

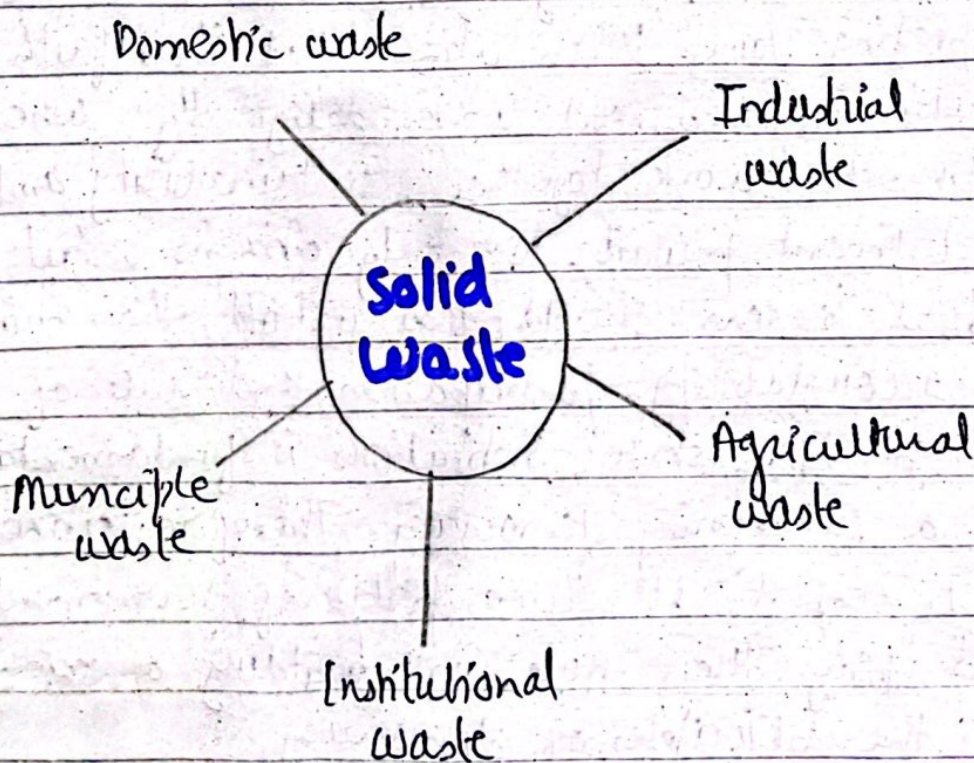
# General Science and Ability

## Question no. 4(a)

### Solid waste :-

A solid waste is the mixture of solid and semi-solid waste which is the material of waste.

### Types of solid waste On the Basis Of sources :-



Following are the types of waste on the basis of its sources :-

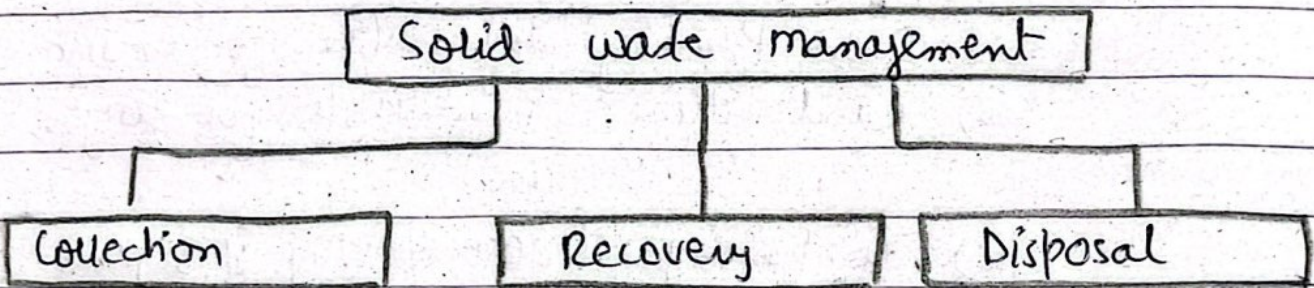
- (1) Industrial waste : It is the waste which comes from industries such as textile, sugarcane etc
- (2) Agricultural waste : The waste of agriculture is called Agricultural waste
- (3) Domestic waste : The waste which comes from domestic use is called Domestic waste
- (4) Municipal waste : It is waste of municipal use.
- (5) Institutional waste : It comes from institutions e.g hospitals, factories etc

## Solid waste Management :-

Solid waste management is the supervised handling of waste from collection point through recovery process upto the disposal of waste.

