

Date: 10<sup>th</sup> July, 2024.

## Section - II

### Q. No. 6

- a) In a bag, there are a certain number of toy-blocks with alphabets A, B, C and D written on them. The ratio of blocks A:B:C:D is in the ratio 4:7:3:1. If the number of 'A' blocks is 50 more than the number of 'C' blocks, what is the number of 'B' blocks.

**Data:**

NO. of toy-blocks marked with alphabets A, B, C and D.

Ratio of Blocks = 4:7:3:1

Number of A block exceeds C by 50.

To find = Number of B blocks.

**Solution:**

Alphabets            A : B : C : D

Their ratios        4 : 7 : 3 : 1

Number of A blocks is more than that of C blocks by 50.

So,

for convenience sake we take denote all ratio by a same alphabet that is 'a'

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Hence the above ratio becomes

$$4a : 7a : 3a : a \longrightarrow \textcircled{1}$$

Here we first find the value of  $a$ .

from above data

$$4a - 3a = 50$$

$$a = 50 \longrightarrow \textcircled{2}$$

By putting this value in equation  $\textcircled{1}$   
we get.

$$4(50) : 7(50) : 3(50) : 50$$

$$200 : 350 : 150 : 50.$$

Hence, the number of B blocks  
is 350.

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- b) A pair of shoes originally cost is 80\$. If there is a 15% discount and 10% sales tax applied. What is the final price.

**Data:**

Original Price of shoes = 80\$

Discount = 15%

Sales tax = 10%

Final Price = ?

**Solution:**

Discount on shoes = 15% or 0.15

Hence after discount the price of shoes becomes

$$80 \times 0.15 = 68\$$$

In addition, there is sales tax of 10%.

$$68 \times 0.1 = 6.8\$$$

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Adding Sales tax to discounted amount we get

$$68\$ + 6.8 = 74.8\$$$

Hence final Price of the pair of shoes is 74.8 USD.

- c. A Train travels 42 km between two stops at average of 36 km/hr. If train departs by 4 pm. When does the train arrive?

**Data =**

Distance travelled by Train = 42 km

Average speed = 36 km/hr.

To find = Time or  $t = ?$

**Solution:**

The formula of speed is

$$S = \frac{d}{t}$$

$$36 \text{ km/hr} = \frac{42 \text{ km}}{t}$$

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$$t = \frac{42 \text{ km}}{36 \text{ km/hr}} = \frac{7}{6}$$

$$t = 1.16 \text{ hrs.}$$

As train departs by 4pm,

It will arrive by 5:16pm.

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Q. NO. 8

c. What will be the surface area and volume of a sphere if it has radius of 7m?

Data:

Radius = 7m

To find = surface area and volume of a sphere

Solution:

Formula of surface area of sphere =  $4\pi r^2$

Formula of volume of sphere =  $\frac{4}{3}\pi r^3$

Surface area of sphere =

$$= 4\pi r^2 = 4(3.14)(7)^2$$

$$= 4 \times 3.14 \times 49 =$$

$$= 12.56 \times 49 = \boxed{615.4 \text{ m}^2}$$

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Volume of sphere =

$$= \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \times 3.14 \times (7)^3$$

$$= \frac{4}{3} \times 3.14 \times 343$$

$$= \frac{4}{3} \times 1077$$

$$= 1.33 \times 1077$$

$$= 1432.41 \text{ m.}$$

So, the volume of sphere is

**1432.41 m.**

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d. Distribute Rs. 4320 among Zain, Aslam and Ashraf in such a way that Zain gets 2 parts then Aslam gets three parts, whereas Ashraf gets seven parts.

**Data:**

Amount to be distributed = Rs. 4320

Zain's share = 2 parts

Aslam's share = 3 parts

Ashraf's share = 7 parts

or Zain : Aslam : Ashraf  
2 : 3 : 7.

**Solution:**

Ratio of amounts

2 : 3 : 7

Amount / share of Zain =

$$\frac{1}{2} \times \frac{4320}{7} = 720$$

Share of Aslam

$$\frac{3}{7} \times \frac{4320}{7} = 1080$$



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Ashraf's share

$$\frac{7}{12} \times 4320 = 2520$$

So, the share of Zain, Aslam and Ashraf is 720, 1080 & 2520 rupees respectively.

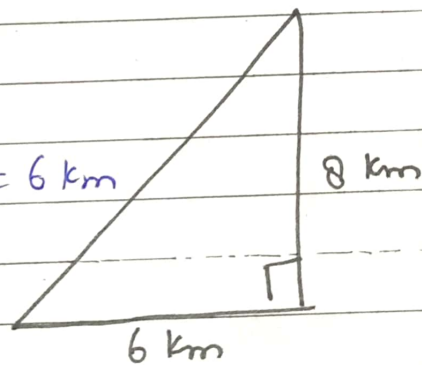
9. A man travels over the path of a right-angle triangle having base and hypotenuse 4 and 5 kilometers respectively. After a complete round he continues in the same direction for 6 km and then turns at 90 degree and continues for another 8 km. How long he has travelled and how far he is from his starting point?

Data:

Man travelled first = 6 km

After 90 degree turn

he travelled = 8 km



To find distance from starting point.

Sol:

$$\text{Hypotenuse} = \frac{\text{Perpendicular}}{\text{base}}$$

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$$\begin{array}{r} 13 \\ 3 \overline{) 41} \\ \underline{39} \\ 2 \end{array}$$

$$= \frac{4}{3} = \frac{4}{3} = 1.33 \text{ km}$$

He is 1.33 km away from the starting point.

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## Part - II

### Section - I

#### Q. NO. 3

- a) Why atoms form chemical bonds?  
Discuss covalent bond in a water molecule?

