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SECTION - I

QUESTION NO # 4:-

(Q) What are the methods employed in Solid Waste Management?

ANS-

METHODS EMPLOYED IN SOLID WASTE MANAGEMENT:-

⇒ INTRODUCTION TO SOLID WASTE MANAGEMENT:-

→ DEFINING SOLID WASTE:-

Solid waste could be defined as:

"Solid waste means any garbage, refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded materials, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial mining and agricultural operations, and from community activities."

- United States Environmental Protection Agency

So, from above definition it is concluded that solid waste is that part which could not be filtered out or get ridder off through traditional purification methods of air or water. So, for such kind of waste, there should be separate method to filter out important substances and to remove the waste.

Such phenomenon is known as Solid Waste Management.

→ DEFINITION OF SOLID WASTE MANAGEMENT:-

"Solid waste management is the collection, transportation, and disposal or recycling of waste materials gathered by human activities, in ways that protect public health and the environment."

- United States Environmental Protection Agency

Solid waste management would not only manage the waste disposal but will also extract essential nutrients or recycling materials.

⇒ METHODS OF SOLID WASTE MANAGEMENT:-

Different methods are employed for solid waste management. Each country employ different methods according to their own capacity. Here, we will discuss the methods employed by Pakistan:

1. WASTE COLLECTION AND TRANSPORT:-

Solid wastes are of different types, one of these including hospital and municipal wastes. So for such kinds of waste, Pakistan has proper waste collection and transport system. They collect waste from household colonies and hospitals and ~~transport~~^{transfer} it to treatment centers. The drawback is that this facility is present only in urban areas of Pakistan.

2. LANDFILLING - ONE OF THE OLDEST METHOD:-

Landfilling is one of the oldest method used in Pakistan. In this method, solid wastes are buried under the soil to protect the environment from their harmful effects. Moreover, the organic compounds in these wastes could be utilized by plant roots and bacteria under the soil. But this technique is also used only in urban area and many landfill designs and management does not meet ^{the} environmental standard.

3. COMPOSTING OF ORGANIC WASTE:-

The most important method employed in Pakistan for solid waste management is the composting of organic waste. Composting is the controlled, aerobic process that converts organic materials into a nutrient rich, biologically stable soil amendment or mulch through natural decomposition. Therefore, it is very important to extract the best out of waste. But, this method is practice in only some areas of Pakistan and not widespreadly employed. Moreover, the organic waste ^{often} end up in landfills that contributes in \times greenhouse gas emissions.

4. WASTE-TO-ENERGY (WTE) - A MODERN TECHNIQUE:-

For the modern problem, a modern solution is to turn the waste into energy. This technique is not yet completely adopted in Pakistan, but Pakistan should work on this because this is a highly efficient technique. For example, "Denmark, ~~has~~ over 60% of their municipal waste is processed in WTE facilities.

⇒ CONCLUSION:-

As ~~the~~ discussed above that solid waste is any solid form of waste extracted from different sources. There are many harmful effects of solid waste, therefore, it should be managed properly. For solid waste management, Pakistan employ various techniques, including collection and transport, landfilling, composting of organic waste and waste-to-energy. Each technique employed in Pakistan had certain drawbacks ^{therefore} but Pakistan should focus on them. After several reforms, these techniques would be enough to remove or manage solid waste in country.

(b) How does a human heart work in blood circulation?

Ans: Blood Circulation:-

⇒ INTRODUCTION:-

Blood circulation is the important circulation of circulatory system of human body. It occurs through out the human life and transport blood from cells to heart and then ^{from} heart to cells. The blood contain blood cells, fluid (plasma), nutrients and the most important, ~~org~~ oxygen. With circulation of blood, oxygen is also circulated through which it is provided to the cells for respiration.

⇒ COMPONENTS OF BLOOD CIRCULATION:-

The major components of blood circulation are heart, arteries, veins, and capillaries. Heart is the main pumping organ, arteries transfer blood from heart to human cells, veins bring blood back from cells to heart, and capillaries are small tubules that provide efficient blood travel ^{due to} tiny spaces between cells.