# Methods of Solid Waste Management

Following are the three methods of solid waste management :-



**(1) Collection :-** The process of collection is the most expensive and backbone of solid waste management. The collection of waste is either done through government municipalities or by hiring private stakeholders like Chinese company in Karachi. It comprises of two methods :-

- (a) Collection staff
- (b) Collection vehicles

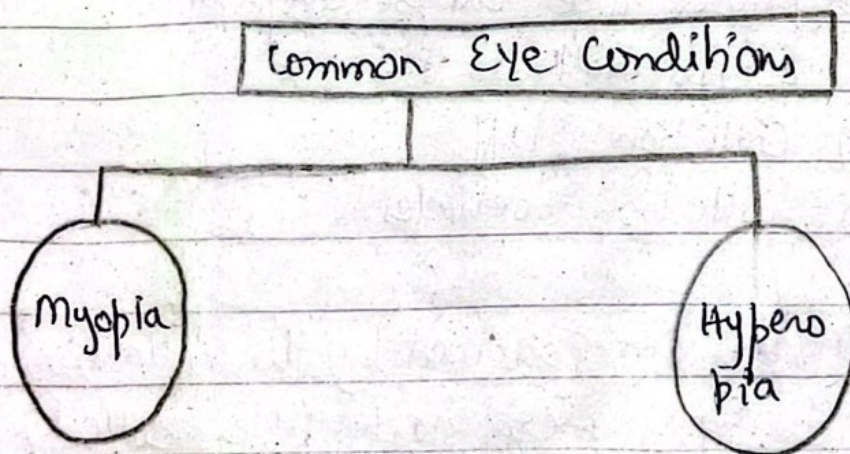
**(2) Recovery :-** Followed by the collection of waste, the process of recovery starts. After collecting waste, it is transferred to 'Transfer stations' build in the middle of the cities to segregate the waste. The waste which can be recycled are separated whereas the rest of the waste is transferred for disposal.

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**(3) Disposal :-** Disposal is the last method of solid waste management where the waste is finally disposed off. There are four methods of disposal of waste.

- (a) Open Dumping (degradable for environment)
- (b) Land Filling (unreliable for longer use)
- (c) Compositing (decomposing of organic waste)
- (d) Incineration (Burning of waste in controlled environment)

