Date: 10/07/2024. Mock. 3rd

Name: Mohammad Zikria
Batch No#: 59
LMS ID: 32328
Roll No#: ISB1-6979

General Science and Ability

SECTION-I

Question: 4

Q: (a) Write a note on Liver juice "Bile".

Bile: A Vital Digestic Juice

Bile is the essential digestive juice produced by the liver, plays a pivotal role in the digestion and absorption of fats in the human body. It is composed of bile salts, bilirubin, cholesterol and water, bile is stored in the gallbladder and released into the small intestine during meals.

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2. Primary Function of Bile:

The primary function of bile is to emulsify fats, breaking them down into smaller droplets that can be more easily digested by enzymes. Beyond aiding fat digestion, bile also helps to eliminate waste products, regulates pH in the intestines and facilitates the absorption of fat-soluble vitamins like vitamin A, vitamin D, vitamin E and vitamin K. Overall bile ensures efficient digestion and nutrient absorption, focus its critical role in maintaining digestive health.

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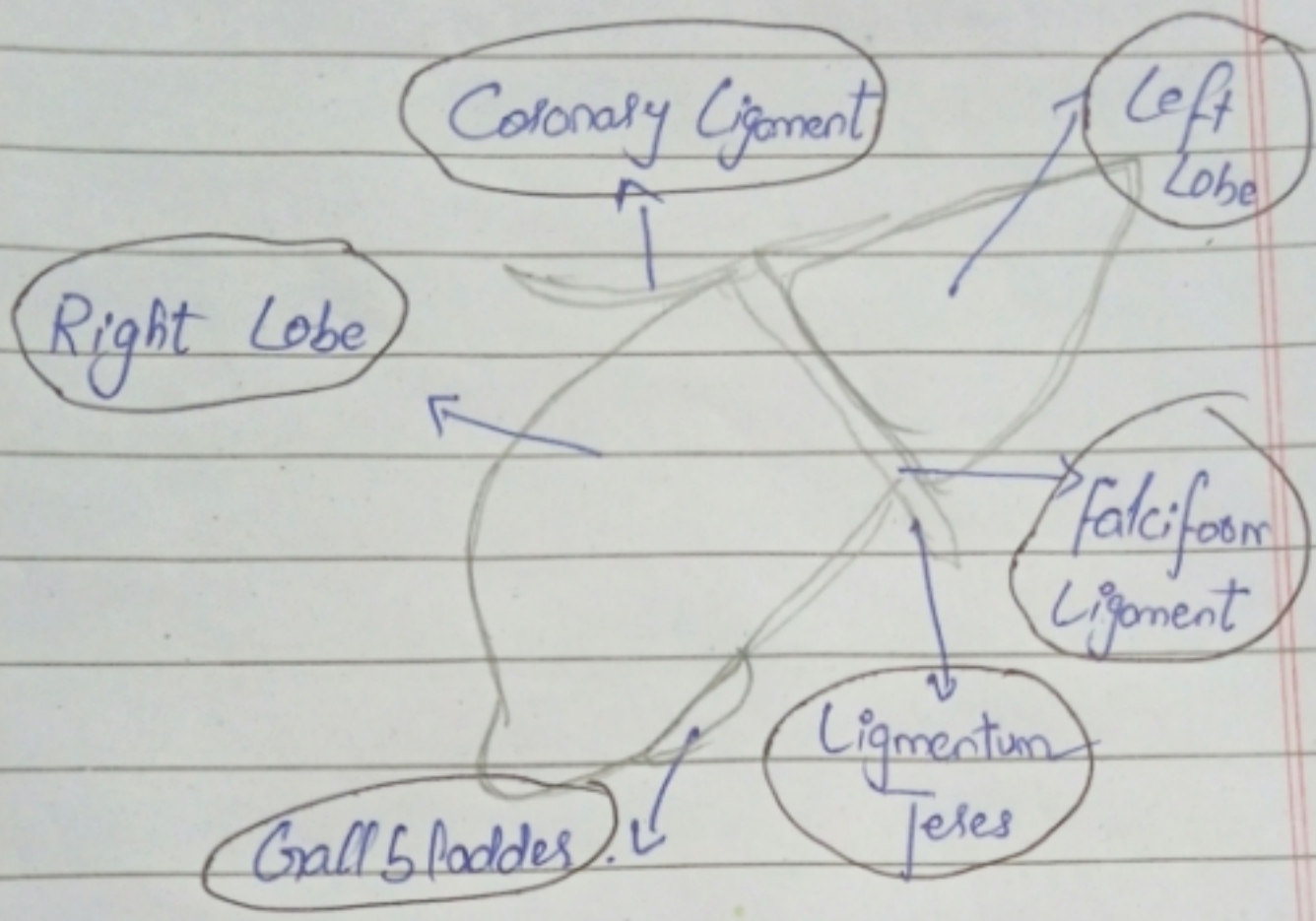
Lives