⇒ HUMAN HEART:-

⇒ DEFINITION:-

Human heart is a fist-sized, muscular organ that pumps blood throughout the body.

⇒ STRUCTURE OF HUMAN HEART:-

The human heart has four chambers. The upper two chambers, the right and left atria, are receiving chambers for blood. The heart's lower two chambers, the right and left ventricles, are the powerful pumping chambers. Moreover, there is a wall of tissue that separate the right and left side of heart called septum. Furthermore, there are also four valves within the heart that prevent the blood from flowing backward in the heart.

⇒ ROLE OF HUMAN HEART IN BLOOD CIRCULATION:-

The circulation of blood through heart can be divided into two circuits for understanding purpose. In each circuit, the blood returns to the heart. These two circuits are:

1. SYSTEMIC CIRCULATION:-

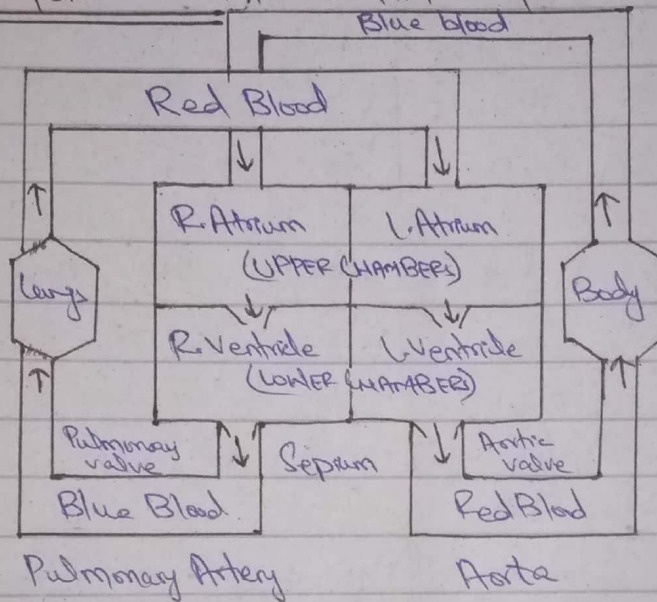
This circuit takes oxygenated blood from the left side of the heart to the body. When the blood returns to the right side of the heart, it is deoxygenated, as the oxygen has been mostly used by the muscles and organs in order to make

energy.

2. PULMONARY CIRCULATION:-

This circuit takes deoxygenated blood from the right side of the heart to the lungs where it is oxygenated. It then returns this newly-oxygenated blood to the left side of the heart where the cycle begins again.

=> DIAGRAMATIC REPRESENTATION:-



Q) What is Myopia and Hyperopia? Enlist the major parts of Human Eye.

Ans MYOPIA AND HYPEROPIA:-

=> INTRODUCTION:-

Both Myopia and Hyperopia are eye-related illnesses. These both conditions are caused by the inappropriate shapes of an eye's eyeball or lens, leading to refractive errors. In both conditions, a person is not able to see clearly either the distant object (Myopia) or closer objects (Hyperopia).

⇒ EXPLAINING MYOPIA AND HYPEROPIA COLLECTIVELY THROUGH DIFFERENTIATION:-

MYOPIA

HYPEROPIA

COMMON NAME OF BOTH:-

1) Myopia is also known as Short Sightedness.

Hyperopia is also known as Far or long Sightedness

WHEN THEY HAPPEN?

2) Myopia happens when the eye balls get elongated or there is larger convergence of eyes.

Hyperopia happens when eye balls get shortened or there is lesser convergence of light by the eyes.

SIGHT OF A PERSON INFECTED WITH THESE DISEASES:-

3) A person infected with Myopia is able to see close or nearby objects but not the faraway.

A person infected with Hyperopia is able to see faraway objects and not the near ones.

HOW THEY COULD BE CORRECTED?

