

Mock GSA -

PART - (II)

SECTION - II

Increase length of  
theory portion  
Keep length equal for  
all answers  
Good for math work

General Abilities

Q#08

(a)

Solution:

Let the three numbers be  
 $x$ ,  $y$  and  $z$ ,  
As given, the numbers are  
odd and consecutive.

Suppose that, then

$$x$$

$$y = x + 2$$

$$z = x + 4$$

Now,

The sum of three numbers is 273.

So,

$$x + y + z = 273$$

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

$$3x + 6 = 273$$

$$3x = 273 - 6$$

$$3x = 267$$

$$x = \frac{267}{3}$$

$$x = 89$$

Now,

$$y = x + 2$$

$$y = 89 + 2$$

$$y = 91$$

Similarly,

$$z = x + 4$$

$$z = 89 + 4$$

$$z = 93$$

$$\begin{array}{r} 89 \\ 3 \overline{) 267} \\ \underline{-24} \phantom{0} \\ 27 \\ \underline{27} \\ 0 \end{array}$$

**Result:**

Hence, the three consecutive odd numbers are 89, 91 and 93.

Q(8)  
(b)

i) 4, 16, 36, 64, —, 144

The above series is the square of consecutive even numbers starting from 2.

It could be written as

$(2)^2, (4)^2, (6)^2, (8)^2, (x)^2, (12)^2$

So,

$x = 10$

$x^2 = 100$

hence,

missing number is 100.

ii) 30, 29, 27, x, 20, 15

let the missing number be x,

So,

$30 - 29 = 1$

$29 - 27 = 2$

$27 - x = ?$

The above series is a subtraction series.

hence, the missing number will be 24, as it satisfies the series.

$$\text{So, } 30, 29, 27, \mathbf{24}, 20, 15$$

iii)  $1, 7, 15, 25, ?, 51$

let missing number =  $x$

$$1 + 6 = 7$$

$$7 + 8 = 15$$

$$15 + 10 = 25$$

$$25 + x = 51$$

$$? + y = 51$$

The series consecutively takes even numbers in the addition operation. So, next even number is 12. Hence,

$$25 + 12 = 37$$

$$37 + 14 = 51$$

So, missing number =  $\mathbf{37}$

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

0 + 2 = 2

2 + 4 = 6

6 + 6 = 12

12 + 8 = 20

20 + 10 = 30

30 + 12 = 42

42, is the number that satisfies the series.

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

$\frac{48}{2} = 24 \Rightarrow 24 \times 3 = 72$

$\frac{72}{2} = 36 \Rightarrow 36 \times 3 = 108$

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

The next number in the series is 54

Q 8  
(c)

i- THRSI

Correct word = SHIRT

ii. GNDREP

Correct word = DANGER

iii. SCHFMOT

Correct word =

iv- ONLNDO

Correct word = LONDON

v- HIODALY

Correct word = HOLIDAY

Q 8  
(d)

let the eyes of

Sara = x

mother = y

brother = z

According to the given condition

$$6x = y \quad - \text{eq (i)}$$

$$2x = z \quad - \text{eq (ii)}$$

$$3(x+y+z) = 72$$

$$x+y+z = \frac{72}{3} \quad \text{---}$$

$$x+y+z = 24 \quad - \text{eq (iii)}$$

Putting values of  $y, z$  in eq (iii)

$$x + 6x + 2x = 24$$

$$9x = 24$$

$$x = \frac{24}{9} = \frac{8}{3}$$

$$\boxed{x = \frac{8}{3}}$$

Putting in eq (i) & (ii)

$$6\left(\frac{8}{3}\right) = y$$

$$y = 16$$

Ali's age  $\frac{2x}{3}$   
 $x = \frac{2(9)}{3}$

~~$\left[ x = \frac{18}{3} \right]$~~

Q # 06

(9)

Given:

Let the candidates be  
A, B and C.

As given, votes received by them are

$$A = 15000$$

$$B = 10000$$

$$C = 8000$$

To find out:

Percentage of total votes of winning candidate.

Solution:

Apparently, A has won with maximum vote bank.



Now,

$$\begin{aligned} \text{Total votes in the constituency} &= A + B + C \\ &= 15000 + 10000 + 8000 \end{aligned}$$

$$\text{Total } V = 33000$$

% age of winner = A

$$\begin{aligned} \frac{A}{V} \times 100 &= \frac{15000}{33000} \times 100 \\ &= \frac{1500}{33} \end{aligned}$$

$$\boxed{A\% = 45.45\%}$$

Hence, the winning candidate won 45.45% of the total votes.

$$2000 =$$

$$\begin{array}{r} 33 \\ \times 3 \\ \hline 109 \end{array}$$

$$\begin{array}{r} 33 \\ \underline{4} \\ 132 \end{array} \qquad \begin{array}{r} 33 \\ \underline{5} \\ 165 \end{array}$$

$$33 \overline{) 1500} \begin{array}{r} 45.45 \\ \underline{132} \\ 180 \\ \underline{165} \\ 150 \\ \underline{132} \\ 180 \\ \underline{165} \end{array}$$

