GSA Mock July

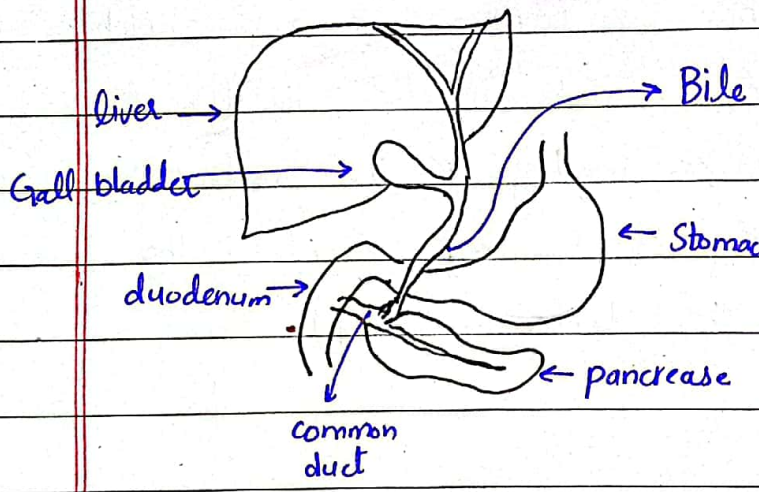
DATE: 10-7-24 Hajra Sarfraz DAY: Wednesday

Q no 4

(a)

Bile:

Bile is a pigmented liquid which is produced and secreted by the liver. It is also called as "liver juice." After being secreted, bile enters into the duodenum through bile duct.



Composition of Bile

Bile juice does not contain any enzyme, However, it consists of two components:

(a) Bile Pigments

(b) Bile salts

Bile Pigments: Bile pigments are responsible for giving green color to it. These

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pigments are formed in the liver by the breakdown of haemoglobin in it.

Gall stones:

Gall stones is a disorder which happens when bile pigments stored and trapped in the liver due to accumulation of cholesterol in the liver.

Bile Salts:

Bile contains some salts which play a crucial role in the digestion of fats. They are involved in the emulsification of fats, or simply they breakdown the fats in the duodenum.

Function:

① Bile is important for excretion of waste products produced by breakdown (destruction) of red blood cells in the liver.

② It involves in digestion process by performing the emulsification of fats.

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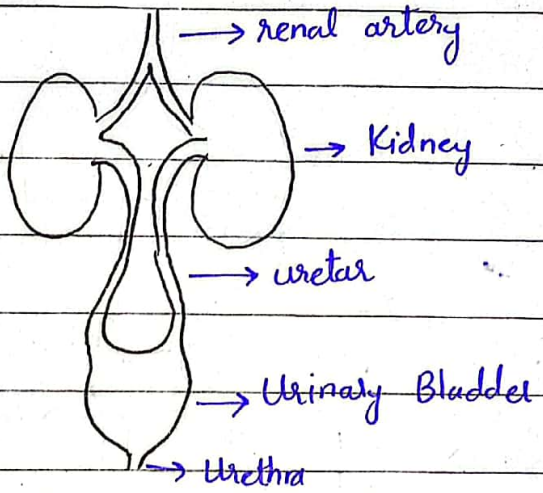
(b)

Role of Kidney in Excretion

Excretion:

Excretion is the process of removal of waste products from the body. This process is performed by the excretory system of body consisting of renal artery, kidney, uretar, urinary bladder and urethra.



Role of Kidney in Excretion:

Kidney:

Kidney is a bean shaped organ. It performs the filtration of blood and prepares urine. There is a pair of Kidneys. Their weight is less than 1% of the total body weight.