### Question no. 4 (c)



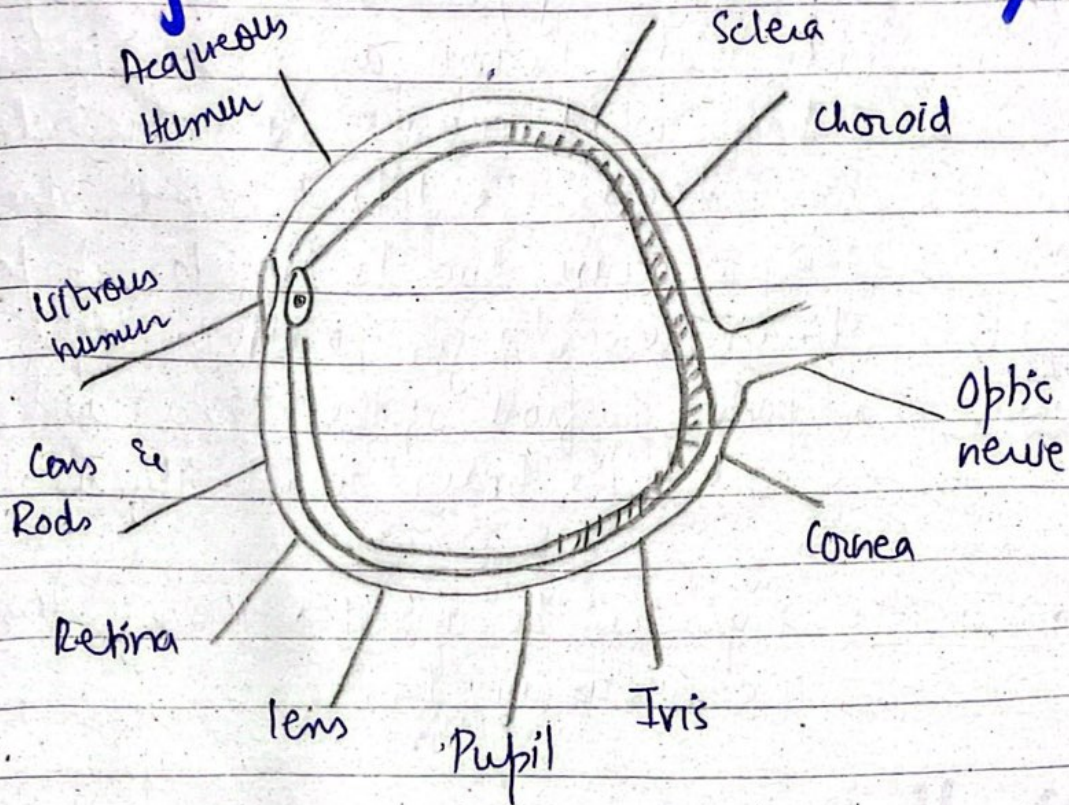
**(1) Myopia :-** Myopia is a common eye condition which is also known as short-sightedness. It is a condition which causes near objects to be seen clear whereas the distant objects are blurred. Myopia occurs due to irregular shape of the retina. These changes result in light rays coming to a point in front of the retina and the messages are sent to the brain resultantly as blurred.

Treatment: Myopia can be corrected through the use of concave lens

**(2) Hyperopia :-** Hyperopia is another common eye condition called far-sightedness. It is a condition which causes near objects to be seen as blurred whereas the distant objects are perceived clearly. It occurs when the cornea is curved too little and as a result of this, the light rays coming to a point behind the retina. They are not refracted correctly causing a refractive error.

Treatment: Hyperopia can be treated by the use of convex lens

# Major Parts of Human Eye :-



- (1) Sclera : The outermost layer of the backside of an eye which protects the eye
- (2) Choroid : It is the red part of the eye which contain capillaries in which. It is responsible for the nourishment of eye
- (3) Cornea : It is the outer layer of the frontal side of the eye. It is the point where light first interact
- (4) Iris is the muscle which controls the movement of the pupil
- (5) Pupil : It is the whole through which the light enters.

- (6) Lens : Lens is responsible for the reception and the bending of the eye
- (7) Retina : Retina is the most sensitive and protected layer of the eye and it contains rods and cones.
- (8) Rods and Cones : Photoreceptors which are responsible of the conversion of light into image
- (9) Aqueous and vitreous Humour : water area for nourishment of eye
- (10) Optic Nerve : It is nerve which takes image to the eye for further instructions.

### Question no. 4 (c)

**(a) Microwave :-** Microwave is the electromagnetic radiation having energy and frequency greater than radio waves and less than Infrared waves. It has wavelength very short.

Uses :- Microwave is used for :

- (a) Microwave oven
- (b) Traffic challan
- (c) Spacecraft communication
- (d) Radar technology

## (b) Ultraviolet Rays :-

Ultraviolet rays are the rays which have energy and frequency less than gamma and X-rays but greater than Infrared. It has good penetrating power but less wavelength than microwaves and radio waves.

