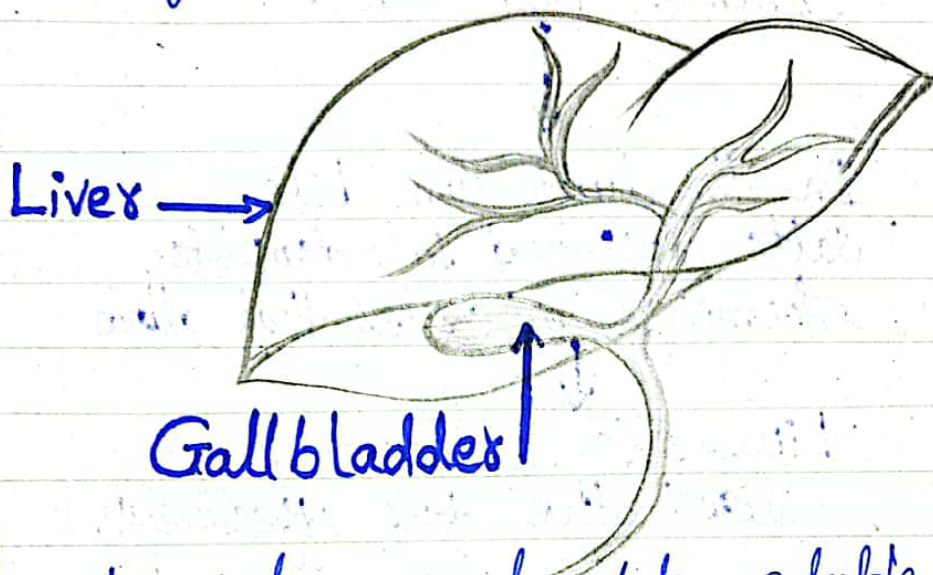


Q4: (a)

## Note on Liver juice "Bile"

Liver bile is a vital digestive fluid produced by hepatocytes in the liver and stored in the gall bladder. It plays an important role in the digestion and absorption



of fats and fat-soluble vitamins (A, D, E and K) in the small intestine.

### Composition:

Bile is composed primarily of bile salts, cholesterol, bilirubin, electrolytes, and water. Bile salts, derived from cholesterol, and most important or significant component for digestion, aiding in the emulsification of dietary fats.



## Function:

Released the hormone cholecystinin

signaling the gallbladder to contract and release stored bile into the duodenum through Common bile duct.

In the duodenum bile salts surround fat droplets, forming micelles that allow

Lipases to access and digest the fats effectively.

**Bilirubin:** Another critical component of bile, bilirubin is a product of hemoglobin breakdown from old red blood cells.