4) Myopia can be corrected by concave lens in glasses.

Hyperopia can be corrected by convex lens in glasses.

⇒ MAJOR PARTS OF HUMAN EYE :-

⇒ INTRODUCING HUMAN EYE:-

→ ETIMOLOGY:-

The word Eye is derived from Greek word "Ophthalmos."

→ DISCOVERY:-

It was first described by a Muslim scientist "Ibn al-Harthan" in his book "Kitab al-Manazir". Later, it was discovered completely by Kepler in his discovery of the path of light

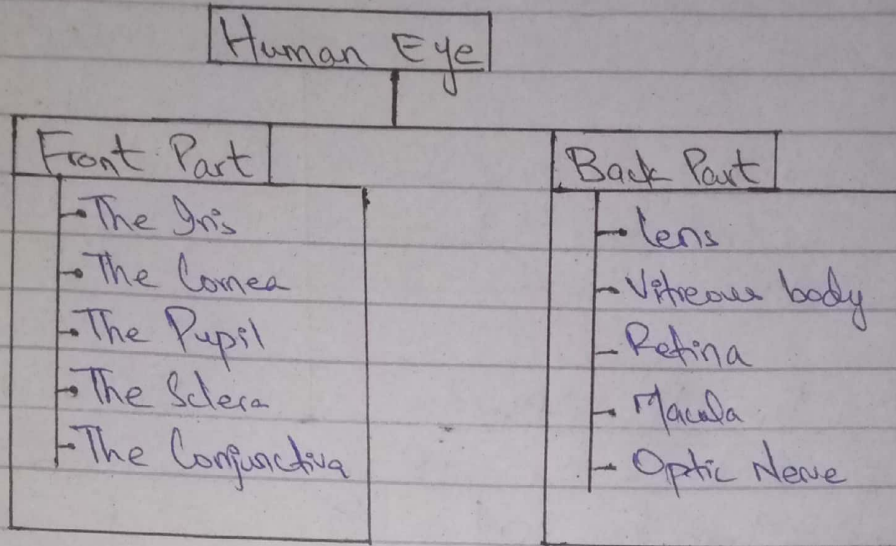
→ DEFINITION:-

Human eye could be defined as one of the sense organs

An human body that reacts to light and helps in seeing objects.

⇒ MAJOR PARTS OF HUMAN EYE:-

The major parts of human eye could be enlisted by dividing them into two categories: Front part and the back part.



QUESTION # 5:-

(a) What are the different methods of food preservation?

Ans FOOD PRESERVATION:-

⇒ INTRODUCTION:-

Food preservation is an effort to prevent food from spoilage and to keep its natural and fresh contents alive.

→ ETYMOLOGY AND DEFINITION OF FOOD:-

Food is derived from Old English *fōda* plus English *fodder*. Food could be defined as any nutritious substance that people or animals eat or drink or that plants absorb in order to maintain life and growth.

So, according to definition of food, it is important to preserve

Food to keep its nutritional value alive.

→ ETYMOLOGY AND DEFINITION OF FOOD PRESERVATION:-

DEFINITION:-

Preservation is the activity or process of keeping something valued alive, intact, or free from damage or decay.

→ After defining food and preservation separately, we will now define food preservation.

→ DEFINING FOOD PRESERVATION:-

Food preservation is any of a number of methods by which food is kept from spoilage after harvest or slaughter.

→ WHAT AN EFFECTIVE PRESERVATION LOOKS LIKE?

An effective preservation must eliminate or minimize all of the factors or ~~factors~~ in food that cause its deterioration. These factors include growth and activities of microorganisms, and enzymes; infestation by insects; inappropriate temperature, light, time and other physical stress or abuse.