Key Points of Bile:

I. Production and storage:

Bile is produced by Lives Cell and Stored in the gall bladder untill needed for digestion.

"Bile is the cure for all diseases of the Lives, but the liver itself is the cure for bile" (Galileo Galilei)

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2. **Digestive Function:**

Bile helps in the digestion and absorption of fats in the small intestine by breaking down large fat molecules into smaller ones.

3. **Waste Elimination:**

Bile helps remove waste products, including bilirubin, a by product of red blood cell breakdown, from the body.

4. **PH Balance:**

It neutralizes stomach acid entering the small intestine, creating an optimal environment for digestive enzymes to function.

5. **Recycling:**

The body efficiently recycle bile salts, reabsorbing them from the intestine and returning them to the liver for reuse.

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Question: 4

Q: (b) Describe role of kidney in excretion.

Role of Kidney in Excretion:

The kidney play a crucial role in excretion, which is the process of removing metabolic wastes and excess substances from the body. The kidneys are vital organs involved in the filteration of blood, regulation of water and electrolyte balance, maintenance of acid-base balance and excretion of urine. They are also helping to keep the internal environment of the body stable and healthy.

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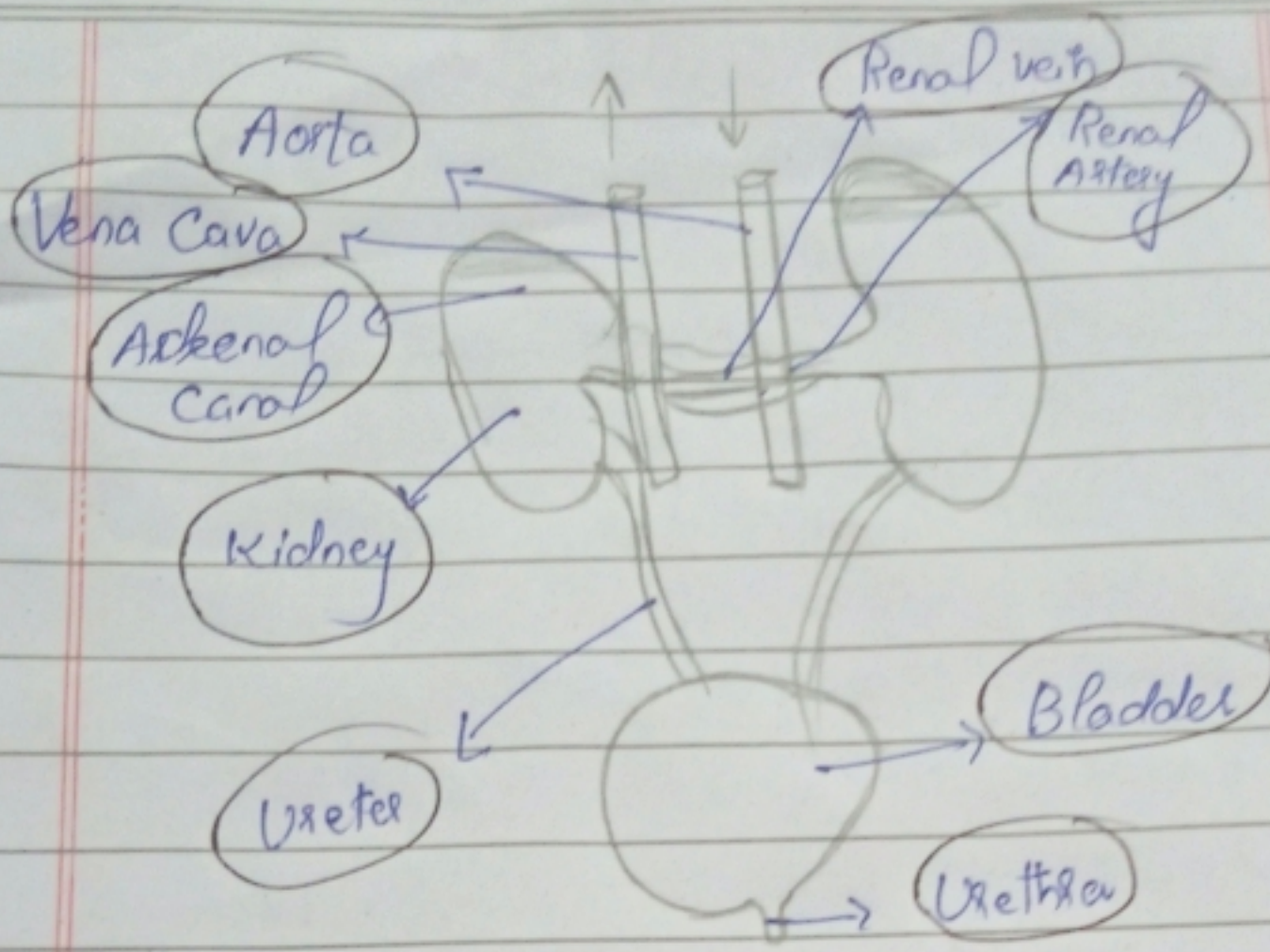

