Tuesday Mark Exam: 4 Date 20-08-2024

GENERAL SCIENCE AND ABILITY

Cl. No 2:

(a) Define the term malnutrition, elaborate its major causes and consequences.

Definition of Malnutrition:

Malnutrition is the condition that results when a person's diet does not provide adequate nutrients, either in excess or in deficiency of essential nutrients, leading to unhealthy conditions such as undernutrition or overnutrition.

Major Causes of Malnutrition:

1. Inadequate Food Intake:

Lack of access to sufficient, nutrition food due to poverty, food scarcity or lack of availability can lead to malnutrition.

"The great wealth is health" (Virgil)

Dos and Don'ts for Generaral Science & Ability Paper

Hi there, you've done well. Know that acquiring knowledge is one thing and reproducing it in paper acccording to what's asked is another. There are a few things I would like to highlight.

1. A 5 marks part requires at least 2 and at max 3 sides of a paper. Know that there can be two or three parts of a question and their marks are divided accordingly. So, address all of them in a just manner.
2. Focus on time management. You get 35 minutes to solve one question and about 8 minutes per 5 mark part. Manage your time accordingly.
3. You need to understand that your paper is supposed to look more scientific than theoretical. So, add flowcharts and diagrams where required.
4. Your handwriting and neatness can be really impactful. Avoid cutting and overwriting.
5. Focus on your spellings and your grammar. Here in GSA there's no deduction in marks but your expression will definitely create an impact.
6. In ability portion, give explanation for analytical ability question in words. You need to understand that a 5 mark part requires all steps written and explained.

Good luck for CSS 2025. You're gonna rock in sha Allah. :)

Date 20.08.2024.

2. **Poor Diet Quality:**
Even when food is available, it may lack essential nutrients if it consists mainly of processed or junk food.

"According to the World Health Organization (WHO), nearly 2.5 billion people suffer from mult/micronutrient deficiencies, which are often as a result of poor diet quality."

3. **Health Conditions:**
Health conditions like gastrointestinal disorders or chronic illnesses can impair nutrient absorption, leading to malnutrition. Infections and diseases can further increase nutritional deficiencies by increasing the body's nutritional needs.

4. **Poor Feeding Practices:**
Inadequate breast feeding, improper weaning or poor dietary practices can contribute to malnutrition, especially in children.

"It is health that is real wealth and not pieces of gold and silver"
(Mahatma Gandhi)

Date 20.08.2024

Consequences of the Malnutrition:

i- **Stunted Growth:**
In children, malnutrition can result in stunted growth and developmental delays.

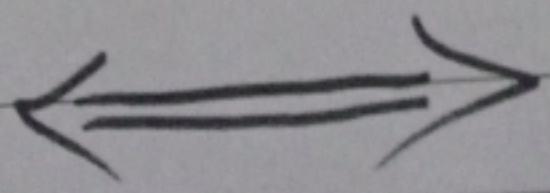
ii- **Weakened Immune System:**
Malnutrition compromises the immune system, increasing susceptibility to infections and diseases.

"Let food be thy medicine and medicine be thy food"
(Hippocrates)

iii- **Cognitive Impairment:**
Inadequate nutrition can impair brain development and cognitive function, affecting learning and mental performance.

iv- **Increased Risk of Chronic Diseases:**
Malnutrition, especially overnutrition, can lead to chronic diseases such as obesity, diabetes, and cardiovascular conditions.

v- **Reduced Life Expectancy:**
Prolonged malnutrition can lead to severe health complications and a reduced lifespan due to weakened overall health.



Date

Q.No2: (b) Differentiate between food Contamination and food adulteration.

Food Contamination:

Food Contamination refers to the presence of harmful substances or microorganisms in food that can cause illness or harm. Contaminants can be biological (bacteria, viruses, parasites) chemical (pesticides, heavy metals) or physical (foreign objects like glass or metal shards).

2) Sources of Food Contamination:

Contamination can occur at any stage food production from farm to table, due to poor hygiene, improper handling, inadequate cooking or environmental factors.

"The world Health Organization (WHO) estimates that contaminated food and water cause over 600 million illnesses and 420,000 death each year worldwide".

Contamination is usually accidental and unintentional. It occurs due to lapses in food safety practices or environmental conditions.

3) Example of Food Contamination:

1) Salmonella in raw poultry.
2) Pesticides residues on fruits and vegetables.
3) Metal shards found in canned goods.

Date 20.08.2024

4) Regulation measures of Food Contamination:
Food Safety regulations and standards aims to prevent contamination through practices like sanitation, proper storage and cooking procedure.