Q 6 (b)

Given

let the angles be  $a, b, c$

As provided in the statement,  
 $a : b : c = 3 : 4 : 5$

To find out:

$$a = ?$$

$$b = ?$$

$$c = ?$$

Solution

As we know that, the sum of three angles of a Triangle is  $180^\circ$  so

$$a + b + c = 180$$

adding the ratios, we get,

$$3 + 4 + 5 = \textcircled{12}$$

so,

$$a = \frac{3}{12} = \frac{1}{4}, \quad b = \frac{4}{12} = \frac{1}{3}, \quad c = \frac{5}{12}$$

Now

$$\text{angle } a = \frac{1}{4} \times 180^\circ = \boxed{45^\circ = a}$$

angle  $b = \frac{1}{3} \times 180^\circ$

$$b = 60^\circ$$

angle  $c = \frac{5}{12} \times 180^\circ$

$$c = 75^\circ$$

Verification.

$$a + b + c = 180^\circ$$

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

$$105^\circ + 75^\circ = 180^\circ$$

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

$$\text{LHS} = \text{RHS}$$

Result.

Hence the angles of the triangle are,  $45^\circ$ ,  $60^\circ$ ,  $75^\circ$  respectively.

Q6  
(c)

Each group consists of 4 boys  
and 6 girls.

Total number of girls = 102

Groups that could be formed out of 102 girls are =  $\frac{102}{6}$

Groups =  $\frac{102}{6} = 17$

**Groups = 17**

Number of boys in each group = 4

Total number of boys required =  $4 \times 17$

**Boys = 68**

$$\begin{array}{r} 17 \\ \times 4 \\ \hline 68 \end{array}$$

Q 6  
(d)

$$A : B = 6 : 7$$

$$S + A : S + B = \frac{7}{8}$$

$$\frac{A}{B} = \frac{6}{7}$$

$$\boxed{A = \frac{6B}{7}} \quad \text{--- eq (1)}$$

$$\frac{5+A}{5+B} = \frac{7}{8}$$

$$5+A = \frac{7(5+B)}{8}$$

$$40 + 8A = 35 + 7B$$

Put the value of A

$$40 + 8\left(\frac{6B}{7}\right) = 35 + 7B$$

$$40 + \frac{48B}{7} = 35 + 7B$$

$$7 \times \frac{280 + 48B}{7} = (245) + 49B$$

$$280 - 245 = 49B - 48B$$

$$35 = B$$

$$\boxed{B = 35}$$

	<u>35</u>	
3	<u>7</u>	
	<u>245</u>	
		280
		<u>245</u>
		<u>35</u>

$$A = \frac{6B}{7}$$

$$A = 6\left(\frac{35}{7}\right)$$

$$\boxed{A = 30}$$

Result:

→ the ages of A and B are 30 and 35 respectively.

PART - II

SECTION - I

General Sciences

Question No. 2

(a)

Volcanoes:

Volcanoes are the eruptions of hot molten lava through the earth's crust. These could be active or dormant depending upon the type of lava present in them.

According to United Nations Framework Convention on Climate Change (UNFCCC), volcanic eruptions are one of the causes of air pollution, contributing to lead (Pb) and sulphur (S) fumes in the air along with infant gases.