Function of Kidney:

It contributes to the

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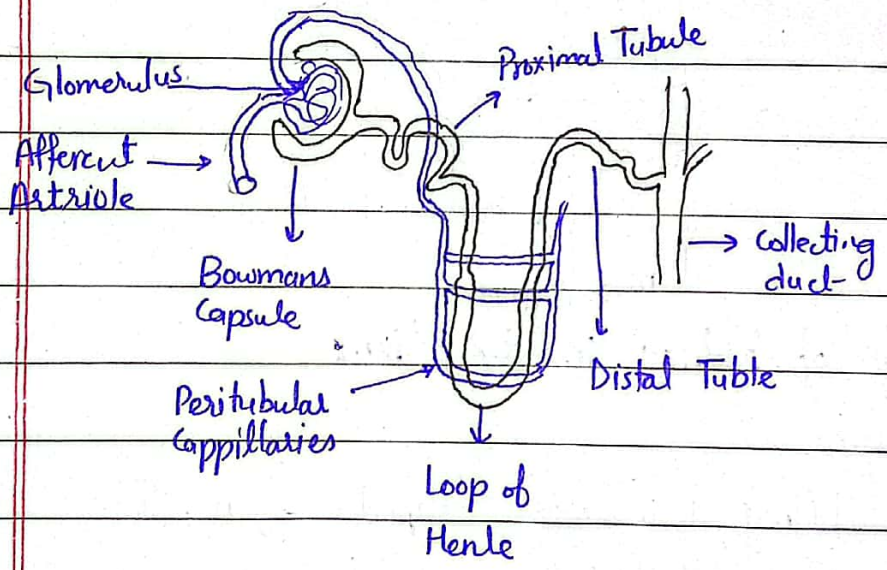
process of excretion by filtrating blood, reabserbing useful constituents and secreting wastes in the form of urine. This function of kidney is performed by its structural and functional unit, which is known as nephrons.

Nephrons:

There are 2 million nephrons per kidney. Nephrones filter the blood to produce urine

Structure of Nephron



Function of Nephron: It consists of three steps:

(a) Filtration: Blood enters into glomerolous via afferent artriole. Due to high blood pressure and porous walls of glomerolus, blood

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filters. Blood cells and proteins remain in the glomerolus, while glucose, urea, uric acid, and salts filters and enters into the proximal tubule. This is called as filtrate

(b) Reabsorption: The useful constituents of filtrate are reabsorbed in the proximal tubule, loop of henle and distal tubule by peritubular cappillaries.

(c) Secretion: Waste products and excess water are secreted from distal tubule to collecting duct which carries urine to uretars. Uretars carry the urine to urinary bladder where it stores temporarily and then secreted through urethra.

(c)

Methods of Solid Waste Management

"Solid Wastes" are leftovers of our advanced consumer society. These mountains of garbage and trash represent not only our attitude

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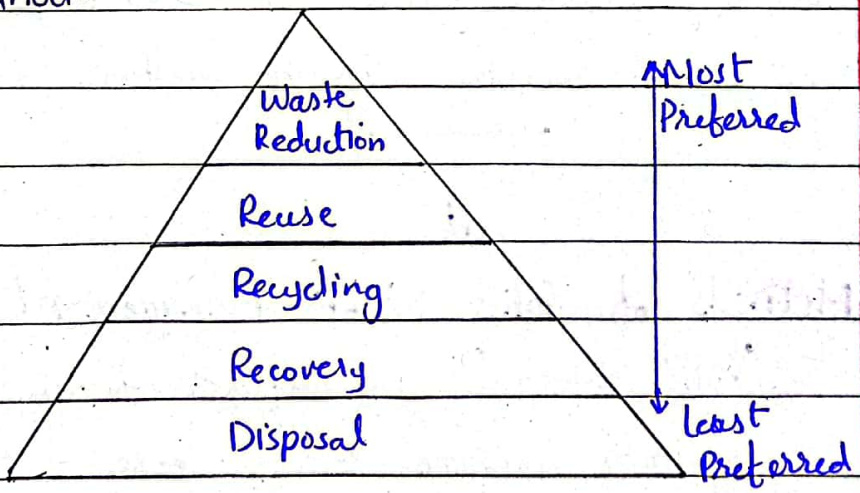
of indifference towards ~~us~~ valuable natural resources, but also economic and public health problems."

— Jimmy carter

Different methods of solid waste management can be explained through concept of Waste Heirarchy.