Excretory System

Key Points of Kidney in Excretion :

These are following main key points of kidney in Excretion System are as:

1. **Filtration Process :**

Blood enters the kidneys through the renal artery. Inside the kidneys, millions of tiny structures called nephrons filter the blood.

They remove waste products such as urea, excess salts and water from the bloodstream.

2. Formation of Urine:

The filtrate collected by the nephrons passes through a series of tubules where essential substances like glucose, amino acid and some salts are reabsorbed back into the bloodstream.

3. Regulation of water and Electrolytes:

The kidneys maintain the body's water balance and electrolyte level by adjusting the amount of water and ions reabsorbed into a excreted from the urine.

"Water is the driving force of all nature"
(Leonardo da Vinci)

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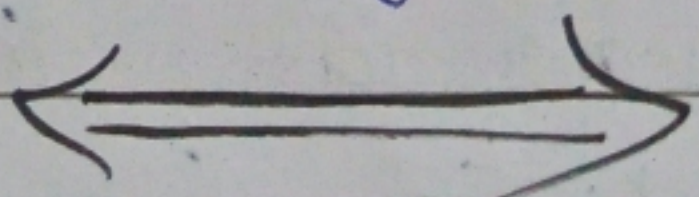
4. Acid-Base Balance:

Kidneys help regulate the pH balance of blood by excreting hydrogen ions and reabsorbing bicarbonate ions, Thereby maintaining the body's acid-base balance.

5. Excretion of Urine:

Urine, Consisting of water, urea and other waste products, collect in the renal pelvis and is then transported to the bladder through the ureters. From the bladder, urine is eventually excreted from the body through urethra.



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Question: 4 ;

Q: (c) Discuss the different methods of Solid waste Management ?

Solid waste Management :

Solid waste management refers to the systematic control of the generation, collection, treatment, disposal and monitoring of solid waste materials to minimize their environmental impact while promoting resource recovery and sustainability.

"The greatest threat to our planet is the belief that someone else will save it" (Robert Swan)

Methods of Solid waste Management :

Solid waste management involves various methods to handle and dispose of waste effectively.