#### Chemical Bond:

Chemical bond is an electrostatic force of attraction between two atoms.

#### Why do atoms form chemical bond:

Atoms form chemical bonds in order to attain stability or inert gas electronic configuration. Except Hydrogen and Helium all other atoms form chemical bond to complete octet (8 electrons) in their outermost shell. Bonded atoms are more stable than unbonded atoms. Bonded atoms possess less amount of energy than unbonded atoms.

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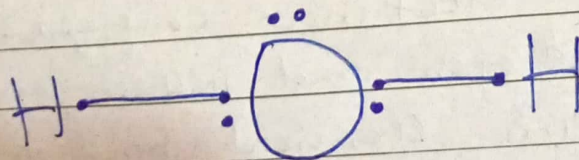
## Types of Chemical Bond:

Covalent bond    Ionic bond ~~Elect~~  
Co-ordinate bond

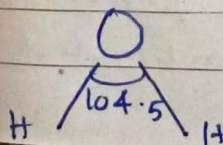
## Chemical Bond in water molecule

Water molecule consists of

two hydrogen atoms and one oxygen atom. The oxygen contains 6 electrons in its outer most shell. So, it forms covalent bond with two hydrogen atoms to form water molecule. The formation of chemical bond in water is illustrated below



OR



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The bond angle in water molecule is  $104.5^\circ$  b/c it possesses two lone pairs on oxygen atoms which reduces its bond angle from  $109^\circ$  to  $104^\circ$ .

b. What is doping? Discuss different types of ceramics.

## Doping:-

Doping is the process of adding impurities in the intrinsic semiconductors to increase their electrical conductance.

## Types of Doping

There are two types of doping:

1. Donor doping
2. Acceptor doping.

### 1. Donor doping:

Donor doping takes place between semiconductors (IVA) elements and elements of VA.

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In this type of doping, four electrons of VA group forms bond with four electrons of IV. However, one electron remains unbonded.

It helps in the conduction of electricity. Hence, it is called the donor doping.

## 2. Acceptor Doping:

In acceptor doping, the impurities from IIIA group are added to intrinsic semiconductors of IVA elements. Here three electrons of Al are involved in the bond formation with three electrons of selenium, however, one electron of selenium remains unbonded, it creates a hole in the intrinsic semiconductor which is responsible for the conduction of electricity in acceptor doping.

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d. What is Polio? What are the challenges in eradication of Polio in Pakistan?

## Polio

Polio is an infectious disease caused by polio virus. It causes the paralysis of the body.

## Symptoms

Fever, chills, stiffening of body muscles. Polio virus cause complete paralysis within in a matter of few seconds. If the muscles of respiratory systems are stiffed it may result in death of the patient.

## Treatment:

1- Inactive Polio vaccine: IPV

It is injected in arms via syringes or is injected in drips to be ~~in~~ infused into human body.

2. Oral Polio vaccine (OPV):

It is administered orally to the children under the age of five years.

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## Preventive measures

Polio virus is mostly transmitted via faeces. and lack of sanitation is mainly responsible for it. Sanitation conditions must be improved.

Hands must be washed after using washrooms.

Safe drinking water.

Polio vaccine.

## Polio Eradication Challenges

### in Pakistan

Following are the main challenges for the eradication of Polio virus in Pakistan:

1. Cultural causes
2. Religious causes
3. Security concerns
4. Lack of Education



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c. State some of the merits and demerits of global warming.

Following are the merits and demerits of global warming:

### Merits:

- 1- In some areas global warming results in the affluence of crops.
- 2- It ensures food security.
- 3- It aids in revenue generation for the government as a result of immense crop yield.

### Demerits:

Demerits of global warming outnumber the merits accrued from it. Here are given below:

- 1- Frequent heat waves.
- 2- Recession of glaciers.
- 3- Glacial outburst
- 4- Flash floods.
- 5- Rise in sea level.

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6. Global warming induced diseases  
Such as heatstroke.

## Q. No. 5.

9. Pakistan is the fifth most populous country of the world. What are the causes of population explosion in Pakistan? What can be the control measures?

## Population Explosion

As per the census of 2023, the population of Pakistan stands at whopping 240 million with annual growth rate 2.5% making it the fifth most populous country of the world.

### Causes:

Following are the causes of Population explosion in Pakistan:

- 1- Early marriages
- 2- Frequent pregnancies
- 3- Desire for male child
- 4- Lack of contraceptives.
- 5- Lack of Family Planning.

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6. Lack of education.
7. Negligence by Governments.
8. Poverty.

### Control Measures:

1. Budgetary allocation for health sector
2. Article 25A to be implemented in full spirit.
3. Minimum age for marriage be declared as 21.
4. Dissemination of sideeffects of overpopulation.
5. Availability of cheap contraceptives
6. Spread of education among the uneducated masses.
7. Vibrant role be played by media in this regard.

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c. How Earthquake occurs? How many people died in Turkey's earthquake in 2023? What was its intensity of earthquake on Richter scale which jolted Turkey?

## Earthquake:

Earthquake is the sudden release of energy in the form of seismic vibrations that dislocate the tectonic plates of the surface of the earth.

The quake that took place in Turkey killed around three thousand people.

The intensity of the earthquake that jolted Turkey was 7.8.

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d. Define the following terms:

### Hypocentre

The point below the epicentre is called hypocentre.

### Epicentre

The point just below the focus where the fault slide takes place is called epicentre.

### Shallow Focus

When the depth of earthquake is about 60 km it is called the shallow focus.

### Parsec:

Parsec is the astronomical unit of distance. It is equal to 3.25 light years.