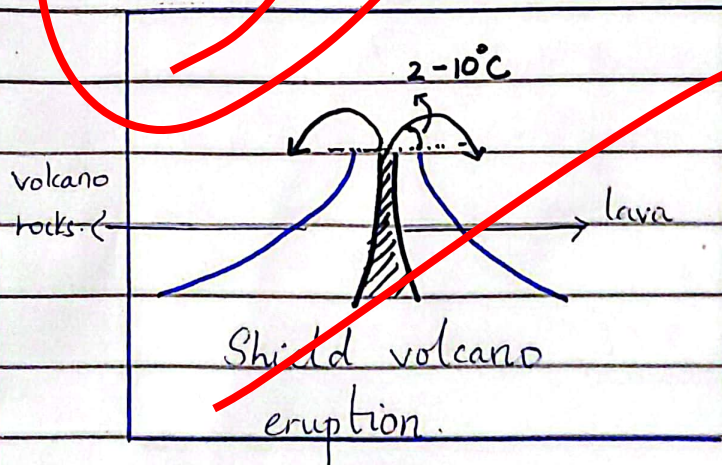
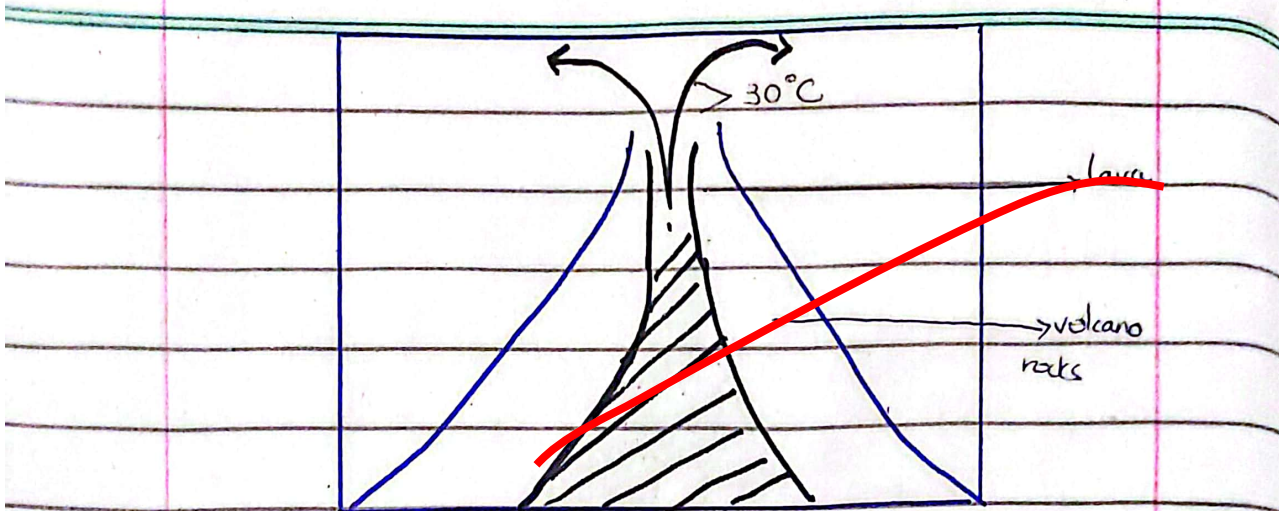


PAPER II : Science

Ans # 2 (a)

A volcano is a vent in ^{core} surface of the earth. It consists of lava in it. This lava is molten or partially molten rock (magma) that has been expelled from the interior of the earth. The eruption of volcano is marked by lava coming out of the volcano's vent. This lava could erupt at different angles and the image below shows these multiple types.





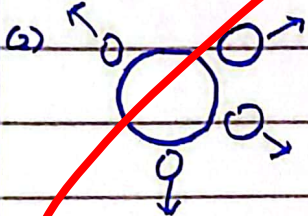
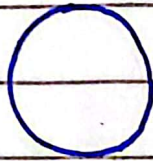
Cinder Cones

The lava erupts from a volcano when the fluid (or semi-molten rock) ^(magma) rise up. They rise up due to lower density than other metallic rocks. When the tectonic plate under the surface of the volcano move, the shaking causes the magma to be pushed out of the vent of the volcano. The angle of eruption is determined by the type of volcano.