⇒ METHODS OF FOOD PRESERVATION:-

There are different methods of food preservation, both old and modern methods are employed in different countries. Among the old methods are drying, refrigeration, and fermentation. Modern methods include canning, pasteurization, freezing, irradiation, and the addition of chemicals. Following are some of the methods of food preservation:

ETYMOLOGY:

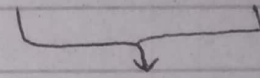
Late Latin Preservare



Medieval Latin Preservation



Old French + English
Preserve



Late Middle English
Preservation

1. HEATING THE FOOD TO KILL INFECTIOUS AGENTS:- ^{respective}
Most bacteria, yeasts, and molds grow best in their temperature range. Therefore, in order to get rid of these agents that can deteriorate the food, food must be heated at certain temperature to kill them out.

2. COOLING THE FOOD - ANOTHER WAY TO KILL INFECTIOUS AGENTS-
As discussed above that different infectious agent survive in their respective temperature range. So, those agents that could not be killed through heating, cooling would kill them. For example, certain bacteria ~~can~~ could be killed in temperatures below 10°C .

3. DRYING THE FOOD BY REMOVING EXCESS WATER:-
Water is an essential medium for the growth of microbes. So, the foods that are rich in water will spoil easily. Therefore, to prevent food from spoilage, excess water in food should be removed ^{through} by drying to prevent the growth of microbes.

4. PUTTING AN ACID IN THE FOOD:-
With proper temperature and water, microbes also require proper pH for their growth. Many microbes grow in less acidic environment. So, to prevent food from spoilage, acid could be used to stop the growth of microbes.

5. CHEMICALS AND RADIATIONS CAN ALSO KILL MICROBES:-
Certain chemicals such as sodium benzoate, sorbic acid, sodium and calcium propionate can kill microbes, if used in prescribed levels in food. Moreover, certain radiations such as X-Rays, microwaves, and ultraviolet light rays can also inactivate microbes. These chemicals and radiations should be used at appropriate level to prevent food ^{from} causing danger to humans.

c) Distinguish Solar and Lunar eclipses.

SOLAR ECLIPSE

LUNAR ECLIPSE

1) DEFINING BOTH ECLIPSES:-

Solar eclipse is a type of eclipse occur when moon comes between Earth and Sun and its shadow obscure the face of the Earth from the light of sun.

A lunar eclipse is a type of eclipse that occur when Earth comes between moon and the sun and its shadow obscure the moon.

2) HOW OFTEN THEY OCCUR?

Solar eclipse occurs approximately every 18 months. It always occur at time of new moon.

Lunar eclipse occurs only when moon is full. At least two partial lunar eclipse happen every year, but total lunar eclipses are rare.

3) LASTING PERIOD OF BOTH:-

Solar eclipse only lasts for few minutes.

Lunar eclipse usually lasts for few hours.

4) TYPES OF BOTH ECLIPSES:-

There are four types of solar eclipse namely total solar eclipse, partial solar eclipse, annular solar eclipse and hybrid solar eclipse.

There are three types of lunar eclipse namely penumbral lunar eclipse, partial lunar eclipse, and total lunar eclipse.

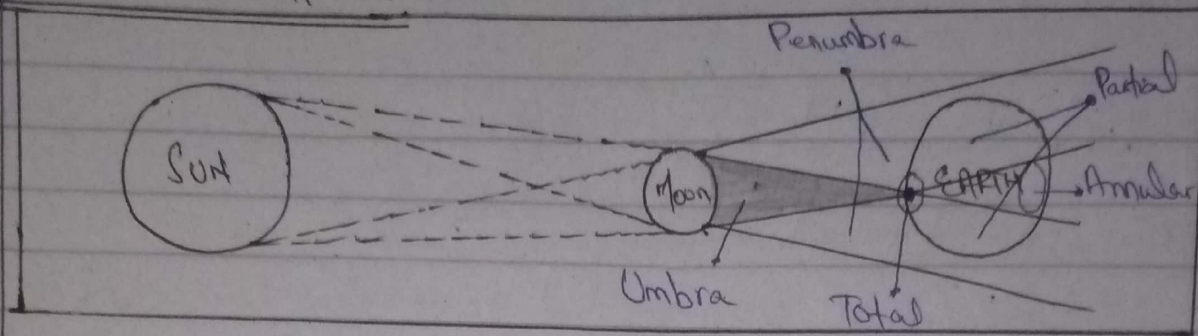
5) RECENT EVENTS:-

The annular solar eclipse, also called the ring of fire, was observed on October 14, 2023.