2. Food Adulteration:

Food adulteration refers to the deliberate addition of substances to food that either degrade its quality or deviere consumers. Adulteration/ Adulterants may be harm or merely intended to enhance appearance or weight.

ii) Sources of Food Adulteration:

Adulteration is typically intentional and occurs to increase profit margins by diluting or misrepresenting the true nature of the food.

Adulteration is done with the intention of deception or financial gain, often compromising food quality and safety.

iii) Examples of Food Adulteration:

1) Adding artificial colors to enhance appearance,
2) mixing cheaper oils into high-quality
3) Diluting milk with water.

Date 2[illegible].2024

iv) Regulation Measures of Food Adulteration:

Regulations and quality control measures are in place to detect and prevent adulteration, including food inspection and testing to ensure products meet specified standards.

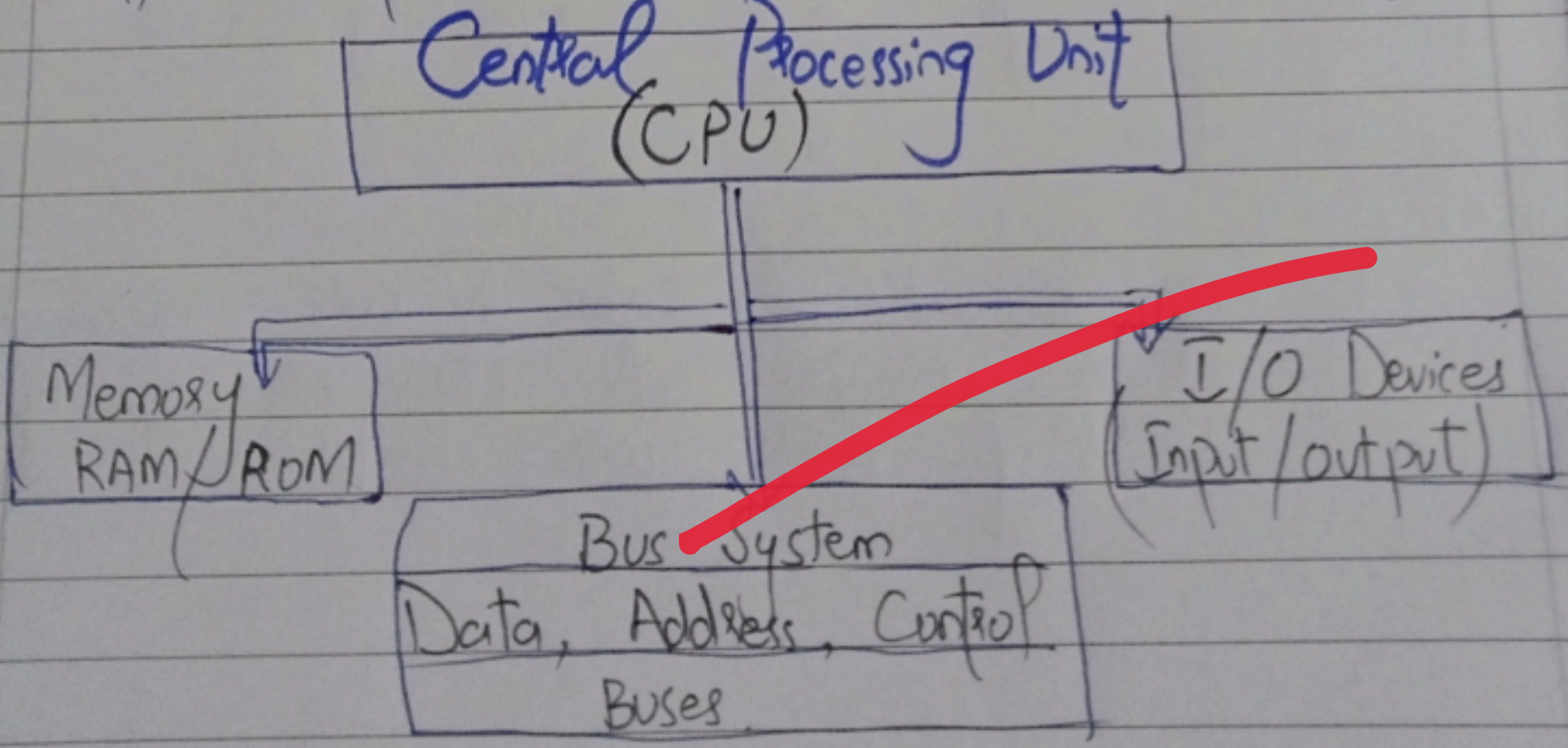
Q.No 2: (c)

What are Computer buses? Differentiate RAM and ROM?