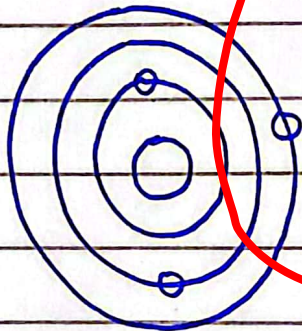
Ans # 2 (b)

BIG BANG

(1)



(3)



→ The big bang is a theory that explains the formation of our universe.

→ The big bang explains that universe was once a solid mass, bound by gravitational energy - (As shown in picture)

→ Then the universe broke down and released matter

into space (As shown in 2. in diagram)

→ Lastly the universe arranged itself in form of the current galaxy milky way and our solar system was created.

BIG CRUNCH

The big crunch is another theory which says that eventually the universe will start to move back and will ultimately become one single body as well. This will take the universe back to where it began.

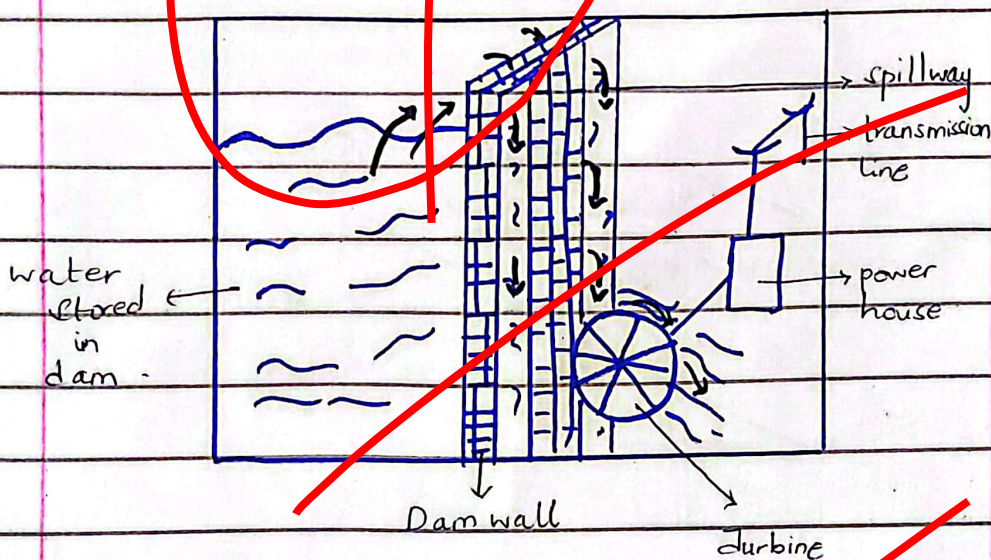
‡ Ans # 2c

SOLAR ENERGY

The solar energy refers to the energy that is produced from sunlight. Silicon plates are heated using sun's energy to produce other form of energy such as electricity.

HYDAL ENERGY

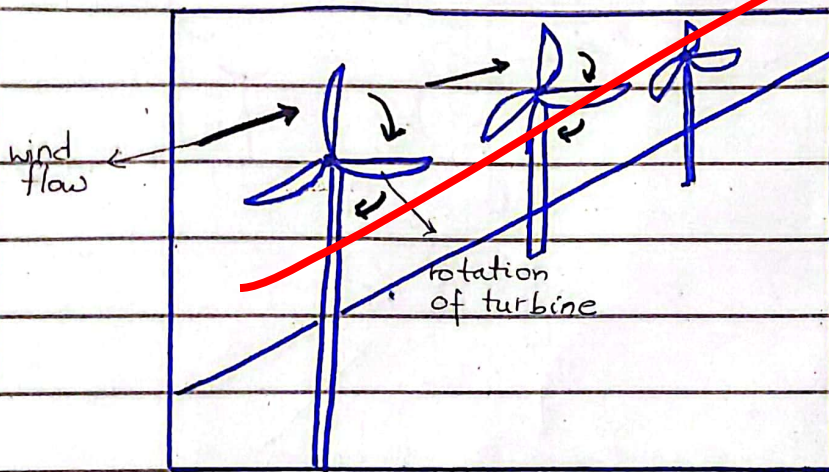
As the name suggest hydal energy is used to produce electricity using the energy of water. The water has potential energy which is converted to kinetic energy of the turbines. The turbines kinetic energy generate electricity. The process is shown in diagram below.



