

Kaynat Iqbal - 331.

Question #3

part (a)

Cyclone

A cyclone is a system of rotating winds around a low pressure core due to pressure gradient and Coriolis effect of spin motion of the Earth.

Causes of Cyclone

Cyclones are caused by a combination of several atmospheric and oceanic factors.

Two important factors in the formation of cyclone are;

Pressure gradient and Coriolis effect.

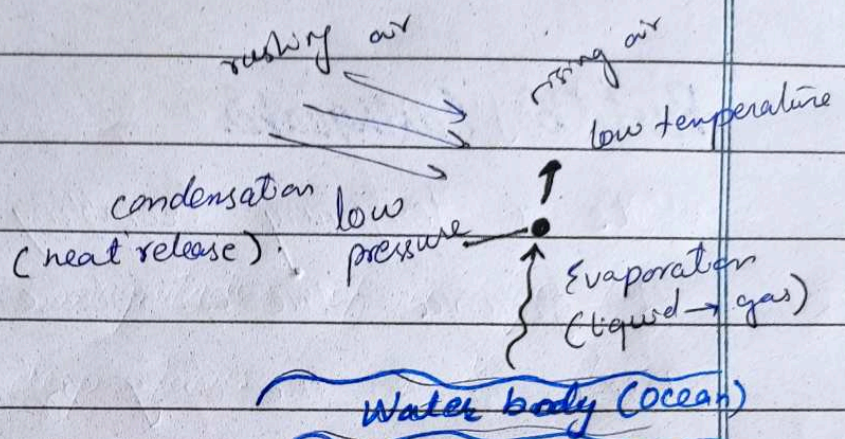
**Pressure gradient:** Pressure gradients are the areas where there are significant differences in atmospheric pressure over short distances. The creation of a low-pressure area sets up a pressure gradient.

As the warm air rises from the surface of the ocean, it creates an



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area of lower pressure at the surface.  
This rising air is the result of buoyancy -  
as warmer, moist air less dense than the  
surrounding cooler, drier air.



## Coriolis effect

The earth's rotation (Coriolis effect) comes into play. In the Northern hemisphere, the Coriolis effect causes the air to rotate anti-clockwise around the low pressure center. In the southern-hemisphere, it causes clockwise rotation. When the Coriolis effect of the spin motion of the earth is coupled with pressure gradient then the resulting phenomenon is called cyclone.

**Part where cyclone winds are strongest and destructive**

The strongest and most destructive



winds in a cyclone are typically found in the **eye wall**, which is a ring of intense thunderstorms surrounding the eye of the storm.

## Part (b) Earthquakes

It's a temporary trembling and shaking of ground due to release of energy stored inside the body of the Earth.

**Example:** On 8<sup>th</sup> Oct, 2005, Pakistan faced earthquake. And ~~is~~ recently Morocco faced severe destruction due to earthquake.

### Deep and Shallow focus

Deep focus earthquakes are known as intraplate earthquake, as they are triggered by collision between tectonic plates. While

shallow focus earthquakes are termed as crustal earthquakes, as they exist in the earth's crustal layer. The shallow focus

earthquakes occur at depths less than

70 km while that of deep focus occurs

at depths of 300-700 km. Shallow focus



# Causes of Earthquake

The lithosphere is the solid crust on top of the mantle region. It is made up of giant puzzle pieces called **tectonic plates** that are slowly but constantly moving. These plates sometimes get stuck due to friction and when this stress overcomes the friction, energy waves are released causing shaking i.e. earthquake.

## Magnitude of Morocco Earthquake

6.8 was the recorded magnitude of Morocco earthquake.



## c) Dengue fever

It is a viral illness transmitted to humans through the bite of infected female *Aedes* mosquitoes.

### Primary causes

*Aedes* mosquitoes are the primary cause of dengue fever. Dengue virus is the primary causative agent of dengue fever, which belongs to the Flaviviridae family.

### Preventive measures

The most effective way to prevent dengue fever is to control mosquito populations and reduce the risk of mosquito bites.