- Uses :
- (a) Killing bacteria
  - (b) Creating fluorescent effects
  - (c) Curing inks & resins
  - (d) phototherapy
  - (e) suntanning

## (c) X-Rays :-

X-rays are also called Roentgen waves. It has energy less than gamma rays but more than ultraviolet rays. Wavelength is more than gamma rays but less than UV rays.

- Uses :
- detects bone fractures, certain tumours and other abnormal masses, pneumonia, some types of injuries, calcifications and to study arrangement of different material.
  - Also to observe dental problems and foreign objects.

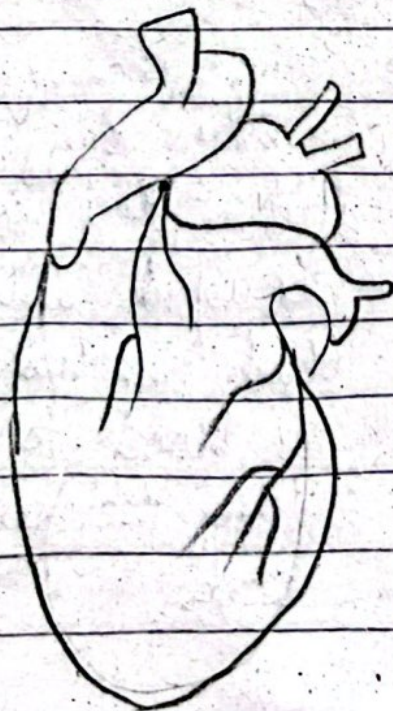


## Question no. 4(b)

**Heart :-** Heart is the central organ of the circulatory system. It is one of the most important organs of the body, thus, one of the most protected organs. It is responsible for the pumping of the blood. Human circulatory system is double circulation and closed circulatory system.

Human heart is surrounded by three layers for the protection of heart: Peri-cardium, Myocardium and Endocardium.

Moreover, the human heart has four chambers: two atrias and two ventricles.



## Working of the Human Heart :-

Different veins arising from different parts of the body. They collect deoxygenated blood. It is collected in single big vein called Venacava. The Venacava collects that blood and that blood opens into right side of heart : right Atrium.

Right atrium contracts when blood reaches there. These chambers make 'lub dub' sound and this deoxygenated blood move from right atrium to tricuspid valve. They prevent the backflow of the blood, then it reaches to right ventricle.

Right ventricle contracts and it reaches pulmonary artery.

Pulmonary artery takes the deoxygenated blood to lungs where oxygenation of blood takes place. Pulmonary vein brings oxygenated blood to left side of atrium that contracts and move blood through bicuspid valve. Left ventricle contracts & blood reaches aorta. Aorta, ensures supply of blood to the rest of the organs. This is how the circulatory system of heart of human works.

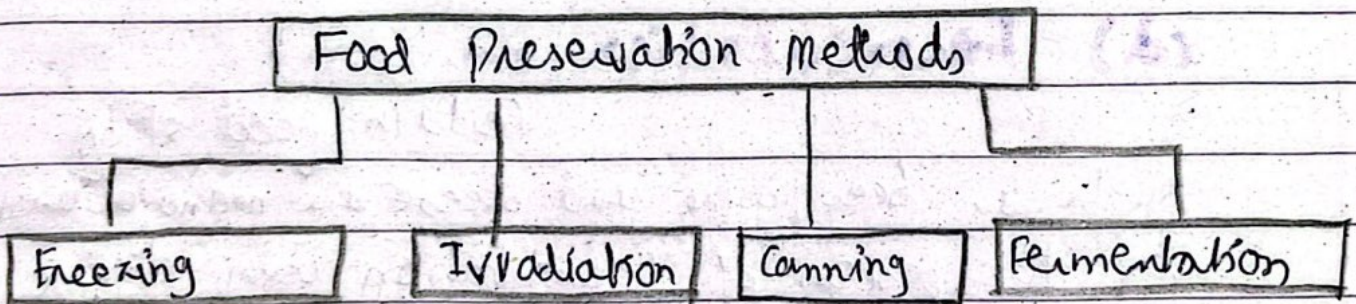
## Question no. 5(a)

### Food Preservation :-

Food preservation is the technique to prevent food spoilage, food poisoning and microbial contamination in food. The objective of food preservation is to kill pathogens, to keep food in best quality and to preserve food for a longer period of time.