Waste Heirarchy Concept: It is a concept of heirarchy of waste management methods. There are five methods of solid waste management. Reduction of waste is the most preferred while disposal of waste is the least preferred method.



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(1) Waste Reduction: It is the most preferred method. Using less means producing less waste. Reducing the use of disposable products is an important step in this regard.

(2) Reusing: Reusing is another important method for waste reduction. The by-products or waste products can be repaired & cleaned to make them usable again. For example, bottles and shopping bags can be reused.

(3) Recycling: Recycling is the most environmental friendly method when it comes to disposal. It is a process in which a new product is made by the waste products. The waste product that can be recycled include glass, plastic and wood etc.

(4) Recovery: It is preferred step after 3Rs of the solid waste management. It is done through Waste-to-Energy (WTE). It is a process in which waste is incenerated to produce electricity. After incensation,

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10% volume of waste left in the form of ash.

(5) Disposal: It is the least preferred method of waste management. In this method, waste is disposed into landfills or open dumps.

(d)

Defining the Terms

(i) Anaemia

Anaemia is a condition in which number of red blood cells or concentration of haemoglobin within them is less than normal. It is a blood disorder in which oxygen carrying capacity of blood reduces.

Normal Haemoglobin Concentration

Men = 13.0 - 16 g/dL

Women = 11.6 - 15 g/dL

(ii) Appendicitis

Appendicitis is an inflammation of appendix. Its symptoms include pain in

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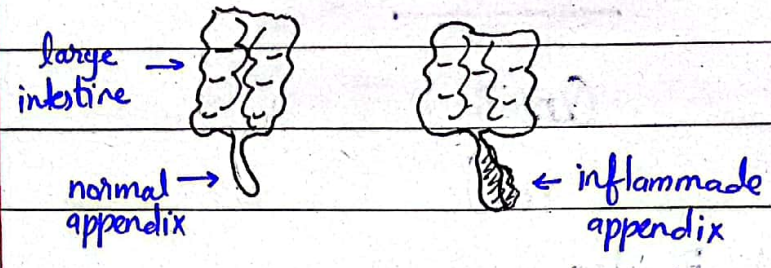
lower abdomin, fatigue and loss of appetite.



(iii) Spleen

Spleen is an organ in the left rib cage just above the of stomach. It stores and filters the blood. It is a part of lymphatic system and protects the body from infections and produce white blood cells.

(iv) Myopia

Myopia also called as near-sightedness or shat-sightedness, is a condition in which light from distant objects focuses in front of, instead of on, the reting. Resultantly, the distant objects appear blurry, but close objects appear normal.

(v) Isotones

Isotones are two or more species of

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atoms having different atomic numbers and mass, but same numbes of neutrons.

Qno 3

(a)

Chemical Bonds:

Chemical bond refers to an electric force of attraction between the atoms or ions that form it.

Reason behind Forming Chemical Bonds:

Atoms forms chemical bonds in order to reach the most stable state (lowest-energy state). Atoms become stable when their valence shell is filled or they ~~stat~~ satisfy the octet rule.

Octet Rule:

Octet rule states that atoms gain or lose electrons in order to get the electronic configuration of the nearest nobel gas.

Nobel Gases: Nobel gases are non-reactive gases and do not make bonds because their outermost ~~electrons~~ shells are filled.

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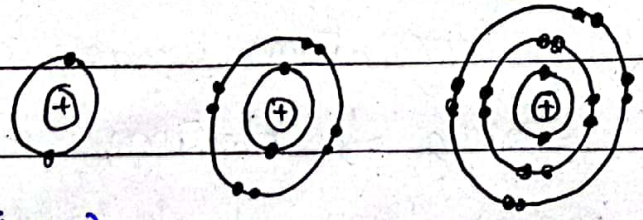
eg. Helium, Neone, Argon



Helium = 2 Neone = 2,8 Argon = 2,8,8

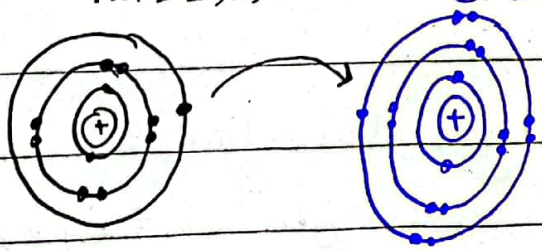
The type of chemical bond stablizes the atoms that form it.