This can be achieved by;

**Eliminating breeding sites:** Empty or cover containers that collect stagnant water i.e flower pots, buckets etc to prevent mosquito breeding.

**Mosquito nets:** Mosquito nets should be used especially for infants and young children while sleeping.

Other preventive measures include using



insecticides, wearing protective clothing,  
using mosquito repellents etc.

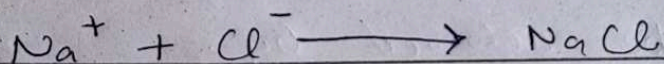
## part (d) Difference between Ionic and Covalent bonds with examples.

### Ionic bond

Ionic bond is a chemical bond which  
is formed by complete transfer of an  
electron from one atom to another.

#### Example

The bond sodium chloride NaCl is  
ionic bond.

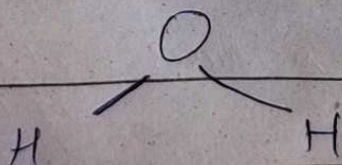


### Covalent bond

A bond formed by mutual  
sharing of electrons between the  
atoms.

#### Example

Water ( $\text{H}_2\text{O}$ ) is an example of  
covalent bond.





## Question 5

### part a

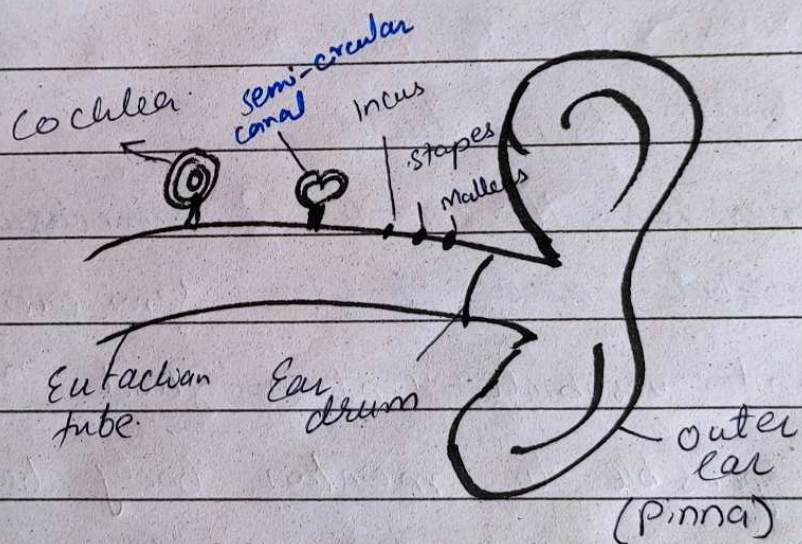
## Structure and function of Human Ear

### Human ear

Human ear is a sensory organ that helps us to hear the things.

### Structure and Function of Human Ear

Human ear is divided into three parts namely Outer ear, middle ear and inner ear.



### Outer Ear

It is the visible part of the ear.

It is further divided into three parts.

Pinna, which is the outermost part. It interacts with sound waves first. External auditory canal is the second part of the outer ear through which sound waves enter.



into the inner ear through external auditory canal. It provides passage to sound waves. **Ear drum** is the third part of outer ear. Sound waves passing from the auditory canal enter and hit the ear drum and vibration is produced resultantly. These sound waves then move ahead towards middle ear.

**Middle ear** - It consists of ossicles namely **malleus**, **stapes** and **incus**. When sound waves interact with these ossicles again vibration is produced.

**Inner ear**. It consists of **semi-circular canal**, **vestibule** and **cochlea**. Semi-circular canal and vestibule contain fluid. These are responsible to maintain body balance as per body positions. **Cochlea**, then sound waves move towards cochlea which is the **hearing part** of the ear. It converts the sound waves into electrical signals for impulses. Cochlea contains auditory nerves which transmit these electrical signals towards brain which then translates and perceives the signals.