Computer Buses:

A computer bus is a communication system that transfer data between various components of a computer. It includes the hardware, protocols and signals used to facilitate the movement of data between the Central Processing Unit (CPU), memory and peripheral devices.

Buses are essential for the overall functioning of a computer as they allow different parts to communicate efficiently.



Date

Three Basic Buses in a Computer:

1. Data Bus:

The data bus is used to transfer actual data between different components of the computer such as the CPU, memory and I/O Devices. It carries the data being processed or transferred.

2. Address Bus:

The address bus is used to specify the memory addressed where data is to be read from or written to. It identifies the location in memory or the I/O devices that is being accessed.

"Memory is the treasure house of the mind where in the monuments thereof are kept and preserved".

(Thomas Fuller)

3. Control Bus:

The control bus is used to send control signals that manage and coordinate the activities of the computer's components such as initiating read or write operations and sychronizing data transfer.

"The original IBM 360 Series, introduced in 1964, had a control bus that was quite rudimentary compared to modern standards".

Random Access Memory (RAM)	Read-only Memory (ROM)
1. It is a type of volatile memory used to store data that is currently being used or processed by the CPU.	ROM is a type of Non-volatile memory that is used to store firmware or software that is not meant to be modified frequently.
2. RAM is crucial for the system's performance as it allows for quick read and write access to data.	ROM retains its data even when the power is turned off.
3. It loses all its stored data when the power is turned off.	ROM typically means, it is designed to be read from but not written to under normal circumstances.
4. RAM can be used from read and written to. It is used for temporary storage while a computer is running, allowing data to be quickly accessed and manipulated.	Some type of ROM such as EEPROM can be rewritten but are generally not modified frequently.
5. Generally Faster Than ROM.	Usually slower compared to RAM.

Date

Q.NO2(d)

What are geo-stationary satellites? Distinguish between natural and artificial satellites, how many are these? artificial satellites of Jupiter

Geo-stationary Satellites:

Geo-stationary satellites are satellites that orbit Earth at a fixed position relative to the Earth's surface. They orbit at an altitude of approximately 35,786 kilometers (22,236 miles) above the equator. At this altitude, their orbital period matches the Earth's rotation period (about 24 hours), allowing them to remain in a fixed position relative to a specific location on Earth. This idea characteristics makes them ideal for telecommunications, weather monitoring and broadcasting.

"The earth is the cradle of humanity, but mankind cannot stay in the cradle forever"

(Konstantin Tsiolkovsky)

Date

Distinction Between Natural and Artificial Satellites :

1. Natural Satellites :

These are celestial bodies that orbit planets or other celestial objects naturally. They are formed through natural processes and are not created by humans.

ii- Example: The Moon (Earth's natural Satellite), Europa (a moon of Jupites) and Titan (a moon of Saturn).

iii- Purpose of Natural Satellite :

Their purpose is primarily the result of natural gravitational interactions and processes. They can affect the host planet's tides, rotation and other characteristics.

iv- Development of Natural Satellite :

Natural Satellites are formed through natural processes like accretion, gravitational capture or co-formation with the host planet.

v- Lifespan of Natural Satellite :

Natural Satellites typically have very long lifespans, lasting for millions or even billions of years.

Date 20-08-2024

2. Artificial Satellites :

These are man-made objects placed into orbit around Earth or other celestial bodies. They are launched for specific purposes such as communication, observation or scientific research.

ii- Example :

The Hubble Space Telescope, GPS Satellites and weather satellites.

iii- Purpose of Artificial Satellites :

Artificial Satellites created to serve specific functions such as telecommunications, Earth observation, weather forecasting and scientific research.

iv- Development of Artificial Satellites :

It designed and built by humans using advanced technology and materials to fulfill specific functions.

v- Lifespan of Artificial Satellites :

Artificial satellites have a finite operational lifespan, often limited by technological degradation and orbital decay and may require replacement or decommissioning.

Date _____

Artificial Satellites of Jupiter:

Jupiter has 95 known artificial satellites. These include spacecraft that have been sent to study Jupiter and its moon, such as Galileo spacecraft and the Juno mission. These artificial satellites contribute to our understanding of Jupiter's atmosphere, magnetosphere and its system of moons.

⟺

Q.No3 (a)
What is meant by the term double circulation? Briefly describe how the heart is adapted to keep blood flowing in a double circulation?