### Methods of Food Preservation :-

Following are the methods of food preservation :-



**(a) Freezing :-** Freezing the food at temperature ranging from minus  $10^{\circ}$  to minus  $80^{\circ}$  for long term storage is the common food preservation method used in both domestic and commercial use.

**(b) Irradiation :-** Irradiation is the food preservation method in which food is exposed to  $\beta$ -particles or  $\gamma$ -rays. The radiations are capable of killing bacteria, molds and pests among others. However, it can be dangerous to expose food to radiations.

**(c) Canning :-** In canning, one of the most common food preservation methods, food is sealed in an airtight container in high temperature. Meat, fish and fruits are preserved through the method of canning.

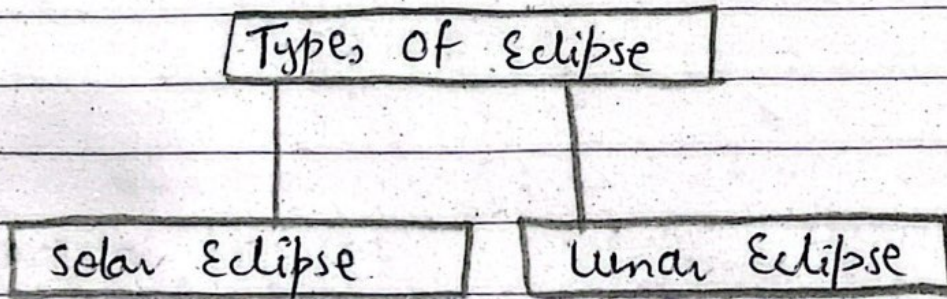
**(d) Fermentation :-**

Certain food stuffs such as beer, wine and cheese are manufactured by the process of fermentation using specific microbes. These fermentative microbes protect the food against other pathogenic microbes by producing acid or alcohol which is toxic to other pathogenic microbes.

## Question no. 5(c)

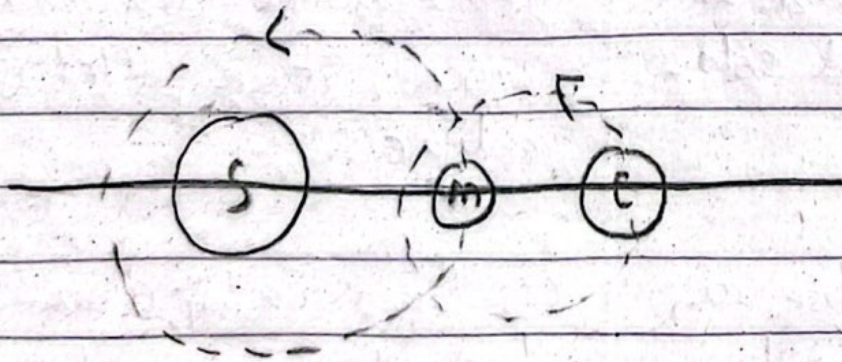
### Eclipse :-

The obscuring of one astronomical object by another astronomical object is called Eclipse. Eclipse are of two types: Solar Eclipse and Lunar Eclipse.