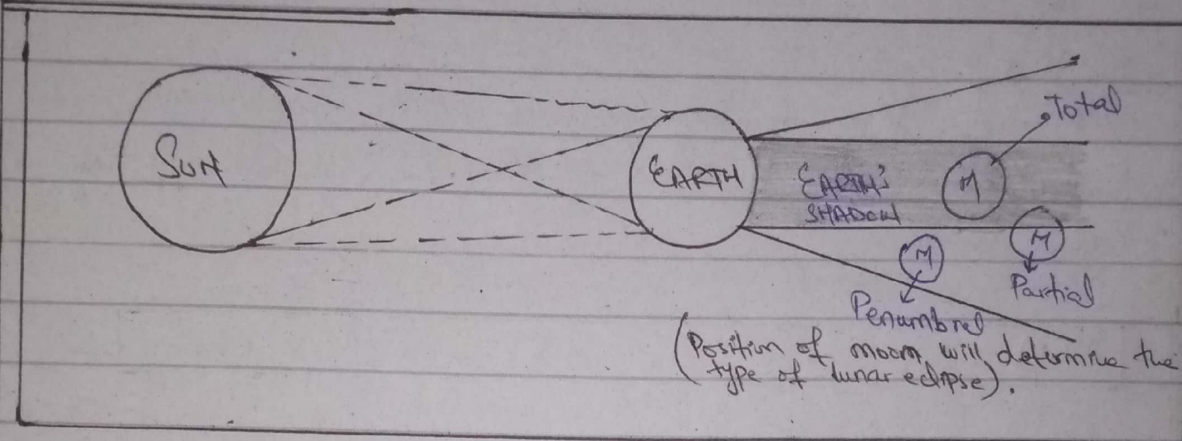
The partial lunar eclipse was observed in Islamabad, Pakistan, on October 28-29, 2023.

DIAGRAMATIC REPRESENTATION OF BOTH ECLIPSES:-

→ SOLAR ECLIPSE:-



→ LUNAR ECLIPSE:-



d) What are nuclear fission and fusion? Explain ionic bond in table salt.

ANSWER NUCLEAR FISSION AND FUSION:-

Nuclear fission and fusion are atomic reactions that occur in the nucleus of an atom.

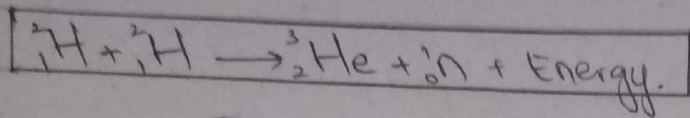
→ NUCLEAR FUSION:-

Nuclear fusion is a process when two or more atomic nuclei fuse to form a single heavier nucleus. In the reaction, the matter is not conserved & conserved because some of the mass of fusing nuclei is converted to energy.

→ EXAMPLE:-

Nuclear fusion reactions occurs mostly in stars, where hydrogen nuclei fuse to form Helium nuclei and after some time (ages)

The Helium nuclei started to fuse together to form higher/larger nuclei. The ideal/general reaction for nuclear fusion:

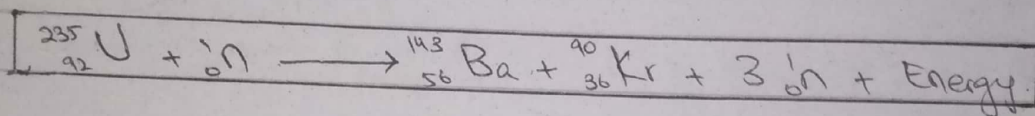


⇒ NUCLEAR FISSION:-

Nuclear fission is reaction that occurs when the nucleus of an atom splits into two or more smaller nuclei, while releasing energy.