Double Circulation:

Double Circulation refers to the type of circulatory system found in humans and some other animals where blood passes through the heart twice during each complete circuit around the body. This system includes two separate circulatory routes:

1. The Pulmonary Circulation
2. The Systemic Circulation.

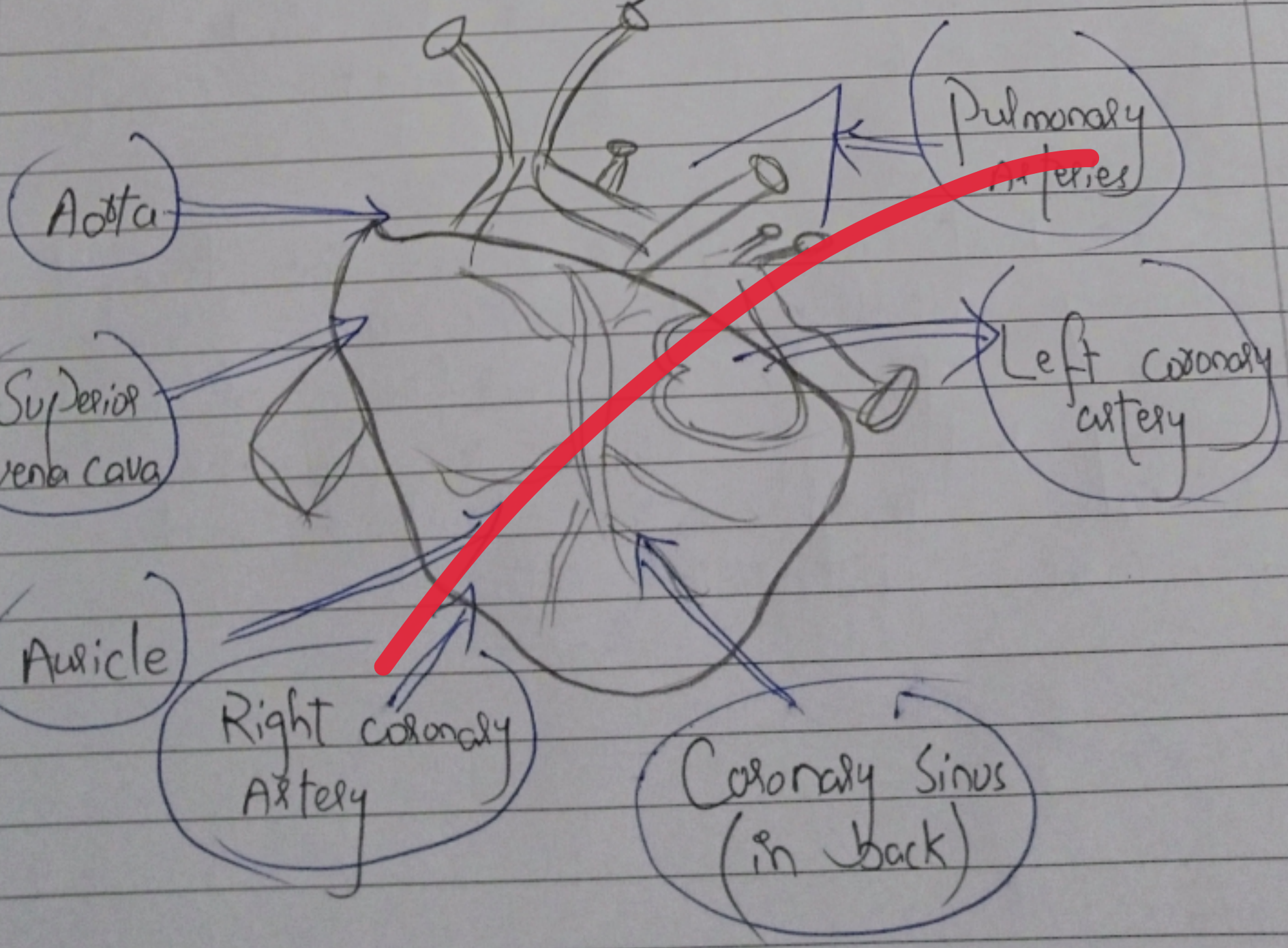
Date

1. **Pulmonary Circulation:** Blood flows from the heart to the lungs for oxygenation and then returns to the heart.

"The breath is the finest gift of nature. Be grateful for this wonderful gift" (Amit Ray)

2. **Systemic Circulation:** Oxygenated blood is then pumped from the heart to the rest of the Body to deliver oxygen and nutrients and returns as deoxygenated blood.

