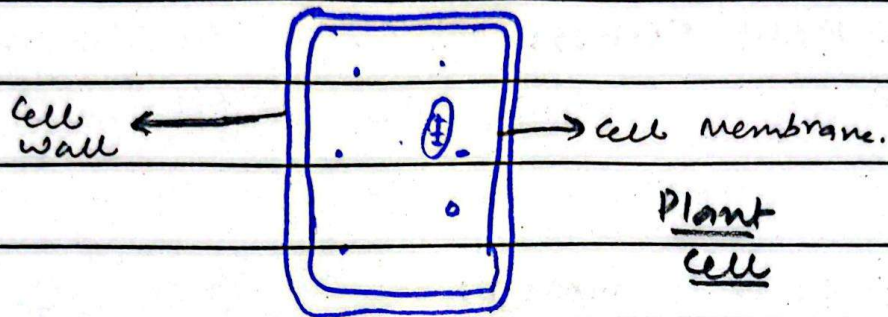
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d)



Animal
Cell



Plant
cell

→ Animal cell's example and plant cell with one having only cell membrane while other has both.

• Function of cell wall:

Cell wall perform a key function in cell's composition. It gives support to cell and protects the inside elements of a cell.

- Function of Cell Membrane:

The function of cell membrane is to control the (movement in and out of the cell).

- Function of Cytoplasm:

Cytoplasm is a suspending fluid in the cell. It holds the particles together.

- Function of Mitochondria:

Mitochondria's function is to provide the energy. It is called 'powerhouse of a cell'. It produces ATP (Adenosin Triphosphate) which plays a key role in generating the necessary energy.

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Q.NO.3:

a) Reversal of Global Warming:

Global warming can be reversed by the addressing the root cause of it and that is increment in the amount of 'green-house gases' GHGs . Following are the reversal techniques and methods.

- Reforestation:

Forests serve as natural "carbon sinks". Reforestation will result in reduction of carbon (CO_2) concentration in the climate.

- Limits on fossil fuel Burning:

The incomplete burning of fossil fuels results in emission of GHGs gas Carbon mono oxide. Therefore, regulations on Transport sector and promote e-vehicles is a viable solution.

- Taxation and penalties on GHG emission at industrial level:

Industrial emission, as per IPCC, is key contributor to global warming. Therefore, they should be subject to strict regulation and taxed upon the emission.

- Moving on to Renewable energy:

Renewable energy serve as a viable substitute to conventional one. Therefore, harmful energy should be curbed and renewable one should be promoted. eg- Solar power.

- Spreading awareness among general population:

General populace should be aware of the risks of global warming and that they should be given instructions to adopt sustainable practices at every movement and stage of life.

b) CERAMICS:

Ceramics are materials that are 'non-metallic' and inorganic in nature. They are burned at higher temperatures before moulded into desired shapes.

• Properties of ceramics:

- 1) Plastic in nature
- 2) Melts under higher temperatures
- 3) Deform. under heavy stress.

• Applications of ceramics:

2) In optics:

Ceramics, for example 'glasses', 'lens', and 'mirrors' are revolutionary in the field of optics.

2) In Aeronautics:

ceramic materials are being used in making of aerospace objects including many parts of satellite.

3) In Military Equipment:

Ceramics are now being used in heavy industries including in ordnance factories.

4) In Construction Sector:

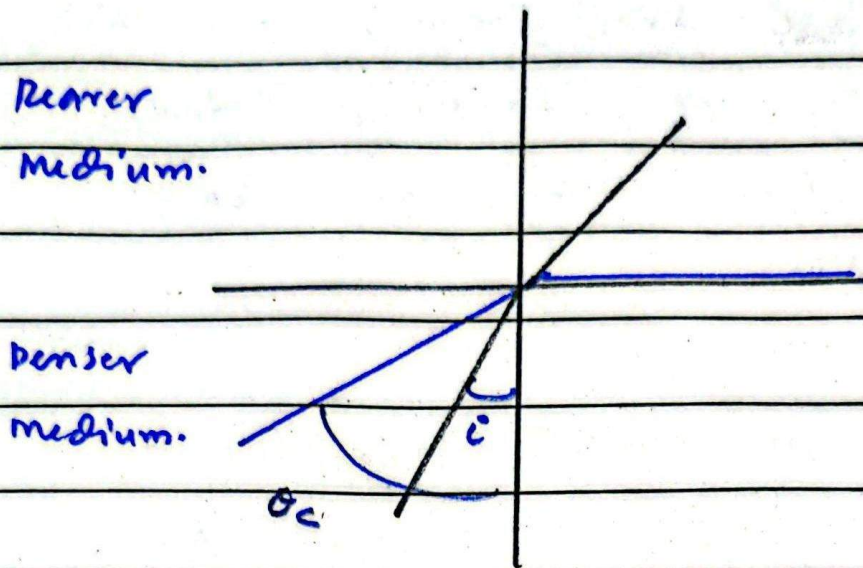
Pole of Bricks, tiles, and other materials remain indispensable in the construction industry.