→ EXAMPLE:-

Nuclear fission reactions occur in highly unstable nucleus. The balanced reaction of Uranium splitting into Barium and Krypton is given below:



⇒ IONIC BOND:-

→ ETYMOLOGY AND DEFINITION:-

Ionic is derived from word ion, which means an atom or molecule with a net electric charge.

So, its name indicate that this bond will ~~not~~ be formed between those atoms or molecules that have same charges, or that are willing to bear charges by gaining or losing electrons. Ionic bond could be defined as a chemical bond formed between two atoms by the complete transfer of one or more electrons from one atom to another.

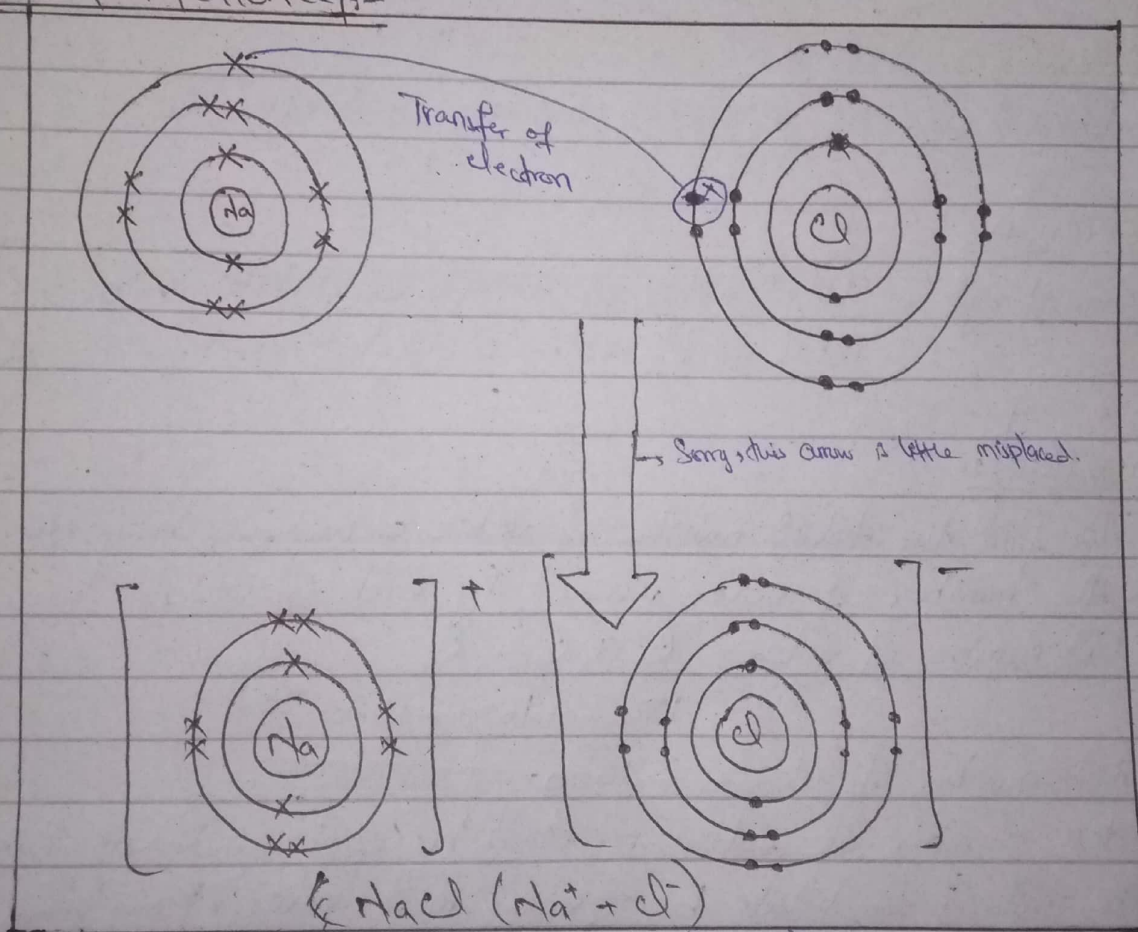
→ EXAMPLES:-

Ionic bond occur between atoms to form salts. For example, Sodium chloride, Sodium bromide, and Potassium fluoride etc.