The water stored is passed from height using a dam wall and spillway. The potential energy of water moves the turbine. The movement of turbine creates electricity.

WIND ENERGY

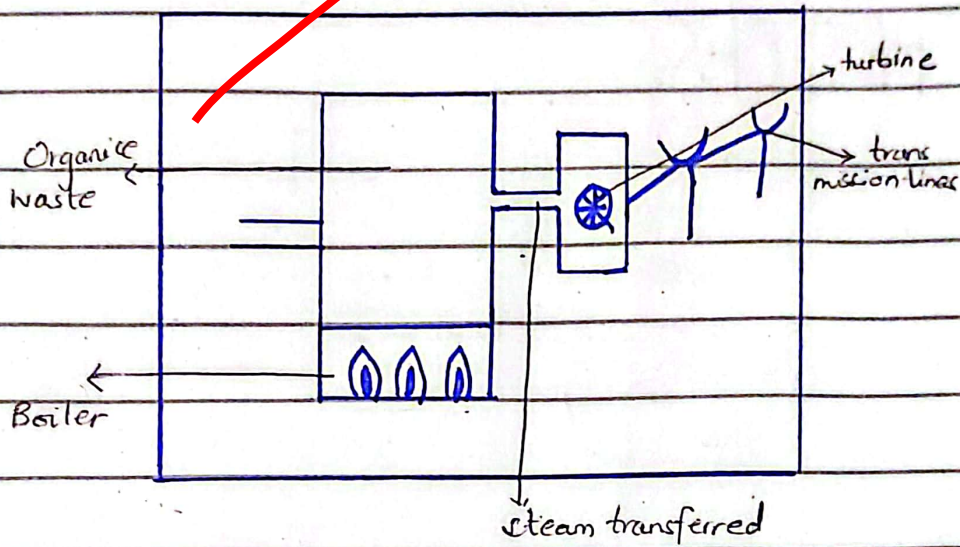
Wind energy using the force in the fast moving wind to move turbines to generate electricity. The turbines are suspended with a wind mill. The diagram outlays the process.



BIOMASS

Biomass using organic waste in generation of electricity. Essentially the waste is burned to produce gas that can move the turbine. This system is

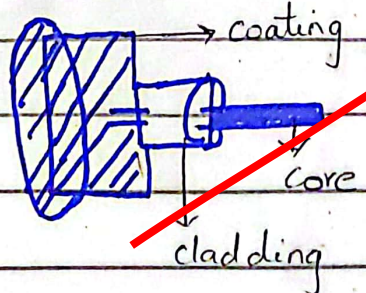
especially effective in rural areas as the available waste is not enough for commercial electricity generation. The diagram shows the process.



Ans # 2(d)

STRUCTURE : OPTICAL FIBER

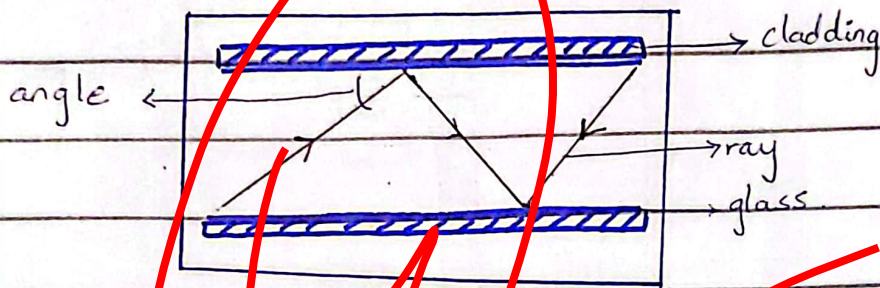
External Area



The external area of optical fiber consists of 3 parts

- (i) core \rightarrow glass strands
- (ii) cladding \rightarrow high refractive index material
- (iii) Coating \rightarrow plastic for mechanical and energy loss protection.