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Here are five common approaches:

1. **Landfill:**

This is the most traditional method, where waste is deposited into designated (area) landfills lined with protective barriers to prevent environmental contamination.

Modern landfills are engineered to minimize methane emissions and groundwater pollution.

2. **Incineration:**

Waste incineration involves burning solid waste at high temperatures to convert into gases and heat. Energy recovery from incineration can be harnessed to generate electricity or heat for industrial process.

3. **Recycling**:

Recycling involves sorting and processing waste material such as paper, glass, metals and plastics to produce new products. It reduces the amount of waste sent to landfills and conserves natural resources.

"Waste is a resource in the wrong place"

(See Block)

4. **Compositing**:

Compositing is the biological decomposition of organic waste materials such as food scraps, and yard waste into nutrients-rich compost. This process produces a soil amendment that can improve soil structure and fertility.

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Question: 4

Q: (d) Define the terms:

i- **Anaemia**:

Anaemia is a medical condition characterized by a deficiency of red blood cells or hemoglobin in the blood, leading to reduced oxygen transport to the body's tissues. Common symptoms include

a. Fatigue,
b. weakness
c. Shortness of breath.

ii. **Appendicits**:

Appendicits is the inflamation of the appendix, a small finger like pouch attached to the large intestine. It typically Cause Severe abdominal pain, Pesticularly in the lower right side and may require Surgical removal of the appendix.

iii- **Spleen:**

The Spleen is an organ located in the upper left part of the abdomen. It plays multiple roles in the body, including filtering blood, recycling old red blood cells, storing white blood cells and platelets, helping find certain kinds of bacteria.

iv. **Myopia:**

Myopia, is a common vision condition where close objects appear clear but distinct object are blurry. It occurs when the eyeball is too long or the cornea is too curved, causing light to focus in front of the retina instead of on it.

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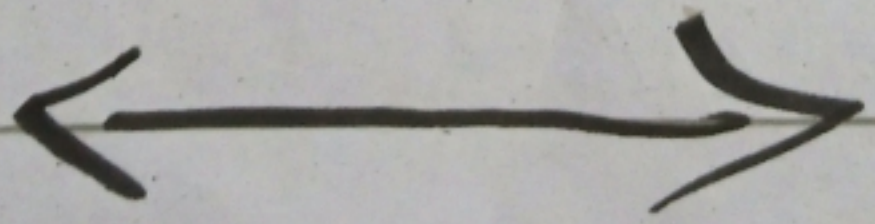
v. Isotones :

Isotones are atoms of different chemical elements that have the same number of neutrons but different number of protons.

For example: Carbon - 14 and nitrogen - 15 are isotones because both have 7 neutrons.



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Question: 5

Q: (a) 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?

Causes of Population Explosion in Pakistan:

1. High Birth Rate:

Cultural and societal norms in Pakistan often favor large families. Lack of awareness and access to family planning also contribute to a high Birth rate.

Pakistan has a birth rate of about 27.5 births per 1,000 people, which is higher than global average of 18.5 births"

2. Early Marriages:

Early marriages are common, particularly in rural areas, leading to longer reproductive periods and more children per family.

According to UNICEF, around 21% of girls in Pakistan are married before the age of 18".

3. Low Education level:

Lower level of education, especially among women, correlate with high birth rates, Educated individuals tends to have fewer children.

"The contraceptive prevalence rate in Pakistan is around 34%, which is lower than many often developing countries."

4. Religious and Cultural Beliefs:

Some religious and cultural beliefs discourages the use of contraceptive, promoting large families as a norm.

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Control Measures of Population Explosion in Pakistan:

1. **Education and Awareness:**
To increase educational opportunities, particularly for women and raise awareness about the benefits of small family norms and family planning

2. **Health Care Improvement:**
Improve maternal and child healthcare services to reduce infant mortality rates, as higher child survival rates often correlate with lower birth rates.

3. **Involvement of Religious Leaders:**
To engage in religious leaders to educate communities on the benefits of family planning and dispel myths related to contraception.