→ IONIC BOND IN TABLE SALT:-

According to definition of ionic bond, a bond will only form when there is a complete ^{transfer} of electron between participating atoms or molecules. So in table salt, a common name for Sodium Chloride (NaCl), one atom must lose while the other atom must gain electron. In case of NaCl , Sodium (Na) lose electron because it is electropositive and contain only one electron in its outermost shell that could be lost easily, and chlorine (Cl) gain the electron. In this way, a bond is formed between sodium and chlorine, forming a salt, called Sodium Chloride (NaCl) or table salt.

→ DIAGRAMMATICALLY:-



This is the traditional Dot & Cross (Lewis) diagram, in which the atom that loss electron is represented with cross (x) and the atom that gain electron is represented with dot (o).

SECTION-II:-

QUESTION NO #6:-

(a) Three candidates

----- winning candidate?

GIVEN DATA:-

Votes of candidate 1, $C_1 = 15000$ votes

Votes of candidate 2, $C_2 = 10000$ votes

Votes of candidate 3, $C_3 = 8000$ votes

REQUIRED DATA:-

Percentage of votes of winning candidate, $C_w = ?$

FORMULA:-

$$\text{Percentage} = \frac{\text{Total votes of winning candidate} \times 100\%}{\text{Total no. of votes casted in elections}}$$

SOLUTION:-

To find the total number of votes casted, we have to add the number of votes received by each candidate. So:

$$\begin{aligned} \text{Total number of votes} &= C_1 + C_2 + C_3 \\ &= 15000 + 10000 + 8000 \end{aligned}$$

$$\text{Total number of votes} = 33000$$

→ As the number of votes received by each candidate indicates the winning candidate by receiving most votes. ^{So,} from given data the candidate 1 received most ~~no~~ votes, so candidate 1 is the winning candidate.

Now, find the percentage of winning candidate:

$$\text{Percentage of } C_w = \frac{15000}{33000} \times 100\%$$

Percentage of winning candidate = 45%.

RESULT:-

The percentage of winning candidate, $C_w = 45\%$.

(b) The ratios

each angle.

GIVEN DATA:-

Given ratio of angles of triangle = 3:4:5

REQUIRED DATA:-

Value of angles of triangle = ?

FORMULA:-

Value of angle = $\frac{\text{Value in ratio}}{\text{Addition of ratios}} \times \text{Total parts}$

SOLUTION:-

Finding different parameters of formula:

→ Addition of ratios: $3+4+5 = 12$

→ Total parts: In case of triangle, according to theorem of triangle, the addition of all angles must be equal to 180, so the total parts would be 180.

→ Finding value of each angle:-

$$i) \frac{3}{12} \times 180 = \frac{540}{12} = 45^\circ$$

$$ii) \frac{4}{12} \times 180 = \frac{720}{12} = 60^\circ$$

$$iii) \frac{5}{12} \times 180 = \frac{900}{12} = 75^\circ$$

→ ERROR CHECK:-

As according to theorem of triangle, the addition of all

angles must equal to 180° , so by adding the calculated angles:
 $45 + 60 + 75 = 180$.

RESULT:-

The angles of a triangle are: 45° , 60° and 75° .

Q) In a sport meet

such grouping?

GIVEN DATA:-

No. of boys in each group = 4

No. of girls in each group = 6

Total number of girls = 102

REQUIRED DATA:-

Total number of boys = ?