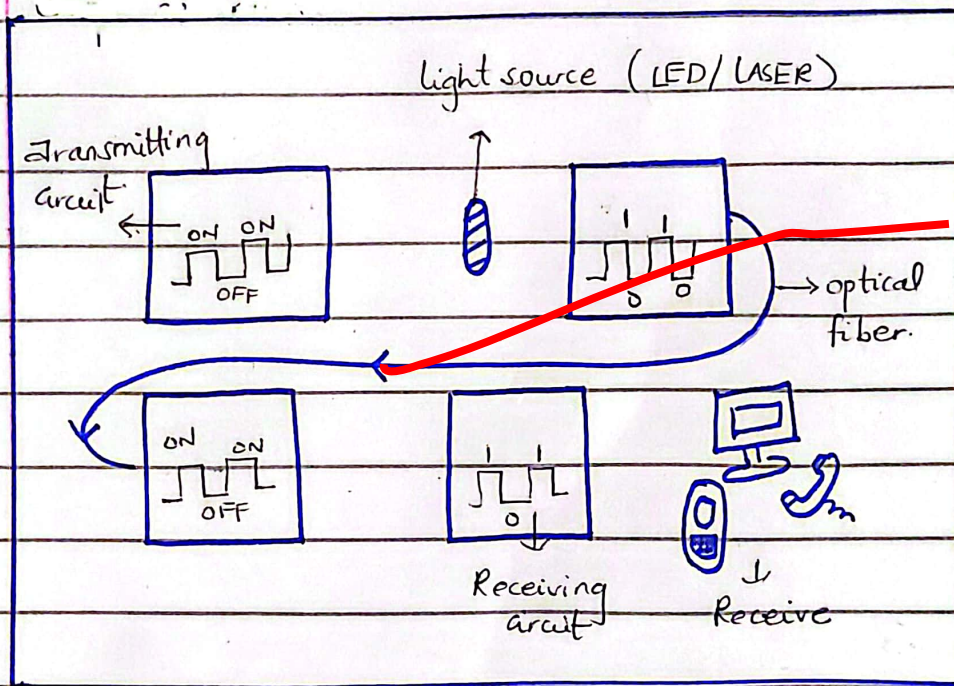
PROCESS



The ray of light enters optical fibre. It is projected at angle greater than critical angle on the glass. Since the angle is greater than critical angle (angle for which refraction occurs at 90°) and the cladding is of higher refractive index material, the light will be reflected. The process will continue. This process of reflected all light is called Total Internal Reflection.

TRANSMISSION

The transmission through optical fibre occurs when the signal from transmission circuit is detected by receiving circuit from one point to another. The process is outlined in the diagram below.

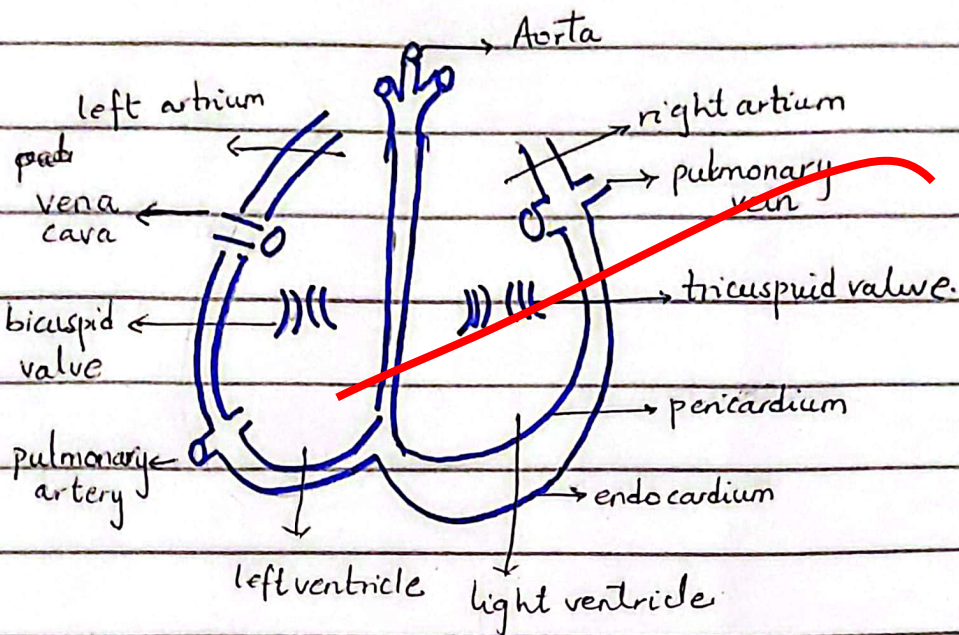


Transmission through fiber optic.