5) In Communication and modern technology:

In every industry, ceramics are dominating including tech tools.

Eg: Ceramic screen in Apple's iPhone.

c) i. Working of optic fibre:



i = incident angle

θ_c = Critical angle.

Mechanism;

Working of fibre optics is done under the principle of total internal reflection, in which light shifts from rarer to denser medium. When angle of incident becomes greater than angle of critical. i.e. ($i > \theta_c$). The ray comes or falls back into the denser medium. In fibre optic case, to the glass core.

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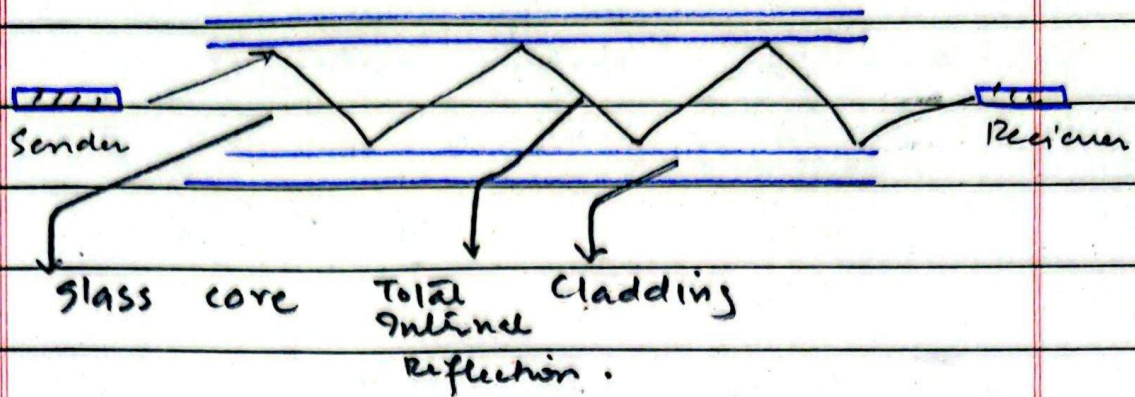
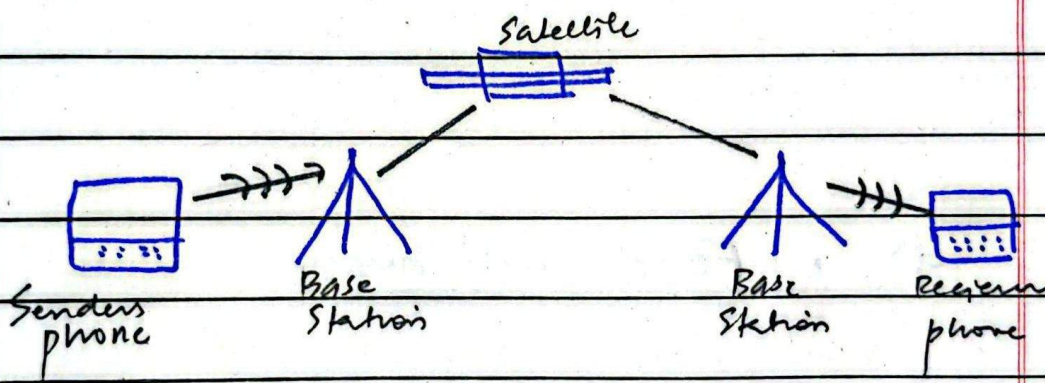


Figure: working of fibre optic.

ii) Working of a Cell phone:



Mechanism:

- 1) Sender dials the phone.
- 2) Phone's antenna converts sound into electric signals
- 3) signals are received by sender's nearest station tower called base station

- 4) Base station with the help of satellite connects with receiver's base station (nearest tower)
- 5) Receiver's base station sends signals to receiver's mobile phone
- 6) Receiver's antenna converts electric signals back into sound.

d) • Food Additives:

Food additives are additions added to food for required taste or quantity. Usually used at homes and kitchens.

• Food Preservatives:

They are used to preserve food for a long time i.e. days to weeks. These include refrigeration, adding salt, or vinegar.

Day: _____

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• Food Adulteration:

Food adulteration refers to an illegal activity to make the quantity grow or quick growth of food for profit. Usually done commercially.

• Food contamination:

Food contamination refers to unwanted addition into food that result is food being not fit for consumption.