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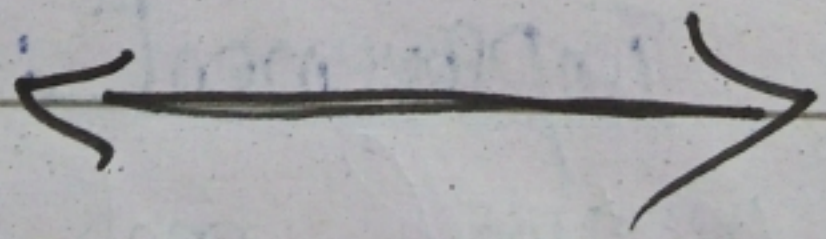
4. Women's Empowerment:

Empowers women through educate, employment opportunities, and legal rights to make informed decisions about their reproductive health.

"A woman with a voice is, by definition, a strong woman" (Melinda Gates)



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Question: 5

Q: (b) Differentiate between Cyclones and Tornadoes, which Cyclones was observed in 2024?

Difference Between Cyclones and Tornadoes

Cyclones:

Cyclones are the large-scale masses that rotate around a strong center of low atmospheric pressure. They occur in the form of hurricanes, typhones or simply cyclones, depending on their location.

It typically span 100's of kilometers in diameter.

Cyclones can form over warm ocean waters in tropical regions, with warm, moist air rising and causing low pressure areas.

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Cyclones have systained wind ranging from 74 mph (for a Category 1 hurricane) to over 157mph (for a Category 5 hurricanes).

Tornadoes:

Tornadoes are small violent windstorms characterized by a rotating column/ column of air that extends from a Thunderstorm to the ground.

It much smaller in scale, usually less than kilometer a width.

Tornadoes can form over land, typically during Severe Thunderstorms when warm, moist air meets cold, dry air.

Tornadoes wind speed can exceed 300 mph in the most severe cases. (EF5 tornadoes).

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Cyclone observed in 2024:

In 2024, one of the significant cyclones observed was Cyclone Biparjoy. This cyclone impacted region in the Arabian Sea, affecting parts of India and Pakistan. Biparjoy caused heavy rainfall, strong winds and significant coastal flooding in the affected areas.

Question: 5

Q: (d) Define the following terms:

i- **Hypocenter:**

The hypocenter is the point within the Earth where an earthquake rupture starts, also known as the focus. It is located beneath the Earth surface.

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ii- **Epicentes:**

The epicentes is the point on the Earth's surface directly above the hypocentes of an earthquake. It is the location where the earthquake is felt mostly strongly.

iii- **Eye wall of Hurricane:**

The eye wall of a hurricane is the ring of intense Thunderstorms surrounding the calm eye, characterized by the strongest winds and heaviest rain of the storm.

iv. **Shallow Focus:**

Shallows focus refers to earthquakes that occurs at a depth of less than 70 Kilometers (43 miles) beneath the earth surface. These earthquakes tend to cause more damage compared to deeper ones.

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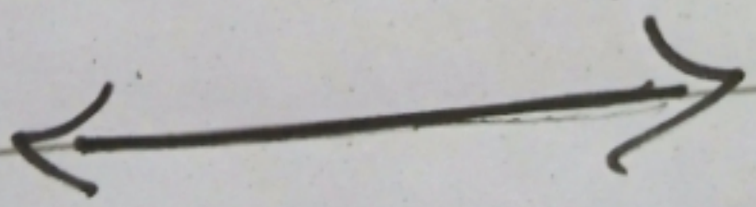
v. **Parsec**:

A parsec is a unit of distance used in astronomy, equivalent to approximately 3.26 light years or 3.0857×10^{13} kilometers.

It is the distance at which one astronomical unit subtends an angle of one arc-second



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SECTION-II

Question 7:

Q: Find the volume of a cylinder with radius 30 cm and height 1 m.

Solution:

To find the volume of a cylinder, we can use the formula.

$$V = \pi r^2 h.$$

where:

V = volume of the cylinder

r = radius of the base of the cylinder

h = height of the cylinder.