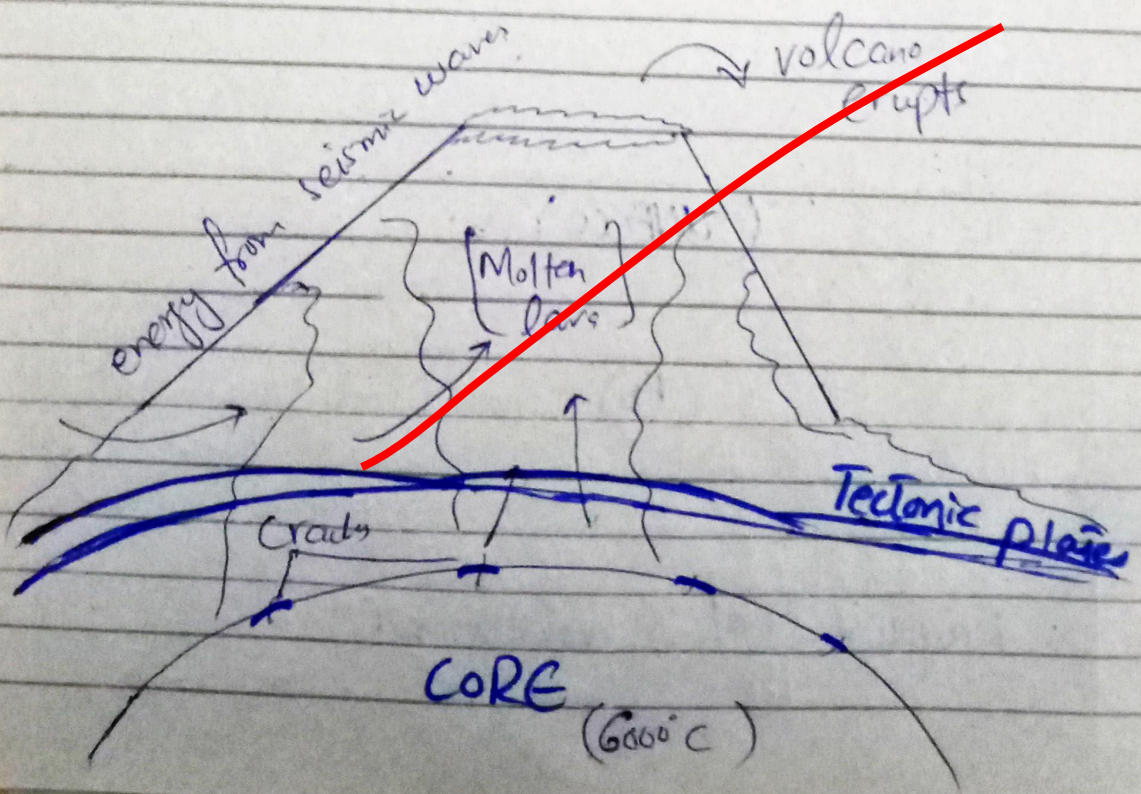
Eruption of volcanoes:

The core of the earth

contains Temperature as high as  $6000^{\circ}\text{C}$ . Over the course of years this lava gets through the cracks within earth's surface; but does not erupt

Earthquakes or in other words, the movement of tectonic plates inside the earth causes disturbance of molten, passing seismic waves through it. As the waves repeatedly pass through it, the lava gains enough energy to erupt.

### Illustration:



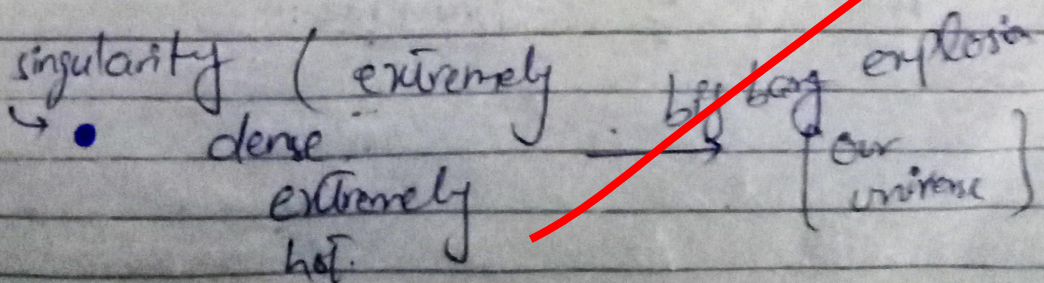


## Big Bang:

The theory about the origin of universe. As per this theory, universe came into being from singularity.

## Phenomenon:

In the start, a hot dense and extremely small mass of energy exploded giving birth to the universe. The singularity was so small but denser than anything on the planet. As it gained momentum, it became denser and hotter, ultimately exploding and sending shock waves through out the universe in the form of radiations.



# Big Crunch:

Big Crunch is the theory about the end or "the fate of universe"

According to this theory, just as a singularity gave birth to the universe; and if it continuously expanding, there will come a point, when the universe will be extinct

## Contemporary Point of view:

Modern theorists ~~for~~ interpret the concept in terms of black holes and their ability of extreme gravity, that even light cannot escape. Ultimately, this universe will be crunched by a black hole marking the end of universe

## Age of Universe:

Age of universe is determined in astronomical units. As per contemporary

scientific evidence, the universe is  
13 billion years old, continuing until now.

illustration

Big Bang

[13  
Billion  
years]

- Extreme weather conditions
- Ice Ages
- ... stat. def. humans race

The World (Universe)  
Now

[unknown  
yet]

Big Crunch

Q 2  
(c)

Renewable Energy

Sources of energy which could be replenished are known as "Renewable sources" of energy.

# Sources:

## i) Hydel - Power:

Energy generated from water at rivers or dams is known as hydel-power.

⇒ Usually, the energy from the flowing water is used to turn the turbine at the "run-of-the-river", to generate electricity.