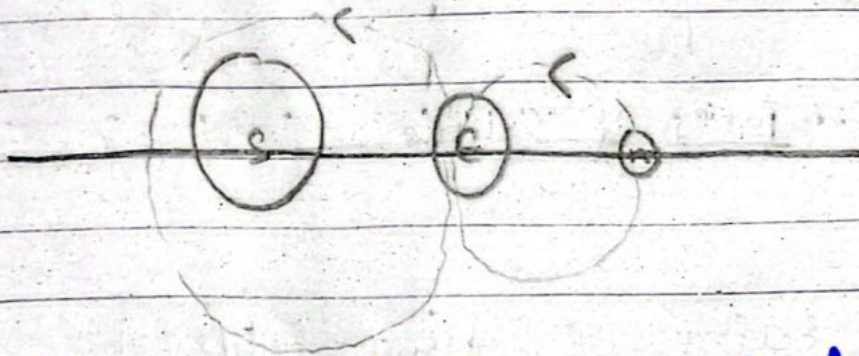
### (1) Solar Eclipse :-

Moon orbits around the earth and at the same time earth orbits around sun. If moon comes between sun and earth, it is called solar Eclipse.



## (2) Lunar Eclipse :-

Moon orbits around the earth and earth orbits around the sun. When sun and moon are disturbed because earth comes in between moon and sun, then it is called lunar eclipse.



## Difference Between Solar and Lunar Eclipse :-

Solar	Lunar
(1) When moon comes in between sun and earth is called solar eclipse.	(1) When earth comes in between the sun and the moon, it is called lunar eclipse.
(2) Solar eclipse can be viewed only in totality along a	(2) lunar eclipse can be observed from nearly an entire hemisphere.

relatively narrow track

(3) Solar eclipses are relatively brief events

(3) Lunar eclipse lasts longer taking several hours to complete

(4) Prayer of Kusuf

(4) Prayer of Ikeruf

## Question no. 5 (d)

### Nuclear Fission :-

Nuclear fission is a reaction in which the nucleus of an atom splits into two or more nuclei. All nuclear power plants use nuclear fission and it releases large amount of energy in the form of heat & radiation.

### Nuclear Fusion :-

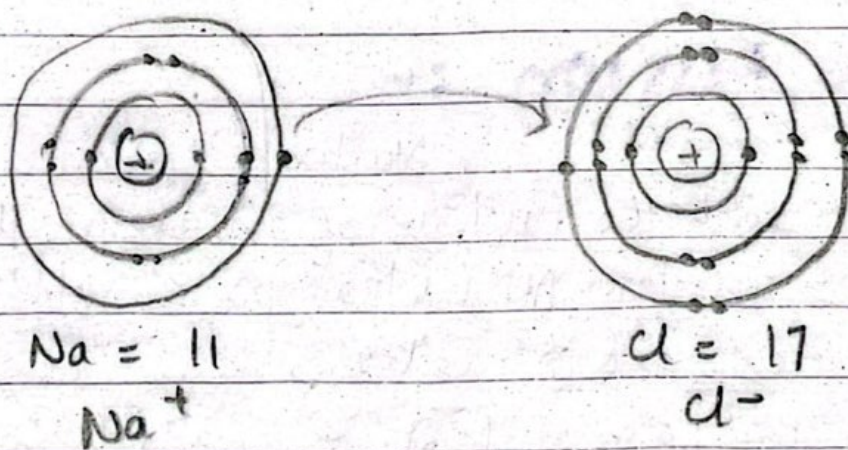
Nuclear fusion is a reaction in which two or more atomic nuclei, usually deuterium and tritium, combine to form a single heavier nuclei while releasing massive amount of energy. However, fission reaction is necessary for nuclear fusion reaction.

# Ionic Bond :-

Ionic bond is the bond which is formed by complete sharing of one or more electrons from one atom to another atom is called ionic bond.

## Explanation of Ionic Bond :-

Ionic bond takes place in table salt = NaCl  
- Between sodium atom and chlorine atom



Sodium atom has one electron in its outermost shell. It loses one electron to attain stability and becomes a cation (Na<sup>+</sup>). On the other hand other, chlorine atom needs one electron to complete its outermost shell, so it gains one electron to attain stability. Therefore, an ionic bond is formed between Na and



Cl which takes place by complete sharing of electron.

## Question no. 6 (c)

### Milky way :-

Milky way is a spiral galaxy. Galaxy is a gravitational bound system of stars and dark matter. Galaxy is a fundamental unit of universe. Solar system revolves around milkyway galaxy.