## Part b Digestive system and role of small intestine in digestion.

**Digestive System:** Digestive system is all about digestion / break down of food into the simpler particles. The system which is responsible for the breakdown of larger food particles into simpler and absorbable food particles is termed as digestive system.

### **Role of Small Intestine in digestion.**

Small intestine plays a fundamental role in the process of digestion. About 90% of the digestion takes place in small intestine. Here digestion completes and absorption takes place. It is further divided into three components.

i) Duodenum      ii) Jejunum      iii) Ileum.

**Duodenum:** It is the smallest part having length 20-25 cm. It releases enzyme called enterokinase. Pancreas release pancreatic juice via pancreatic duct towards the duodenum.

In pancreatic juice there exist amylase which converts starch into maltose, sodium bi



carbonate which neutralizes the acidic nature of chyme; **Lipase** that converts lipids/fats into fatty acids and **Trypsinogen** is converted into trypsin. **Enterokinase** converts trypsinogen into trypsin which further converts proteins into polypeptides.

**Liver** releases bile that converts fat into fatty acids. Thus, digestion in duodenum is facilitated by **pancreas** and **liver**.

**Pancreas** release pancreatic juice that contain multiple chemicals responsible for the digestion of food and bile from liver converts fat into fatty acids.

## **Jejunum**

It is the longest part of small intestine. It releases **intestinal juice** which comprises of **amino peptidase** for converting polypeptide into di-peptide, **erypsin** for converting di-peptide into amino acids, **lipase** that is used to convert remaining fat into fatty acid and **Lactose** and **Maltose** convert lactose and maltose into glucose.



3. Ileum: Then the food passes from ileum and is interacted <sup>with</sup> by villi and absorption of food takes place with the help of villi in ileum. Digested food is absorbed into capillaries and through them blood absorbs nutrients.

### part c Short note on Vitamins

#### Vitamins

Vitamins are the organic compounds essential for body working. They are vital for proper functioning of the human body. While the body requires vitamins in relatively small quantities as compared to macronutrients like carbohydrates, proteins, and fats, their absence or deficiency can lead to a wide range of health problems.

Types: There are two main types of vitamins.

- i) Water Soluble
- ii) Fat-Soluble

Water Soluble vitamins: These vitamins are



soluble in water and include vitamin C and the B-complex vitamins (B1, B2, B3, B5, B6, B7, B9 and B12).

**Fat Soluble vitamins** - These vitamins are fat soluble as they can be stored in the body's fat tissues and liver. These vitamins include A, D, E and K.

### **Functions of vitamins**

There are various functions of vitamins like they act as antioxidants, play role in converting food into energy and maintaining a healthy metabolism. Moreover, they are essential for bone health, blood clotting, vision and immunity.

**Sources** : vitamins are found in a variety of foods, and a balanced diet should provide an adequate <sup>intake</sup> of these vitamins. Some of the sources include ; fruits, vegetables, nuts, grains, meat, dairy products, sunlight etc.

### **Deficiency and Excess**

Their deficiency can lead to a range of health issues like fatigue, weak immunity, skin problems etc. Excess intake



can lead to toxicity symptoms

## part d

### Functions of pituitary glands

#### Pituitary gland

The pituitary gland is referred to as the **master gland** of the endocrine system. It plays a central role in regulating various physiological processes in the body by releasing hormones.

#### Functions

It consists of three lobes namely anterior lobe, median lobe and posterior lobe. **Anterior lobe** consists of  $STH$ ,  $TSH$ ,  $ACTH$ ,  $Gonadal\ Gonado\ trophic\ hormone$ , ~~follicle~~ follicle-stimulating hormone ( $FSH$ ),  $LH$  and prolactin. These are fundamental in the growth of the body parts, activation of thyroid gland, adrenal glands. They play a crucial role in the reproductive system. Median lobe releases melano-phore stimulating hormone ( $MSH$ ) which stimulates melanocytes. It play role in the skin colour. Posterior lobe contains oxytocin and  $ADH$  which



are involved in various reproductive <sup>and</sup> social behaviours and also regulate the balance of the body.