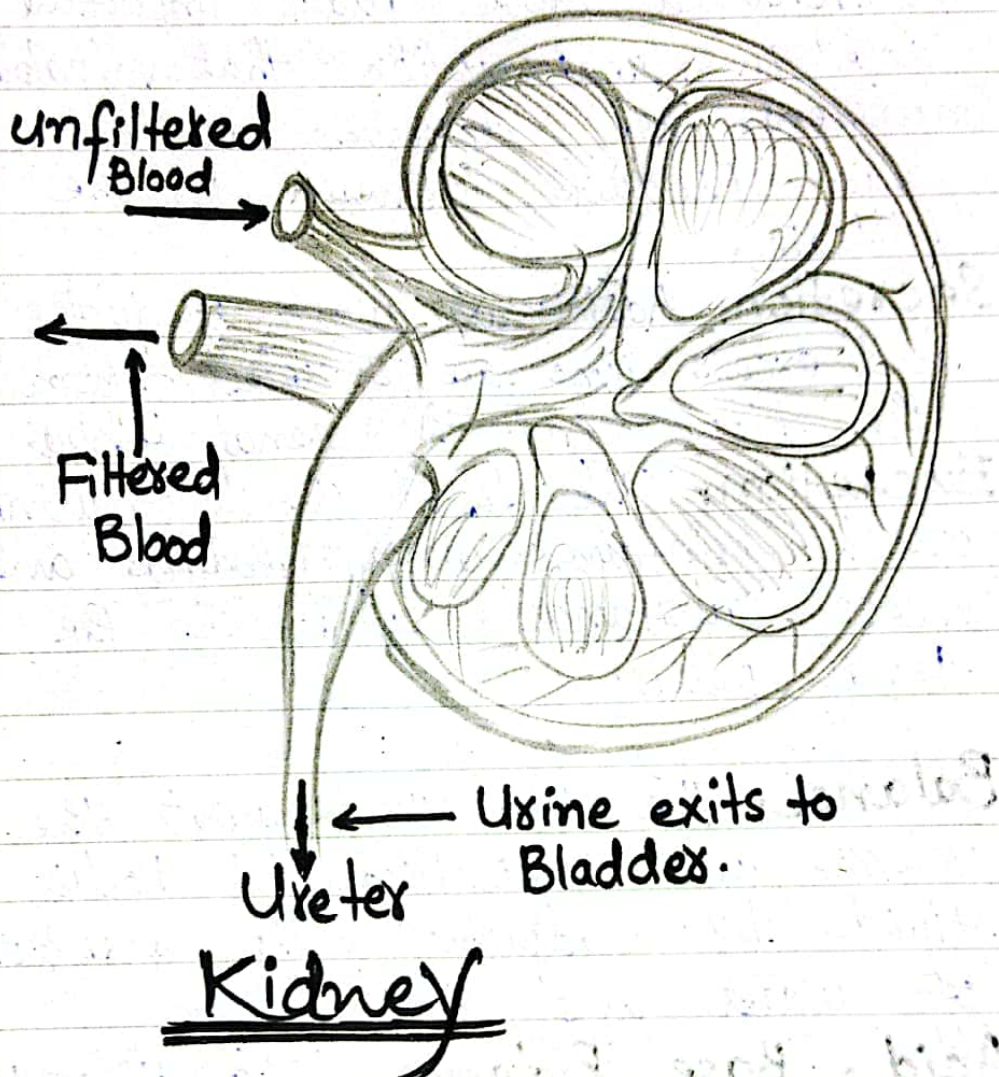
Liver bile production and flow are essential for maintaining digestive health. Jaundice is one of the health issues of gallbladder.



Qu: (b)

## Role of Kidney in excretion

The kidney is the vital organ of the human body.



There are many key functions they perform in excretion.

⇒ **Filtration** Blood enters the kidneys through the renal arteries and flow into kidney nephrons, and the functional unit of kidneys. The filtration process removes water, ions, glucose, amino acids, and



waste products like urea and creatinine from the blood, forming a filtrate.

**Reabsorption:** Proximal convoluted tube, loop of Henle, distal convoluted tube plays important role in reabsorption that valuable nutrients are conserved while waste products remain in the filtrate.

**Secretion:** Additional waste products and excess ions are secreted from the blood into the renal tubules.

**Excretion:** The final product, urine which contains waste products and excess substances, collects in the renal pelvis.

**Balance:** The kidneys regulate the volume and composition of body fluids by adjusting the excretion of water and electrolytes.

**Acid - Base Balance:** The kidneys help maintain the pH of the blood by excreting hydrogen ions and reabsorbing bicarbonate from urine.

**Removal of Metabolic Waste:** By excreting urea, the kidneys prevent the accumulation of toxic substances in the blood.



Q4 (c)

## Different Ways of Solid Waste Management:

### Reduction

Reducing waste generation at the source by designing products with fewer materials.



Improving manufacturing processes and encouraging consumers to choose products with minimal packaging.

### Reuse

Extending the life of products and materials by reusing them for the same or different purposes.



Examples: include using refillable containers, donating unwanted items and repairing rather than discarding products.

## Anaerobic Digestion:

### Bio gas production

Breaking down organic waste in the absence of oxygen to produce bio-gas (methane and carbon dioxide) and digestate (a nutrient-rich slurry). The biogas can be used for heating, electricity or as vehicle fuel, while the digestate can



used as fertilizers

## Advanced Thermal Treatment:

### Gasification

Converting organic waste into synthetic gas (syngas) through high-temperature reaction with limited oxygen.

### Pyrolysis

Decomposing organic waste at high temperatures in the absence of oxygen to produce bio-oil, syngas and char.

## Waste-to-Energy (WTE):

Converting non-recyclable waste into usable heat, electricity or fuel through various processes including combustion, gasification and anaerobic digestion.

WTE reduces landfill use and generates renewable energy.