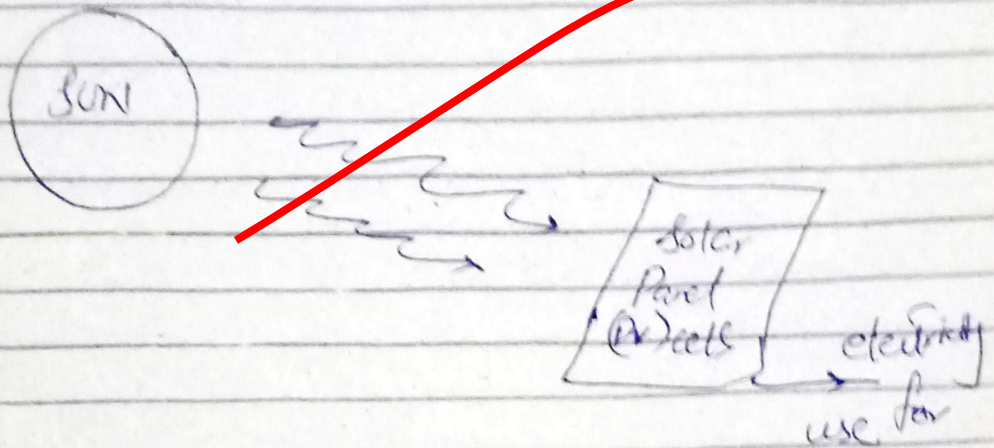
⇒ Sometimes, the potential energy of water stored in the dams is utilized to generate electricity.

## ii - Solar Energy:

Energy from the sun could be converted into electricity through the employment of "Photo-voltaic cells" or in modern days "the flexible photo-voltaic sheets".

Sun rays hit the screen of

Photo-voltaic cells and generate electricity  
This energy is clean and does  
not pollute the environment. Pak  
generates **45000** MW for solar energy.



## Wind Energy

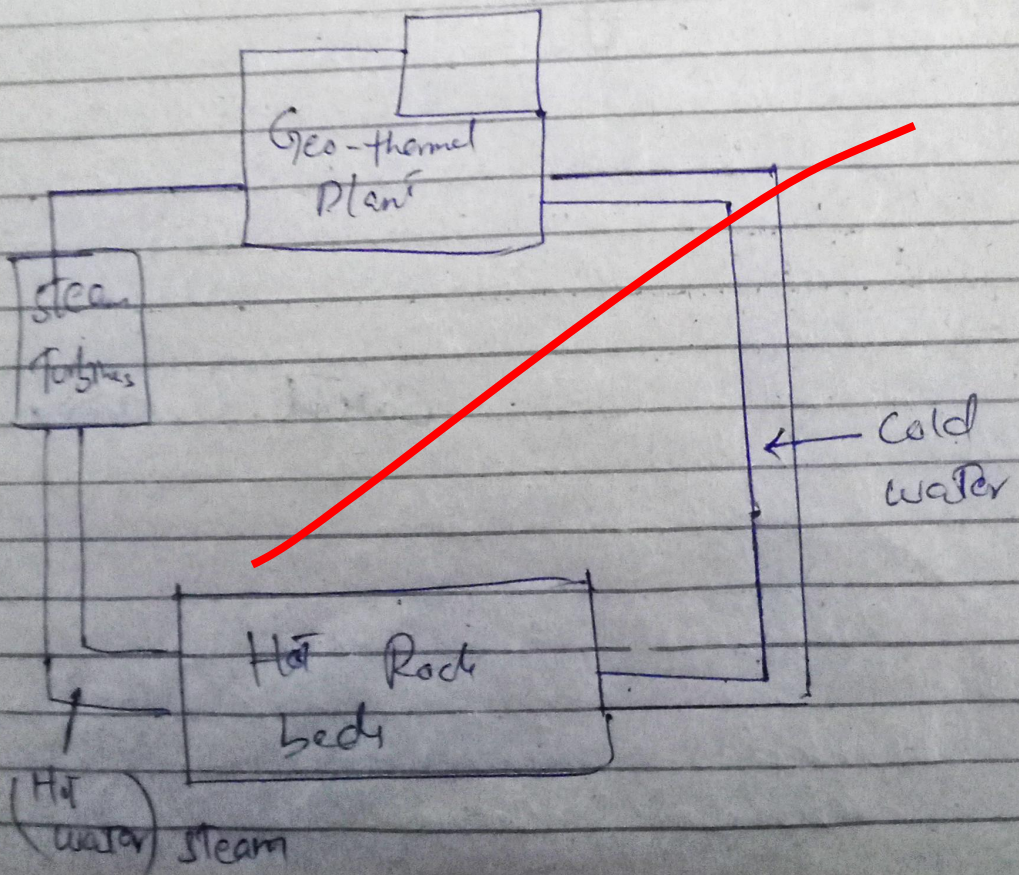
Energy from the  
wind is used to turn  
the turbines that in turn  
generate electricity. Wind  
turbines are usually  
employed at **coastal areas**  
where the speed of wind  
is relatively high.

Pakistan has a 850km coastal  
line and has a huge yet  
untapped potential of  
renewable energy.

## iv. Geo-thermal

The earth's crust contains high temperatures. This high temperature has a huge potential of energy which could be used to generate the form of steam-energy.