Thus, pituitary gland plays a vital role in regulating numerous physiological process including growth, metabolism, reproduction, stress response, and water balance.

## Section - II

Q#6

Identifying the Series

(a) 1) 10, 100, 200, 310, 430.

So,

$$100 - 10 = 90$$

$$200 - 100 = 100$$

$$310 - 200 = 110$$

The differences between the consecutive terms

are increasing by 10 each time. So, it

10 should be added to the difference between

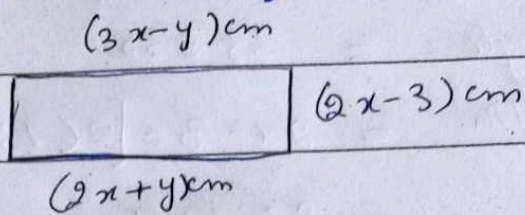
the consecutive terms for each <sup>term</sup> term.

$$\text{So, } 310 + 110 + 10 = 430.$$

ii) 3, 7, 23, 95, 383



(b) Area of rectangle.



Sol. Perimeter = Sum of all sides = 114 cm

In a rectangle parallel sides are equal,

$$\text{So, } 3x - y = 2x + y$$

$$\Rightarrow x = 2y \longrightarrow \text{①}$$

Now perimeter

$$114 = (2x-3) + (3x-y) + (2x+y) + (2x-3)$$

$$114 = 9x - 6$$

From ①

$$114 = 9(2y) - 6 \Rightarrow 114 = 18y - 6$$

$$y = \frac{120}{18} = 6.667 \text{ cm}$$

Now substituting back the value of  $y$  in ①

$$x = 2(6.667 \text{ cm})$$

$$x = 13.334 \text{ cm}$$

Now putting the values of  $x$  and  $y$

in

$$\begin{aligned} 3x - y &= 3(13.334) - 6.667 \\ &= 33.335 \end{aligned}$$

and

$$\begin{aligned} 2x + y &= 2(13.334) + 6.667 \\ &= 33.335 \end{aligned}$$



Thus, length of the

$$\text{rectangle} = 33.335$$

$$\text{Now width} = 2x - 3 = [2(13.334) - 3]$$

$$= 23.668$$

As we know area of rectangle

$$= l \times w$$

$$= 33.335 \times 23.668$$

$$= 788.97 \text{ cm}^2$$



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c) Let  $x$  and  $y$  be the ages of Nisha and Romi respectively.

Acc to the information,

Five years ago, their ages were

$$x-5 = 3(y-5)$$

$$x-5 = 3y-15$$

$$x-3y = -10 \longrightarrow \textcircled{1}$$

Present ages

$$x = y+15 \longrightarrow \textcircled{2}$$

Put the value of  $x$  in  $\textcircled{1}$

$$x-3y = -10$$

$$(y+15) - 3y = -10$$

$$y+15-3y = -10$$

$$+2y = +25$$

$$y = 12.5$$

Now, put the value of  $y$  in  $\textcircled{2}$

$$x = 12.5 + 15$$

$$x = 27.5$$

Thus

Nisha's age is 27.5 years at present



d) To find the largest possible number of cartoons needed, greatest common divisor (GCD) is required to determine

210, 252, 294.

GCD =  $2 \times 3 \times 7 = 42$ .

2	210, 252, 294
2	105, 126, 147
3	35, 42, 49
7	5, 6, 7
5	1, 3, 7
3	1, 1, 7
7	1, 1, 1

So, the largest possible number of cartoons needed

is 42 cartoons. Each

cartoon will contain

the same no. of oranges, apples, and pears.

Q8//

Men	Distance (km)	Days
50	20	40
70	20	x

$$\frac{x}{40} = \frac{50}{70}$$

$$x = \frac{50}{70} \times 40 = \frac{200}{7}$$

$$x = 28.57 \text{ days}$$

28.5  
 $\overline{)200.0}$   
 14  
 60  
 56  
 40  
 35  
 50