(i) Ionic Bonds:

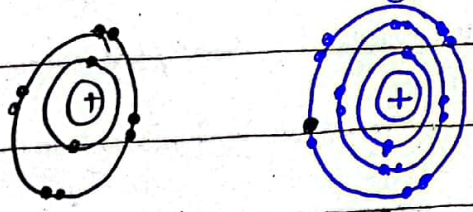
Some atoms become stable, when they fully gain or lose an electrons and produce ions or charged particles. Electron gain or loss make an atom with filled outer electron shell, which makes it energetically more stable.

eg. NaCl

Na = 2,8,1 Cl = 2,8,7



Na^+ Cl^-



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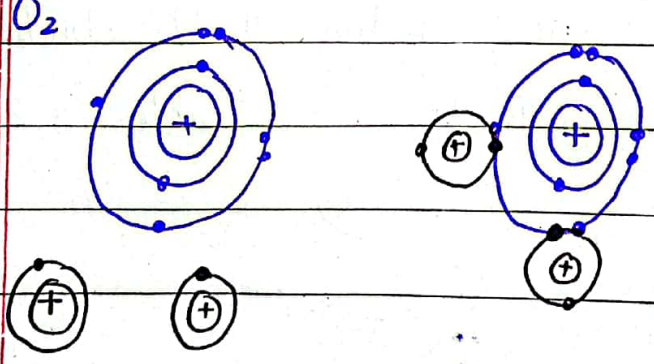
(2) Covalent Bonds:

Some atoms become stable by mutual sharing of electrons rather than full gain or loss of electrons.

eg. Water Molecule

Structure of water Molecule:

Water molecule consists of two hydrogen atoms and one oxygen atom. Hydrogen atoms share their electrons with oxygen atom and oxygen shares one of its electrons with each hydrogen atoms.



Now electrons share their time in valence electrons shells of oxygen and hydrogen. Thus, water molecule is much more stable than its individual components in fonlinen.

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(b)

Doping:

Doping is the process of adding impurity into the pure semiconductor. This process actually adds an extra electron or hole in the semiconductor.

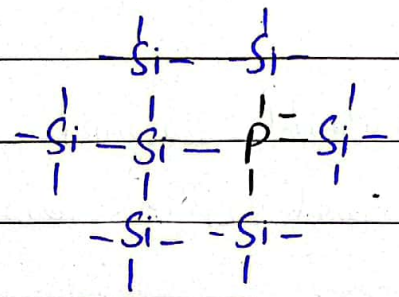
The process of doping creates two types of semi-conductors:

(i) N-Type Semiconductors

(ii) P-Type Semiconductors

N-Type Semiconductors:

N-Type semiconductors are produced by doping with an impurity from 5th group of the periodic table. The addition of Phosphorus in pure semiconductor creates N-type semiconductors



P-Type Semiconductors:

P-type semiconductors are produced by adding an impurity from

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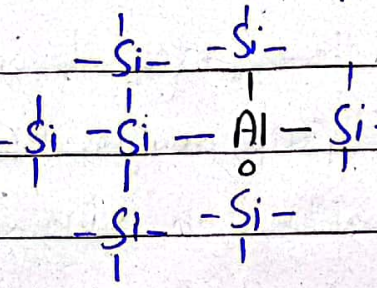
3rd group of the periodic table such as Aluminium into a pure semiconductor.



Types of Ceramics:

Ceramics:

Ceramics are non-metallic and inorganic solids made up of clay and shaped by heating and then hardened.