Q4: (d)

Define following terms

(i) Anaemia: Anaemia is a condition characterized by a deficiency of red blood cells or hemoglobin in the blood, resulting in a reduced capacity of the blood to carry oxygen to the Blood tissues, including nutritional deficiencies (like iron, Vitamin B<sub>12</sub>, or folic acid)

(ii) Appendicitis: Appendicitis is the inflammation of the appendix, a small, tube-like structure attached to the large intestine. It is typically caused by a blockage that leads to infection.

(iii) Spleen: The spleen is an organ located in the upper left part of the abdomen, near the stomach. It plays several important roles in the body, including filtering and recycling old red blood cells and platelets. The spleen is the part of lymphatic system.



#### (iv) Myopia:

Myopia commonly known as nearsightedness, is a vision condition where close objects are seen clearly, but distant object appears blurred. It occurs when the eye ball is too long or the cornea has too much curvature, causing light entering the eye to focus in the front of the retina instead of on it.

#### (v) Isotones:

Isotones are atoms or nuclei of different elements that have the same number of neutrons by different numbers of protons.

For example: (Carbon-14)  
6 protons and 8 neutrons.

The concept of isotones is used in nuclear physics to study the properties and behaviour of atomic nuclei.



Q7 : (a)

To find the volume of a cylinder.

$$\text{Formula} = V = \pi r^2 h$$

Given:

$$\text{Radius} = 30 \text{ cm}$$

$$\text{height} = 1 \text{ m} = 100 \text{ cm}$$

Solution:

$$V = \pi \times (30)^2 \times 100$$

$$V = 90,000 \pi \text{ cm}^3$$

Therefore the volume of the cylinder is  $90,000\pi \text{ cm}^3$ .

Answer.

Q7 (b)

Given the average age of three boys is 15 years and their ages are in the ratio 3:5:7

Solution:

$$\text{Average age} = \frac{3x + 5x + 7x}{3} = 15$$

Solve for (x):

$$= \frac{15x}{3} = 15$$

$$x = 3$$

The age of the youngest boy ( $3x$ ) is:

$$3x = 3 \times 3 = 9$$

Therefore, the age of youngest boy is 9 years.



Q 7 (C)(i)

Series : 8, 19, 52, 151, 447, ....

To identify the wrong number in the series, let's look for a pattern.

$$8 \times 2 + 3 = 19$$

$$52 \times 2 + 47 = 151$$

Mathematical rule are not applied on this series.

Q 7 (C)(ii)

Series: 11, 13, 17, 19, 23

This series consists of prime numbers. Therefore, the next prime number is 29.

Answer -

11, 13, 17, 19, 23, 29.



Q6: (d)

Rearranged the jumbled words:

(i) teninsupexted:

Rearranged: Superintendent:

(ii) hweti:

~~Reag~~ = White:



## Q3 (d)

(A) Describe different causes and preventions of 'Polio'

Polio, or Poliomyelitis, is caused by the poliovirus, a highly infectious virus that primarily affects young children.

### Causes:

#### Fecal-oral Route

The most common transmission method is when the virus is ingested via contaminated food or water



due to poor sanitation and hygiene.

#### Oral-Oral Route

Less Common. Spread through saliva from an infected person.



shared ~~direct~~ utensils or direct contact.

#### Direct Contact

close contact with an infected person.



can also spread through crowded living conditions.



# Prevention of Polio

Preventing polio relies heavily on immunization and maintaining good hygiene practices!

## 1: Vaccination

The most effective way to prevent polio is through vaccination.

There are two types of vaccination.

### 1: Inactivated Poliovirus Vaccine

Administered via injection.

Used in many developed countries.

It contains an inactivated virus and is very effective in preventing poliovirus infection.

### 2: Oral Poliovirus Vaccine

Administered Orally.

Commonly

used in global,

polio eradication

efforts due to its ease of administration and ability

to induce immunity

in the gut, which

helps stop person to

person transmission.

## 2: Hygiene and Sanitation:

Improved sanitation reduces the risk of fecal-oral transmission.

This includes: Ensuring clean drinking water, ~~proper clean drinking water~~, Encouraging hand washing with soap and clean water, especially after using the bathroom and before eating.



Date

**5: Biodegradability:** Biofuels are typically biodegradable and less toxic than fossil fuels, reducing the environmental impact in the event of spills or leaks.

**6: Energy Security:** Producing biofuels locally can enhance energy security by reducing dependence on imported oil and promoting energy independence.