$\pi = 3.14$.

Given:

Radius $r = 30$ cm

Height = $h = 1$ m $= 100$ cm

Now, substitute the given values into the formula:

$$V = \pi (30\text{cm})^2 \times 100\text{cm}$$

$$V = \pi \times 900\text{cm}^2 (100\text{cm})$$

$$V = \pi \times 90000\text{cm}^3.$$

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$V = \pi \times 90000 cm^3$

$V = 3.14 \times 90000 cm^3$

$V = 282743 cm^3$

Question: 7

Q: (b) The average age of three boys is 15 years. If their ages are in the ratio 3:5:7, what is the age of yangest boy?

Solution:

To find the age of yangest boy, we first need to determine the total age of the three boys; using their ratio

Given:

The average age of three boys is 15 years

Their ages are in the ratio 3:5:7.

Let the ages of boys be $3x$, $5x$ and $7x$.

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Since the average age is 15 years,

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

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

$$5x = 15$$

$$x = \frac{15}{5} \quad (3)$$

$$\boxed{x = 3}$$

Now substitute x back into the ages to find the actual ages

Age of the youngest boy =

$= 3x$

$= 3(3) = \boxed{9 \text{ years}}$

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Question: 7

Q: (c) Identify the Series.

i- 8, 19, 52, 151, 447, 296.

Lack of clear mathematical pattern, without a definite pattern in the given Series, it is challenging to predict the next number in the series accurately.

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

This Series Contain prime numbers in ascending order.

Question: 8:

Q: (C) What will be the Suface area and volume of a sphere if it has radius of 7m?

Solution:

To find the Suface area A and volume V of a sphere with radius $r = 7$ meters, we use the formula.

1. Surface Area (A)

$$A = 4\pi r^2$$

Now, putting the value of r.

$$A = 4\pi (7)^2$$

$$A = 4(3.14)(49)$$

$$A = 196\pi \text{ square meters}$$

2. Volume (V):

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

Now, putting the value of r.

$$V = \frac{4}{3}\pi (7)^3$$

$$V = \frac{4}{3}\pi \times 343$$

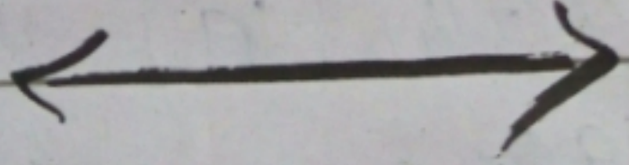
$$V = \frac{4}{3}\pi \times 343$$

$$\boxed{V = \frac{1372}{3}\pi \text{ cubic meters}}$$

$$V = 457.33\pi \text{ cubic meters}$$

Therefore,
The Surface area A is $\boxed{196\pi}$ Sq meteres

The volume V is approximately
$\boxed{457.33\pi \text{ cubic meters}}$



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Question: 8

Q: (d) Distribute Rs 4320 among Zain, Aslam and Ashraf in such a way that if Zain gets 2 parts then Aslam gets three parts, whereas Ashraf gets Seven parts.

Solution:

To distribution Rs: 4320 among Zain, Aslam, and Ashraf in the ratio where Zain gets 2 parts. Aslam gets 3 parts and Ashraf get 7 parts.

1st we calculate the number of total parts:

$$2+3+7 = 12.$$

Now, we distribute Rs: 4320 in proportion in these parts.

1. Amount for Zain $= \frac{2}{12} \times 4320$

$$= \frac{2 \times 4320}{12} = \frac{8640}{12} = \boxed{720 \text{ Rs}}$$

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2. Amount for Aslam = $\frac{3}{12} \times 4320$

$= \frac{3 \times 4320}{12} = \frac{12960}{12}$

$= \boxed{1080 \text{ Rs}}$

3. Amount for Asad = $\frac{7}{12} \times 4320$

$\frac{7 \times 4320}{12} = \frac{30240}{12}$

$= \boxed{2520 \text{ Rs}}$

To verify:

$= 720 + 1080 + 2520$

$= \boxed{4320}$