ANS # 4

A) SOLID WASTE MANAGEMENT

B) HUMAN HEART



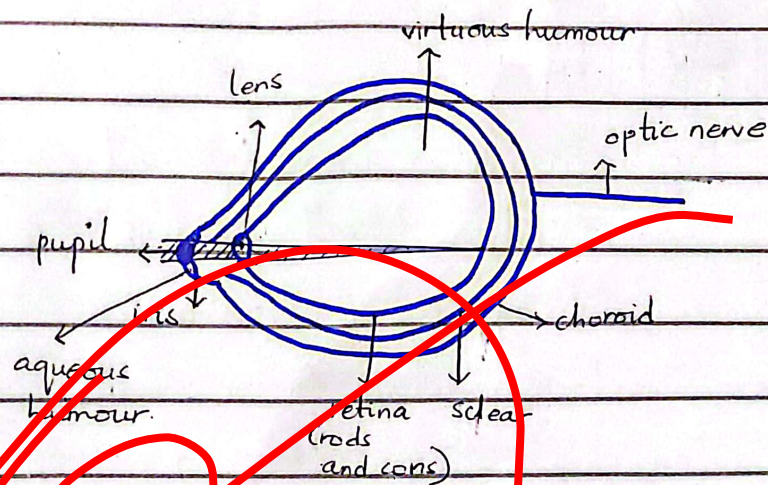
- Deoxygenated blood from the body enters the heart through vena cava into the upper left chamber of heart called left atrium.
- After that it moves into the lower left chamber or left ventricle after passing through bicuspid valve. The bicuspid valve prevent backward flow of blood.
- The blood is then pumped to lungs via pulmonary artery.
- After oxygenation in lungs the bloods again enters the heart through pulmonary

vein - After which it moves to the
light ventricle.

→ The heart pumps oxygenated blood
in body through aorta.

→ The wall lining of left side is thicker
because the pressure of pumping blood to
body is greater than that of pumping blood
to the lungs.

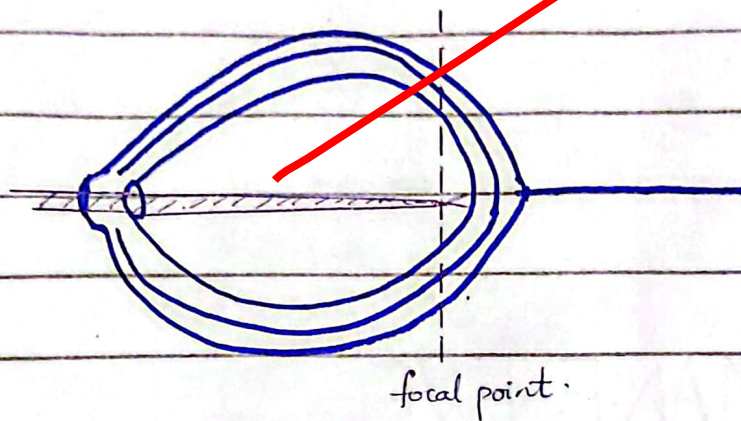
C) HUMAN EYE



MYOPIA

Myopia is also known as short-sightedness. It is the inability to see objects far away. It happens when the focal point of lens

concentration of light starts before the retina. The diagram shows the difference. The normal sight is in picture one.