Geo-thermal plants are usually installed at places containing relatively high amount of heat in rock-beds.



## (v) Bio-mass energy

Energy could be generated through the decomposition of organic waste in biomass plants.

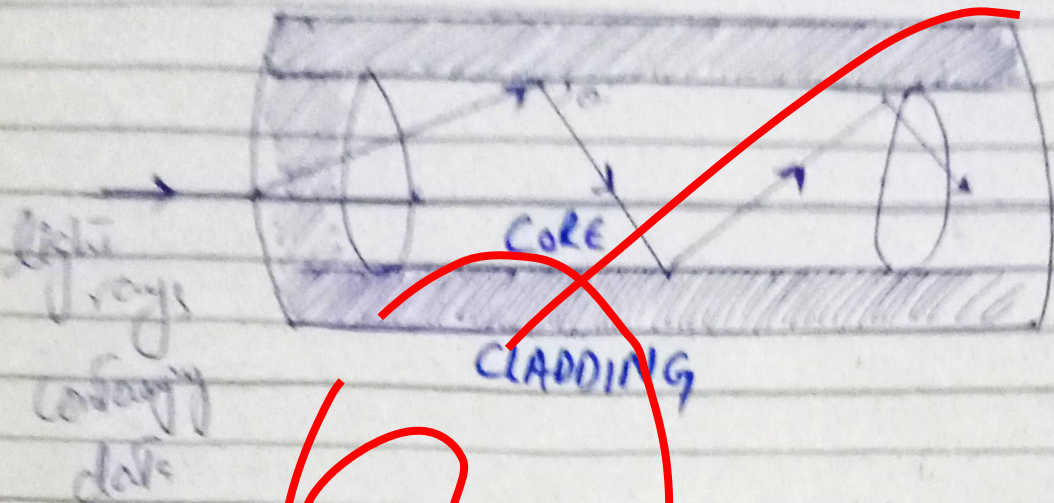
The decomposition occurs in the absence of air, in an air tight container, usually buried inside earth. Organic waste such as waste from plants, animals and dead animals could be used as the raw material. The decomposition generates methane which could then be used for producing heat. The method is used in various outskirts in Punjab, Pakistan.

Q2

(d)

## Optical fibers:

Optical fibers are the small glass tubes, working on the principle of "Total internal reflection" to transmit data at long



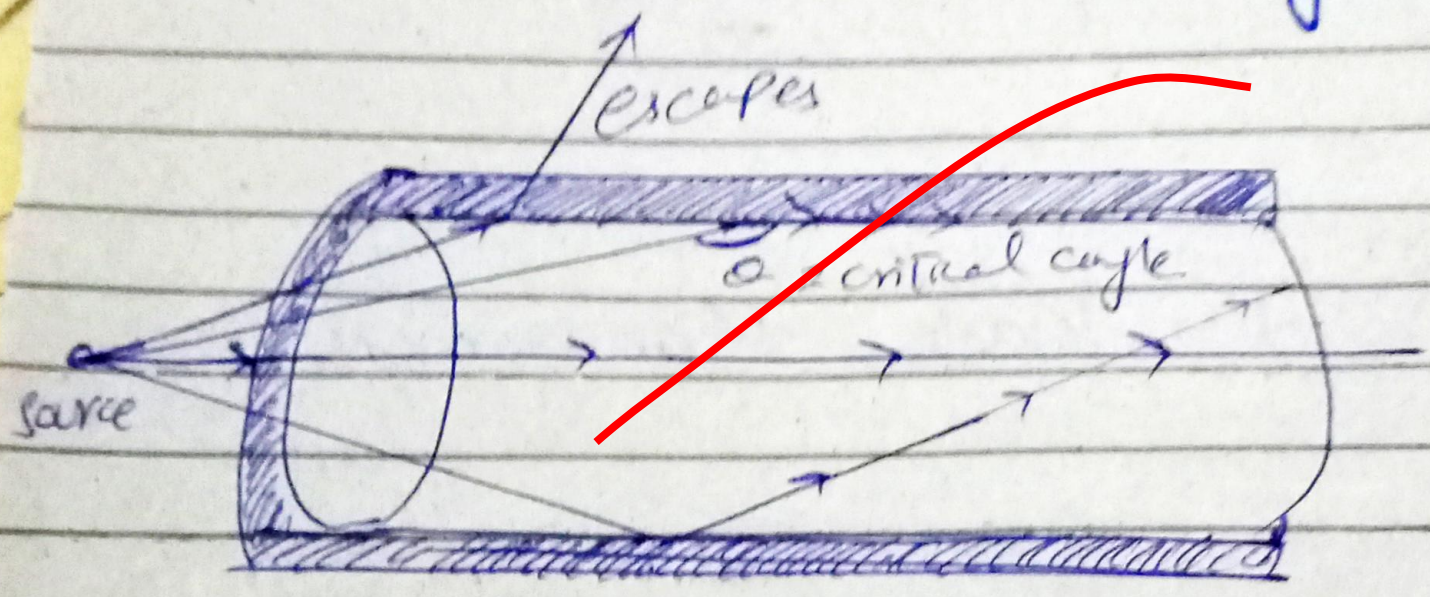
### Principle:

Optical fibres work on the principle of total internal reflection. Consisting of two parts, that is, the core and the cladding. Core has high density and hence, low refractive index - cladding has less density and high refractive index. When the light rays strike the core-cladding boundary, light is totally internally reflected at angles greater than critical angle.