SOLUTION:-

From the given data, the total number of girls available for groupings are 102 and there should be 6 girls in each group. So the total number of groups that would form will be calculated as:

$$\begin{aligned} \text{Total no. of groups} &= \frac{\text{Total number of girls}}{\text{No. of girls in each group}} \\ &= \frac{102}{6} \end{aligned}$$

$$\text{Total no. of groups} = 17$$

So, now according to given data, the total number of boys in each group ~~is~~ should be 4. So, the total number of boys ^{required} will be calculated as:

$$\begin{aligned} \text{Total number of boys} &= \text{Total groups} \times \text{no. of boys in each group} \\ &= 17 \times 4 \end{aligned}$$

$$\text{Total number of boys} = 68$$

RESULT:-

The number of boys required for such grouping = 68 boys.

QUESTION NO # 8:-

(a) The sum

odd numbers?

GIVEN DATA:-

The sum = 273

Condition = Three consecutive odd numbers

REQUIRED DATA:-

The three consecutive odd numbers

SOLUTION:-

Let the three consecutive odd numbers be: $2n+1$, $2n+3$ and $2n+5$. According to given data, their sum is equal to 273, so:

$$(2n+1) + (2n+3) + (2n+5) = 273$$

$$2n+1 + 2n+3 + 2n+5 = 273$$

$$6n + 9 = 273$$

Subtracting 9 on both sides:

$$6n + 9 - 9 = 273 - 9$$

$$6n = 264$$

Dividing 6 on both sides:

$$\frac{6n}{6} = \frac{264}{6}$$

$$n = 44$$

→ Finding the consecutive numbers:

$$(i) 2n+1 = 2(44)+1 = 88+1 = 89$$

$$(ii) 2n+3 = 2(44)+1 = 88+3 = 91$$

$$(iii) 2n+5 = 2(44)+1 = 88+5 = 93$$

→ ERROR CHECK:-

According to given data, the sum of consecutive odd numbers should be 213, so adding the calculated values:
 $89+91+93 = 213$

RESULT:-

The three consecutive odd numbers are 89, 91, and 93.

b) Find the missing number in given series.

i) 4, 16, 36, 64, ?, 144

Solution:-

This is the perfect square series: ^{of even numbers} $(2)^2 = 4, (4)^2 = 16, (6)^2 = 36, (8)^2 = 64, \text{ So the square of } 10 \Rightarrow (10)^2 = 100, \text{ and } (12)^2 = 144$

RESULT:-

The missing number is 100.

ii) 30, 29, 27, ?, 20, 15.

Solution:-

This series is the sequential removal of natural numbers:

$$a) 30-1 = 29 \quad b) 29-2 = 27 \quad c) 27-3 = 24$$

$$d) 24-4 = 20 \quad e) 20-5 = 15$$

RESULT:-

The missing number is 24.

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

Solution:-

This series is the sequential addition of even numbers, starting from 6:

a) $1+6=7$ b) $7+8=15$ c) $15+10=25$

d) $25+12=37$ e) $37+14=51$

MISSING NUMBER:-

The missing number is 37

iv) $0, 2, 6, 12, 20, 30, ?$

Solution:-

This series is the sequential addition of even numbers:

a) $0+2=2$ b) $2+4=6$ c) $6+6=12$ d) $12+8=20$

e) $20+10=30$ f) $30+12=42$

MISSING NUMBER:-

The missing number is 42.

v) $48, 24, 12, 36, 108, ?$

Solution:-

This is a geometric series, meeting the following the condition $x \div 2 = y$, $y \times 3 = z$. So:

a) $48 \div 2 = 24$ b) $24 \times 3 = 72$ c) $72 \div 2 = 36$

d) $36 \times 3 = 108$ e) $108 \div 2 = 54$

MISSING NUMBER:-

The missing number is 54.

(c) Find out the correct word.

JUMBLED WORD

CORRECT WORD

- | | |
|------------|---------|
| 1) THRSI | SHIRT |
| 2) GNDREA | DANGER |
| 3) SCHAMOT | STOMACH |
| 4) ONLNDO | LONDON |
| 5) HIODALY | HOLIDAY |