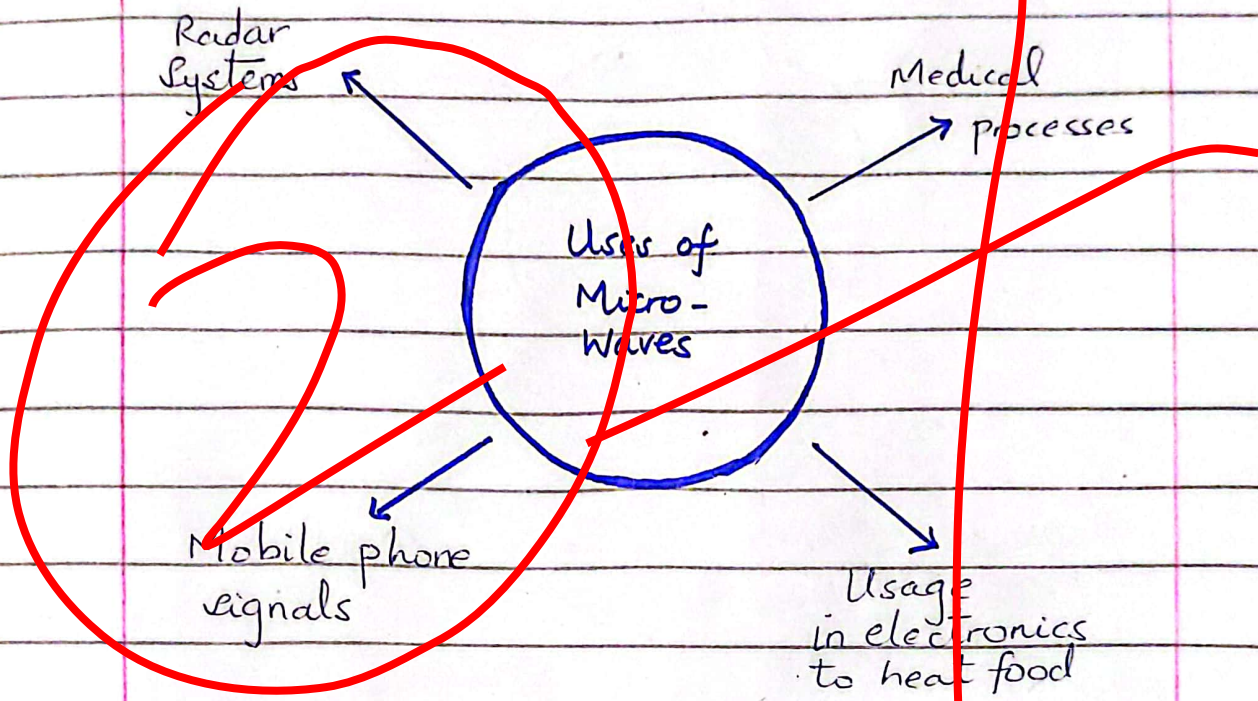
HYPERMIA

Hyperemia also known as red eye, occurs when blood vessels in white part of eye (sclera) become enlarged due factors such as allergies, injury, thyroid, or sun exposure.

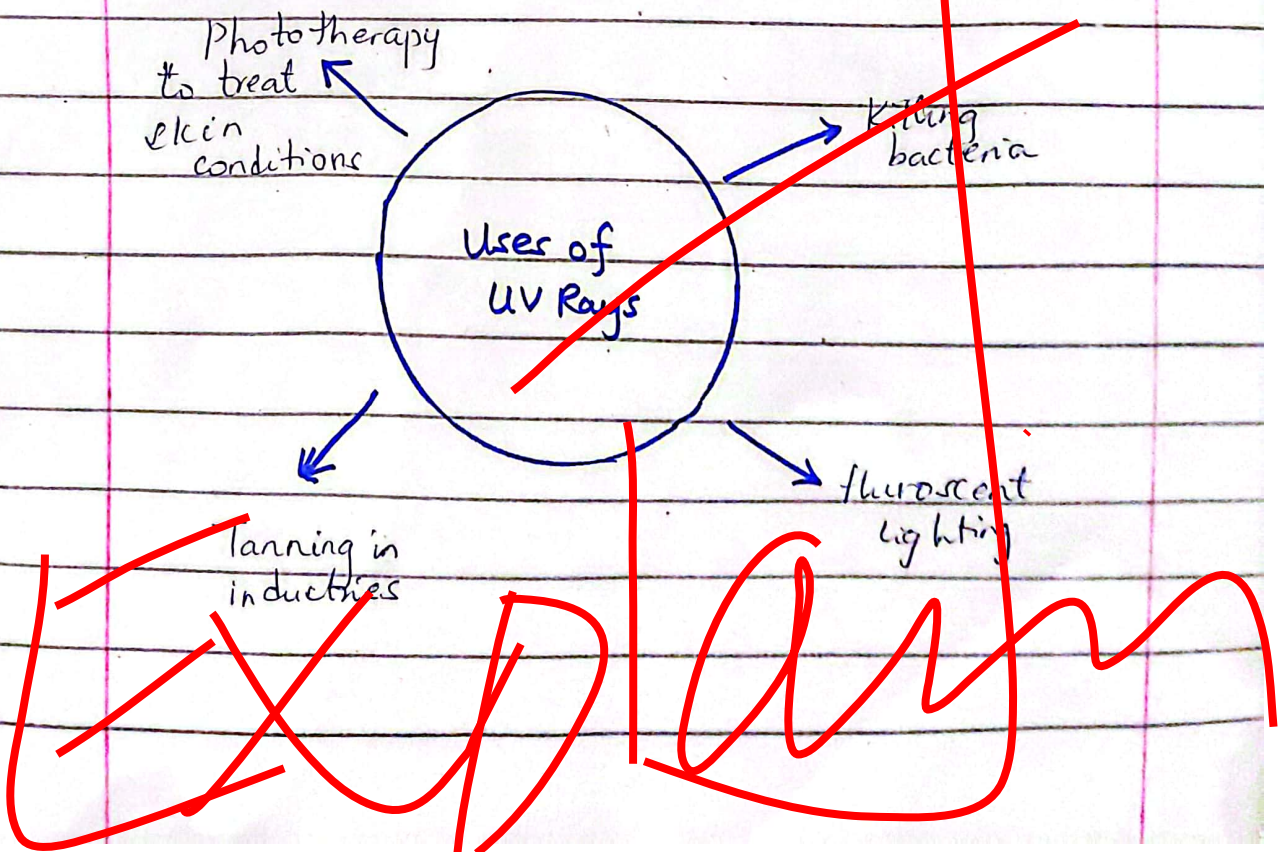
In most cases Hyperemia is resolved on its own. However, in case of factors such as bacterial infection treatment is recommended.