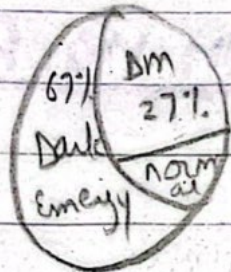
Milkyway is a spiral galaxy. Its diameter is 150 light years. It is not alone in the sky. It is part of collection of other galaxies called local group.

### Dark Matter and Galaxies :-

Dark matter was originated when it was found that galaxy is moving. Earlier galaxy was thought to be stayant. Dark matter makes up most of the mass of galaxy and galaxy clusters. Dark matter is responsible for the way galaxies are organized on grand scales.

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Dark matter seems to outweigh visible matter by making up about 27% of the universe.



Dark matter is the cosmological cement which unites all stars together strongly more than gravity. It consists of non-interacting particles.

## Dark Energy :-

Dark energy is the last part of the galaxy which functions as opposite of dark matter. Dark energy is the name given to mysterious influence driving the accelerated expansion of the universe. It makes up 68% of the universe and appears to be associated with vacuum in space. It is evenly distributed throughout the universe, which means it lacks local gravitational effect, but rather a global effect on the universe.

## Question no. 8(a)

Let three consecutive numbers be  $x$ ,  $x+2$ ,  $x+4$ , then,

$$x + x + 2 + x + 4 = 273$$

$$3x + 6 = 273$$

$$3x = 273 - 6$$

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

$$x = 89$$

Three odd numbers are

$$x = 89$$

$$x + 2 = 89 + 2 = 91$$

$$x + 4 = 89 + 4 = 93$$

The three odd numbers are =  $\boxed{89, 91, 93}$

## Question no. 8(b)

$$2^2 \quad 4^2 \quad 6^2 \quad 8^2 \quad 10^2 \quad 12^2$$

$$(1) \quad 4, 16, 36, 64, ?, 144$$

$$4, 16, 36, 64, 100, 144$$

(square of even numbers)

$$-1 \quad -2 \quad -3 \quad -4 \quad -5$$

$$(2) \quad 30, 29, 27, ?, 20, 15$$

$$30, 29, 27, 24, 20, 15$$

(subtract in ascending number from left side)

$$\begin{array}{r} 12 \\ 12 \\ \hline 24 \\ 120 \\ \hline 144 \end{array}$$

$+6 \quad +8 \quad +10 \quad +12 \quad +14$   
 (3) 1, 7, 15, 25, ?, 51  
 1, 7, 15, 25, 37, 51

$+2 \quad +4 \quad +6 \quad +8 \quad +10 \quad +12$   
 (4) 0, 2, 6, 12, 20, 30, ?  
 0, 2, 6, 12, 20, 30, 42

$+24 \quad -48 \quad -37 \quad +73$   
 (5) 48, 24, 72, 35, 108, ?  
 48, 24, 72, 35, 108, 54

$\frac{48}{24} = 2$   
 $\frac{36}{13} = 2.77$

### Question no. 8(c)

- (1) Shirt
- (2) Craden / Danger
- (3) Stomach
- (4) London
- (5) Holiday

## Question. no 8(d)

let sara age be 'x'

Sara's mother age be =  $6x$

Sara's brother Ali be =  $2x$

In three years, there ages would be :

Sara's age =  $x+3$

mother's age =  $6x+3$

Ali's age =  $2x+3$

Sum of their ages after 3 years would be 72

Sara age + Mother age + Ali age = 72

$$(x+3) + (6x+3) + (2x+3) = 72$$

$$9x+9 = 72$$

$$9x = \frac{72 - 9}{9}$$

$$9x = 63$$

$$x = \frac{63}{9}$$

$$x = 7 \quad \text{Sara's age}$$

So,

$$\text{mother's age} = 6x = 6(7) = 42$$

$$\text{Ali's age} = 2x = 2(7) = 14$$