Types of Ceramics:

There are broadly two types of ceramics:

(a) Traditional Ceramics

(b) Advanced Ceramics

(i) Traditional Ceramics:

Traditional ceramics are made up of clay and silicate based materials.

Examples: Bricks, Tiles, Pottery, Porcelain

Uses:

Traditional ceramics are used in construction

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work, household and art.

(iii) Advanced Ceramics:

Advanced ceramics are made from pure compounds such as oxides, carbides and nitrides.

Examples and their uses:

(a) Silicon Carbide (SiC)

Silicon carbide is used in abrasives, high performance brakes and armours due to their characteristics of hardness and thermal conductivity.

(b) Bioactive Glasses

There are a group of ceramic glasses having high reactivity and biocompatibility. Due to these characteristics, they are used in bone grafting and coatings.

(d)

Polio:

Poliomyelitis or Polio is a highly contagious disease that is caused by a virus and attacks the nervous system causing muscles and limbs

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loss of function and deformity.

Cause:

It is caused by polio virus, which can be transmitted through infected fecal matter and contaminated food & water consumption

Symptoms:

Early symptoms of polio include headache, fatigue and fever. Serious symptoms appear after a week which are as follows:

(a) Loss of reflexes
(b) Sever muscle aches or weakness
(c) Loose and floppy limbs
(d) Deformed limbs especially at hips, knees & ankels
(e) paralysis attack which can be temporary or permanent

Treatment:

There is no treatment available for polio. Haweves, medication is done for speedy recovery, pain relief and preventing complications. Following steps are taken:

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(a) Bed rest

(b) pain killers

(c) portable ventilators to help breathing

(d) Warm towel or heating pads to relieve muscle ache

Prevention:

Polio prevention can be achieved through vaccination. According to the Centre for Disease Control and Prevention, a child should be given a dose of vaccine at the age of 2 months, 4 months, 9-12 months and booster dose between 4-5 years.

Challenges in eradication of Polio in Pakistan:

Pakistan and Afghanistan are the only countries where polio has not eradicated yet. The number of polio positive cases has surged in Pakistan in previous few months. The reason behind the Pakistan's inability to vanish polio completely are as follows:

① Resistance in the process of vaccination from local people

② Misconceptions about the side effects

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of vaccines.

(3) Target killing of Health workers by terrorists

(C)

Global Warming:

"The rise of temperature in the earths atmosphere is called as global warming." It is caused by the presence of greenhouse gases in the atmosphere, which trap the small portion of sunlight that can otherwise reflect back.

Global warming is a natural phenomenon and plays a crucial role in the normal functioning of living and non-living components of the planet Earth. However, due to human activities the concentration of green house gases has increased which results in more trapping of heat in atmosphere. Thus, temperature higher than normal affects the normal function of earth

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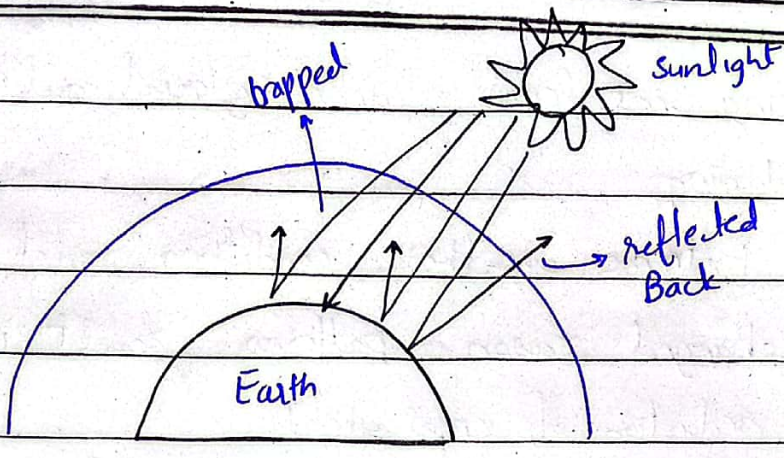

Merits of Global Warming: Normally, it is beneficial.

(1) It helps in maintaining the continuity of water cycle.

(2) It is important for the normal growth and development of humans and plants.