D) USES OF

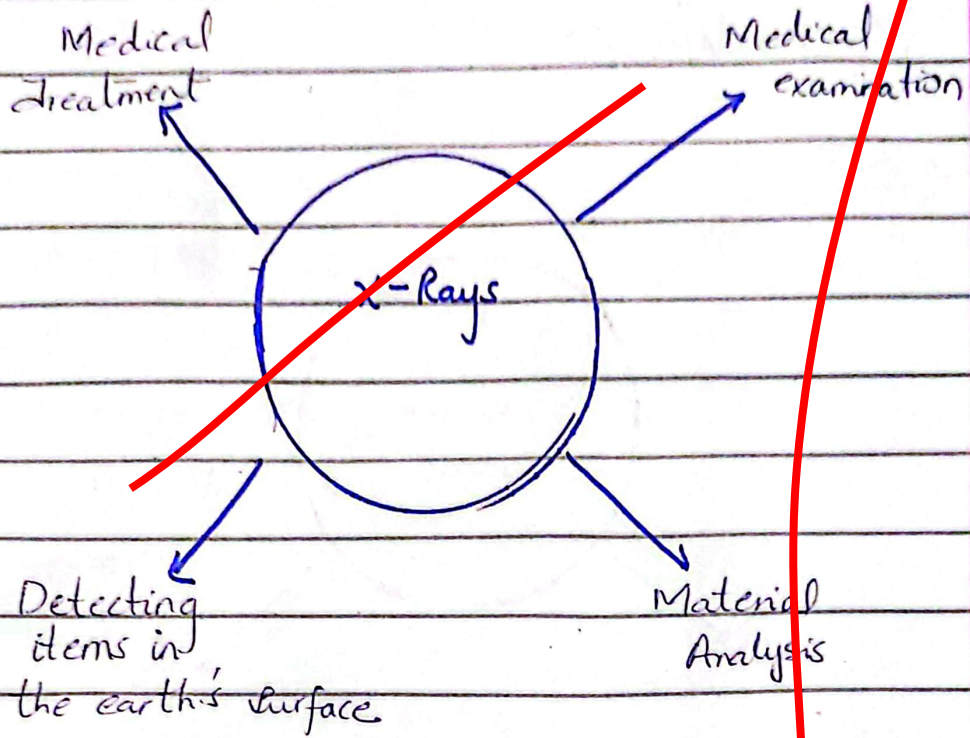
1) MICRO WAVES



2) Ultraviolet Rays



3) X-Rays



PAPER II: SECTION II

ANS # 8

A) Data Given

$$\text{Sum} = 273$$

Let's assume smallest odd number = x .

Equation.

$$x + (x+2) + (x+4) = 273$$

$$3x + 6 = 273$$

$$3x = 267$$

$$x = 89$$

∴ Three odd numbers are ~~89, 91, 93~~.