**Critical angle** is the angle at which light is reflected internally.



# Phenomenon of Critical angle:



At the critical angle, light is not refracted, instead it is reflected at the core-cladding boundary. after this angle, total internal reflection occurs.

# Question - 4

(a)

## Solid - Waste Management:

It is the handling, collection, processing and deposition of solid-waste from the urban centres. Environmental Protection Agency (EPA) has established set of certain frameworks and standards which need to be ensured in the management of solid-waste.

### Stages:

a) Collection :

It is the collection of solid-waste from different points in the city.

b) Handling and transport:

After collection, the waste is then deposited to the center-station, where it is segregated and then

made ready for transportation again.

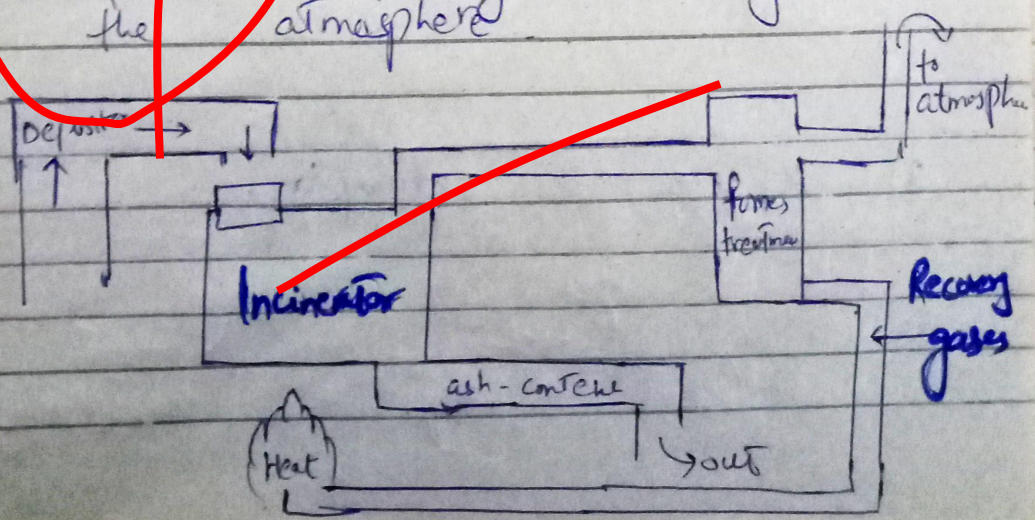
c) Treatment:

The waste in then transported to the treatment stations where various methods are employed for the treatment of waste to minimize its environmental impact.

Methods of treatment.

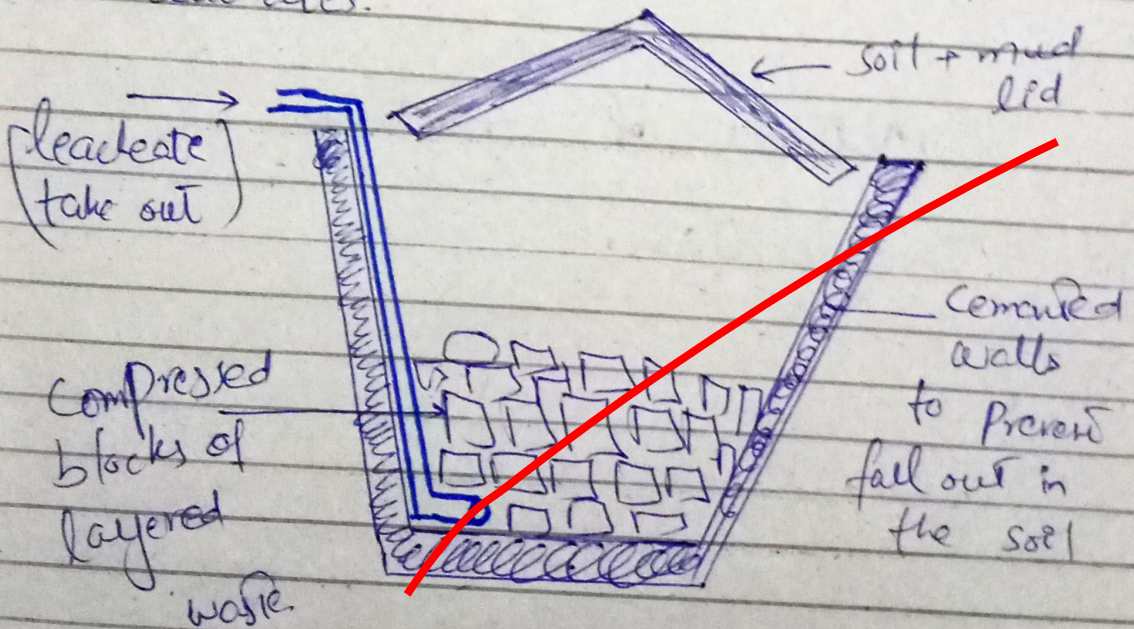
1- Incineration:

Incineration is the burning of waste in specialized containers. The waste is converted to ashes and the fumes are treated before finally releasing into the atmosphere.



## 2. Leaching

Leaching is a method of solid waste treatment, where the waste is dumped underground for a large period of time before compressing it. The walls of the leaching container contains specialized tube for the take out of leachates.



## 3) open-air dumping.

Open-air dumping is the oldest and most inefficient way of waste management.

A

It not only adds to the pollution but also degrades the environment. due to long term exposure of waste. The technique is discouraged by the institutes of Environmental development and awareness campaigns are being held regularly under the banner of "Regional Environmental Protection Agencies".

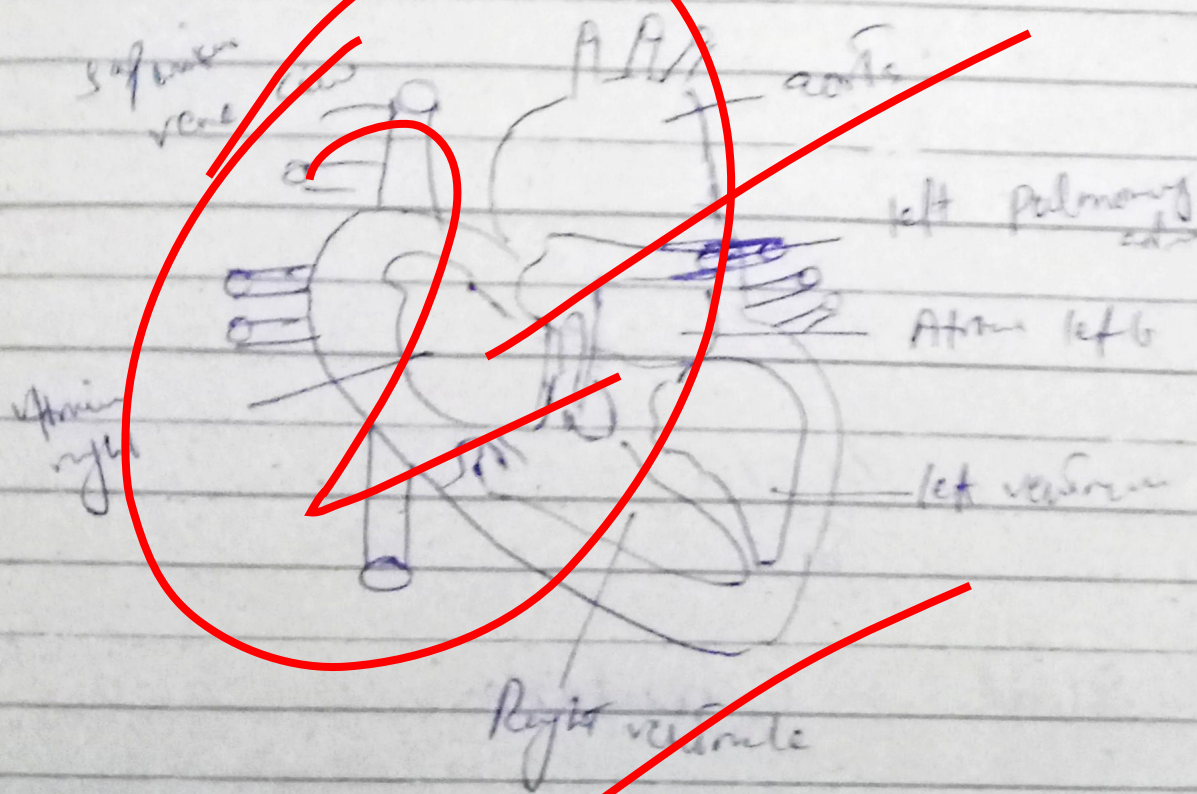
Q 4  
b

### Blood - Circulation

Blood circulation in human body is also known as "Double circulation". The term double circulation itself suggests the function of the heart. In other words, The heart,

- ① supplies oxygenated blood to the body
- ② take back de-oxygenated blood from the body.

In the heart, the four chambers have their own functions. The diagram illustrates the functioning of the human heart.