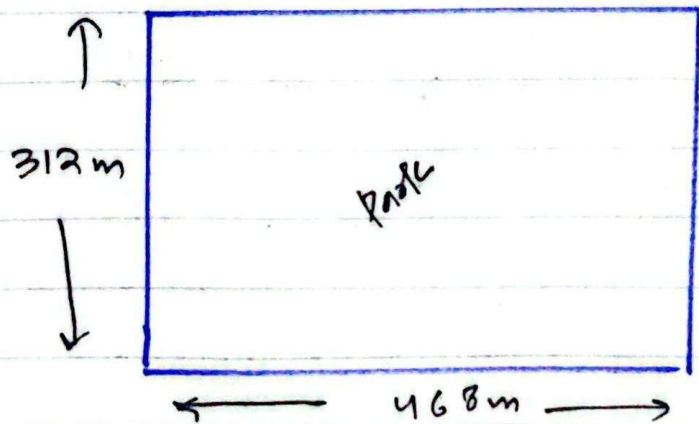
Example: spore landing on a bread.

Section - B

Q. No. 6

A) The woman is the mother of Ahsan.

B)



3:2.

Soln:

- Ratio of length and breadth of the park = 3:2
- Cycling speed of man = 12 km/hr
- Cover one round = 8 minutes
- Area of park in sq.m = ??

Finding total perimeter of
part to divide it as per
ratio to find length and
breadth,

$$\therefore v = \frac{S}{T}$$

$$12 \frac{\text{km}}{\text{hr}} = \frac{S}{8}$$

$$S = 12 \frac{\text{km}}{\text{hr}} \times 8 \text{ minutes}$$

Changing units for uniformity.

$$S = 12 \frac{\text{km}}{\text{hr}} \times 0.13 \text{ hr}$$

$$S = 1.56 \text{ km}$$

$$S = 1.56 \times 10^3 \text{ m}$$

$$S = 1560$$

$$1 \text{ part} = \frac{1560}{10} = 156$$

Solving for length

$$156 \times 3 = 468 \text{ m}$$

Solving for breadth

$$256 \times 2 = 312 \text{ m}$$

$$\text{Area of Park} = 312 \times 468$$

$$\boxed{\text{Area} = 146016 \text{ sq.m}}$$

c)

$$10n + (n+2) = 11n+2$$

$$\text{Sum} = n + (n+2) = 2n+2$$

Given,

$$(11n+2)(2n+2) = 144$$

$$(11n+2) \times 2(n+1) = 144$$

$$(11n+2)(n+1) = 144 \div 2$$

$$(11n+2)(n+1) = 72$$

Trying integer value of $n=2$

$$(11 \times 2 + 2)(2+1) = 72$$

$$72 = 72$$

So the numbers,

$$11(2) = 22 = 24$$

2)

Ratio of numbers = 2:3

$$L.C.M = 48$$

let numbers be $2k$ and $3k$

$$LCM = 2 \times 3 \times k = 6k$$

Given,

$$6k = 48$$

$$k = 8$$

$$2k = 2 \times 8 = 16$$

$$3k = 24$$

$$16 + 24 = 40$$

$$\text{Answer} = 40$$

Q. No. 7

A)

let the numbers be x and y .

Analyzing the statement,

$$\frac{40}{100} \times x = \frac{2}{3} \times y$$

Solving for

Ratio of first number to other,

$$\frac{4x}{10} = \frac{2y}{3} \quad \rightarrow$$

$$\frac{4x}{2y} = \frac{10}{3}$$

$$\frac{2x}{y} = \frac{10}{3}$$

$$\frac{x}{y} = \frac{10}{3 \times 2}$$

$$\frac{x}{y} = \frac{10}{6}$$

$$\frac{x}{y} = \frac{5}{3}$$

$$\boxed{\text{Ratio} = 5:3}$$

B)

CP of 17 balls = $17x$

loss = cost price of 5 balls = $5x$

$$SP = 720$$

$$\text{loss} = CP - SP$$

$$17x = 720 = 5x$$

$$17x - 5x = 720$$

$$12x = 720$$

$$x = \frac{720}{12}$$

$$x = 60$$

cost price of one ball is 60

c)

A man is 24 years older than his son,

$$(\text{son}) n = \text{Father} (n+24)$$

In 2 years, his age will be as that of his son,

$$2(n+2) = n+24+2$$

$$2n+4 = n+26$$

$$2n-n = 26-4$$

$$n = 22$$

→ 22 is the present age of the son.

D)

$$\bullet \text{ Rate of Rashid} = \frac{32}{2}$$

$$= \frac{16}{3} \text{ pages/hr}$$

$$\bullet \text{ Kamran,}$$

$$= \frac{40}{5}$$

$$= 8 \text{ pages/hour}$$

$$\bullet \text{ Combined rate}$$

$$= \frac{16}{3} + 8$$

$$= \frac{16+24}{3}$$

$$= \frac{40}{3}$$

$$\bullet \text{ Time for 110 pages}$$

$$= \frac{110}{\frac{40}{3}}$$

$$= \frac{110 \times 3}{40}$$

$$= 8.25 \text{ hours}$$