B) (i) 4, 16, 36, 64, _____, 144

→ The missing number is ~~100~~ because the equation represent square of even numbers starting from 2.

(ii) 30, 29, 27, _____, 20, 15

→ The missing number is ~~24~~. The equation subtracts from previous number one greater than the difference from second.

(iii) 1, 7, 15, 25, ..., 51.

→ The difference between numbers = 6, 8, 10,

→ These are even number starting at 6

→ So next number is = $25 + 12 = 37$

(iv) 0, 2, 6, 12, 20, 30, ... ?

The series follows the equation

$$x = (x-1) \times \left[\frac{(x-1)}{(x-2)} + 1 \right]$$

$$\text{Hence } x = (30) \times \left[\frac{(30)}{28} + 1 \right]$$

$$x = 30 \times 7 = 210$$

(v) 48, 24, 72, 36, 108, ... ?

$$\begin{array}{cccc} \downarrow \times 2 & \downarrow \times 3 & \downarrow \times 3 & \downarrow \times 3 \\ (24 \times 2) & (12 \times 2) & (24 \times 3) & (12 \times 3) \\ (12 \times 2) & (6 \times 2) & (6 \times 2) & (2 \times 54) \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 6 & 3 & 3 & 2 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ 3 & 2 & 2 & 1 \end{array}$$

$$\begin{array}{cccc} 12 \times 4 & 3 \times 8 & 6 \times 12 & 7 \times 5 \\ 24 \times 2 & \downarrow & 24 \times 3 & \end{array}$$

Second term divided with first term give 2

$$\text{Hence } \frac{108}{2} = 54$$

The next term is 54

c) i) THIRST

ii) GARDEN

iii) STOMACH

iv) LONDON

v) HOLIDAY

S

d) Data Given

Sara's mother = $6x$

Sara's age = x

Ali's age = $2x$

$$(x+3) + (2x+3) + (6x+3) = 72$$

$$\begin{array}{r} 6x+12 \\ -x-3 \\ \hline 63 \end{array}$$

Solution

$$9x + 9 = 72$$

$$9x = 63$$

$$x = 9$$

Answer

Sara = 9 yrs

Mother = 54 yrs

Ali = 18 yrs

Ans# 6

a) Data Given

$$X's \text{ vote} = 15,000$$

$$Y's \text{ vote} = 10,000$$

$$Z's \text{ vote} = 8,000$$

Solution

The winning candidate is X

$$\text{Percentage of } X's \text{ vote} = \frac{X's \text{ vote count}}{\text{Total votes casted}} \times 100$$

$$= \frac{15,000}{15,000 + 10,000 + 8,000} \times 100$$

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

$$= 45.45\% \approx 45.5\%$$

Answer = ~~45.5~~ %

b) $12x = 180^\circ$

$$x = 15^\circ$$

The angle with ratio 3 : 45°

The angle with ratio 4 : 60°

The angle with ratio 5 : 75°

c) → The number of groups that can be formed with girls = $\frac{102}{6} = 17$

→ Hence, 17 groups will be formed

→ For 4 boys in each group the total number of boys will be = $17 \times 4 = 68$.

d) Given data

Assuming A's age = A ; B's age = B

$$A : B = 6 : 7$$

$$A + 5 : B + 5 = 7 : 8$$

$$\begin{array}{r} 13 \\ \times 5 \\ \hline 65 \end{array}$$

$$\frac{6A}{13} + 5 = \frac{7(A+5)}{13}$$

$$\frac{6A}{13} + 65 = \frac{7A + 35}{13}$$

$$6A + 65 = 7A + 35$$

$$7A - 6A = 65 - 35$$

$$\boxed{A = 30}$$

$$\frac{6B}{13} + 5 = \frac{8(B+5)}{13}$$

$$\frac{6B}{13} + 65 = \frac{8B + 40}{13}$$

$$\frac{6B}{13} + 65 = \frac{8B + 40}{13}$$

$$6B + 65 = 8B + 40$$

$$65 - 40 = 8B - 6B$$

$$2B = 25$$

$$B = \frac{25}{2} = 12.5 \text{ yrs.}$$

$$\boxed{B = 12.5 \text{ yrs}}$$

$$\begin{array}{r} 65 \\ -40 \\ \hline 25 \end{array}$$