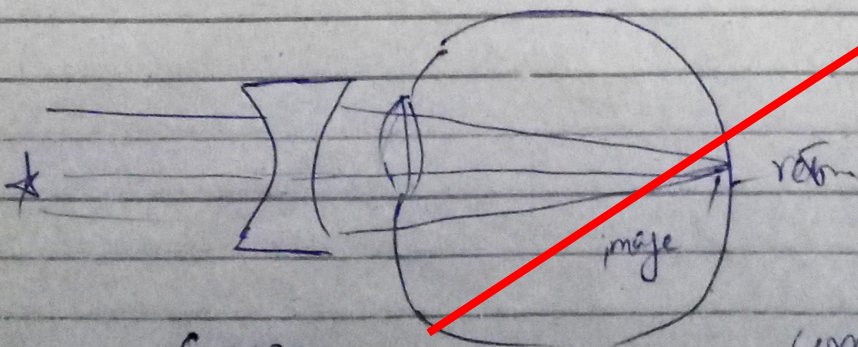
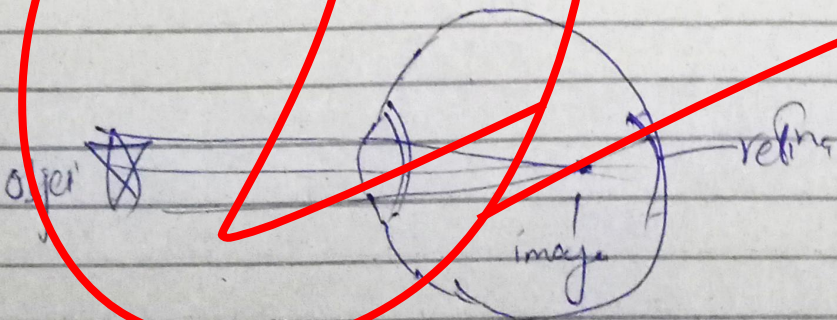


- Aorta pumps blood through the body.

(C)

# Myopia & Hyperopia

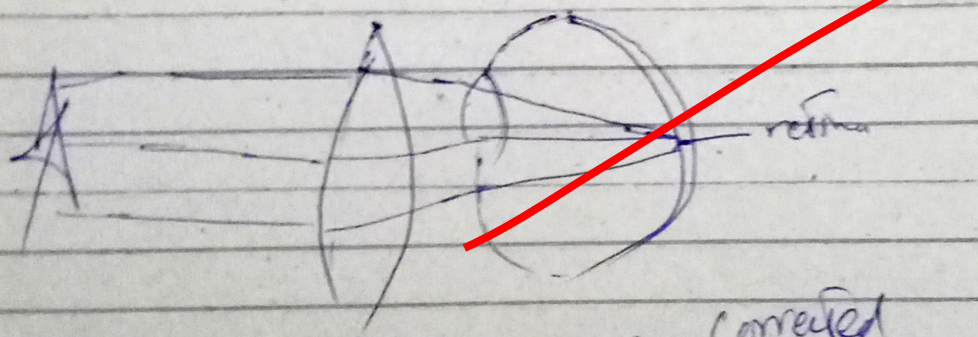
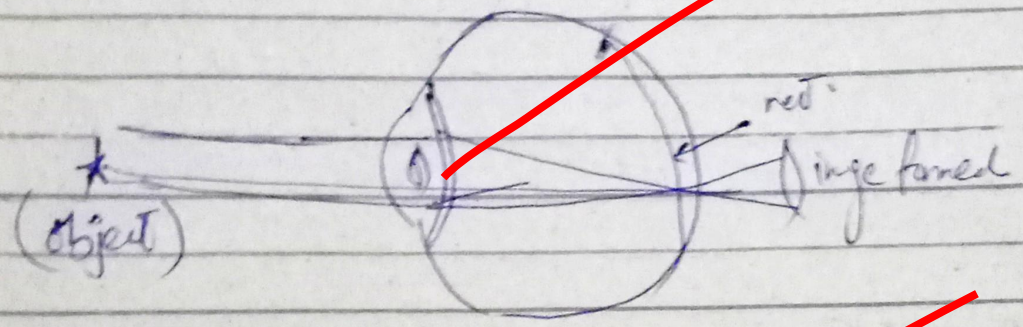
- Myopia is an eye disease in which the image is formed in front of the retina. The light rays from an object are not focused on the retina but are focused in front of it. This diagram represents myopia.



Concave lens

Corrected myopia

Hyperopia is a condition when the image is formed behind the retina.



Corrected Hyperopia

Part of eye

- Retina
- Sclera
- Eye lens
- Cornea
- optic nerve
- Iris
- Aqueous humor
- vitreous humor



24.

(d)

Microwave

- high energy beams used for heating purposes
- used at places that require short yet immediate communication.

Ultraviolet

- Used for highlighter
- used for films and graphics

X-Rays

- used for image processing
- used in various medical purposes