(3) It helps to grow the crops and provide food to living organisms.

(4) It may prevent the future ice-age.

Demerits of Global warming:

Global warming has increased due to human activities like burning of fossil fuels, industrialization, and motor vehicles. This increased atmospheric temperature have many hazardous impacts.

① Melting of ice sheets and resultantly

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rising sea level and glacial lake outburst flooding

(2) Extreme weather conditions and changed season patterns result in reduction of crops yield.

(3) Extreme climate change is a threat to biodiversity

(4) Increased deaths due to climate related disastors such as extreme heat waves.

(5) It also lead to increase in viral born diseases and health problems.

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Qno 6

(b)

Given data:

Cost of pair of shoes = 80$

Discount rate = 15%

Sale tax rate = 10%

Final Price = ?

Solution:

Applying the formula of Discount to find the price after discount

Discount = Original Price x discount rate

Putting the values in the formula

$$\text{Discount} = 80 \times 15\%$$

$$= 80 \times \frac{15}{100}$$

$$= 12\$$$

Now subtracting the amount of discount from the orginal price.

$$\text{Price after Discount} = \text{Original Price} - \underset{\text{amount}}{\text{Discount}}$$

$$= 80 - 12$$

$$= 68\$$$

Using the formula of Sales tax to find the amount sale tax on the

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pair of shoes

Sales tax = Original price x tax rate

$= 68 \times 10\%$

$= 68 \times \frac{10}{100}$

$= 6.8\ \$$

Now finding the final price after applying sales tax

Final Price = Original Price + Sales tax

$= 68 + 6.8$

$= 74.8\ \$$

$= 75\ \$$

Final Price of Pair of Shoes $= 75\$$

The final price of pair of shoes is 75$.

(C)

Given data:

Average speed of train = 36 km/hour

$= 36 \text{ km}/60 \text{ mins}$

Time of train's travel = 42 km

Departure time of train = 4pm

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Solution:

By applying the method of ratio and proportion

$$36 : 60 :: 42 : x$$

$$\frac{36\,km}{60\,min} = \frac{42\,km}{x}$$

$$36x = 42 \times 60$$

$$36x = 2520$$

$$x = \frac{2520}{36}$$

$$x = 70\ min$$

$$x = 1\ hour\ \&\ 10\ mins$$

As the train was departed at 4pm. It will arrive at 5:10 pm.

Qno. 8

(C)

Given data:

Radius of sphere = 7m

Surface area of sphere = ?

Volume of a sphere = ?

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Solution:

By using the formula of surface area of sphere

$$\text{Area of sphere} = 4\pi r^2$$
$$= 4 \times 3.14 \times (7)_m^2$$
$$= 4 \times 3.14 \times 49 m^2$$
$$= 615.44 m^2$$

Applying the formula of volume of sphere

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$
$$= \frac{4}{3} \times 3.14 \times (7)_m^3$$
$$= \frac{4}{3} \times 3.14 \times 343 m^3$$
$$= 1436 m^3$$

Hence, the area of sphere, having radius of 7m, is 615.44 m^2 and volume is 1436 m^3.

(d)

Given data:

Total money to be distributed = 4320 rp

∴ Zain's share = 2 parts

Aslam's share = 3 parts

Ashraf's share = 7 parts

Solution:

In order to find the total no. of parts of the total amount, add the parts of Zain, Aslam, & Ashraf.

$$2 + 3 + 7 = 12$$

Total parts = 12

Now, find the total amount received by each person.

Zain's share = $\frac{2}{\text{parts}}$ of total 12 parts of 4320 rp

$$= \frac{2}{12} \times 4320$$

$$= 720 \text{ rp}$$

Aslam's share = $\frac{3}{12} \times 4320$

$$= 1080 \text{ rps}$$

Ashraf's share = $\frac{7}{12} \times 4320$

$$= 2520 \text{ rp}$$

Hence, Zain will get 720 rps, Aslam's share will be 1080 rp and remaining

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2500 rps will be given to Ashraf.