Anatomy of Heart



Date

Adaptation of the Heart for Double Circulation:

1. **Four Chambers:**
The heart is divided into four chambers - two atria (upper chambers) and two ventricles (lower chambers). This separation ensures that oxygenated and deoxygenated blood do not mix and allows for efficient circulation.

2. **Left and Right Sides:**
The heart's right side pumps deoxygenated blood to the lungs (pulmonary circulation) while the left side pumps oxygenated blood to the rest of the body (systemic circulation). This division ensures that each side of the heart deals with the blood that is appropriate for its respective circuit.

3. **Valves:**
The heart contains four valves - the tricuspid, pulmonary, mitral and aortic valves. These valves prevent the backflow of blood, ensuring that it flows in only one direction through the heart and into the appropriate arteries.

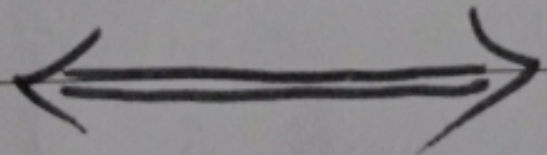
Date _____

4. **Thick Ventricular Walls :**

The left ventricle has thickes wall than the right ventricle because it needs to generate higher pressure to pump blood throughout the entire body. The right ventricle, in contrast only needs to pump blood to the lungs.

"The heart is a fascinating organ. Its function, a symphony of muscle and rhythm, is essential to life itself."

(Dr Charles L. Campbell)



Date

Q No 3: (d) Write a note of the following.

Working of GPS:

Global Positioning System (GPS):

GPS is a satellite-based navigation system that provides location and time information anywhere on Earth.
Here how it works:

2. Satellite Network:

GPS relies on a constellation of at least 24 satellites orbiting Earth. These satellites are positioned in such a way that at least four are visible from any location on the planet at any time.

2. Signal Transmission:

Each GPS satellite continously transmits signals containing the satellite's position and the time the signal was sent. This information is encoded in the signal using a precise atomic clock.

"The goal of science is to build better signals and eliminate noise"
(Niels Bohr)

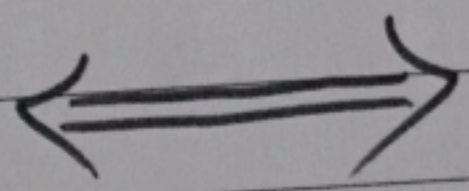
Date _____

3. **Signal Reception:**
A GPS receiver on the ground picks up signals from multiple GPS satellites. To determine its location, the receiver needs signals from at least four satellites.

4. **Distance Calculation:**
The receiver calculates the distance to each satellite based on the time it takes for the signal to travel from the satellite to the receiver. This is done using this formula:

Distance = Speed of Light × Time Delay.

5. **Position Determination:**
The receiver combines the distance information to pinpoint its exact location, which can then be used for navigation or mapping purposes.



Date

b) Working of a Mobile Phone :

Mobile Phones :

Mobile phones operate through a network of cell towers and are designed to facilitate wireless communication.

Here's an overview of how they work:

i- **Cellular Network :**

The mobile phone communicates with nearby cell towers, which are part of a cellular network. The network is divided into cells, each served by a cell tower. This allows for efficient frequency reuse and extensive coverage.

ii- **Signal Transmission :**

When a mobile phone makes a call or send data, it transmits a signal to the nearest cell tower. The signal is encoded with information such as the phone number or data request.

"In a/the modern world, a mobile phone is not just a communication tool but a gateway to knowledge, entertainment and social interaction"

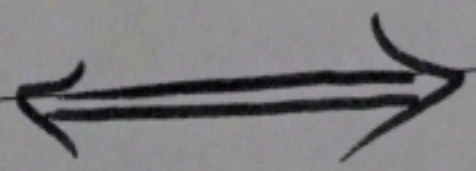
(Satya Nadella)

Date 20-08-2024

iii. Cell Tower Commission/Communication :
The cell tower recieves the signal and forwards it to a base station controller (BSC) or a mobile switching center (MSC). The BSC manages multiple cell towers and handles handoffs as the user moves between cells.

iv. Call Routing :
The BSC or MSC routes the call or data request to the appropriate destination. For phone calls, it connects to the recipient's phone through the network.

v. Network Switching :
Mobile phones also switch between different cell towers as users move, ensuring continous connectivity. This handoff process is managed by a cellular network to maintain the quality of the call.

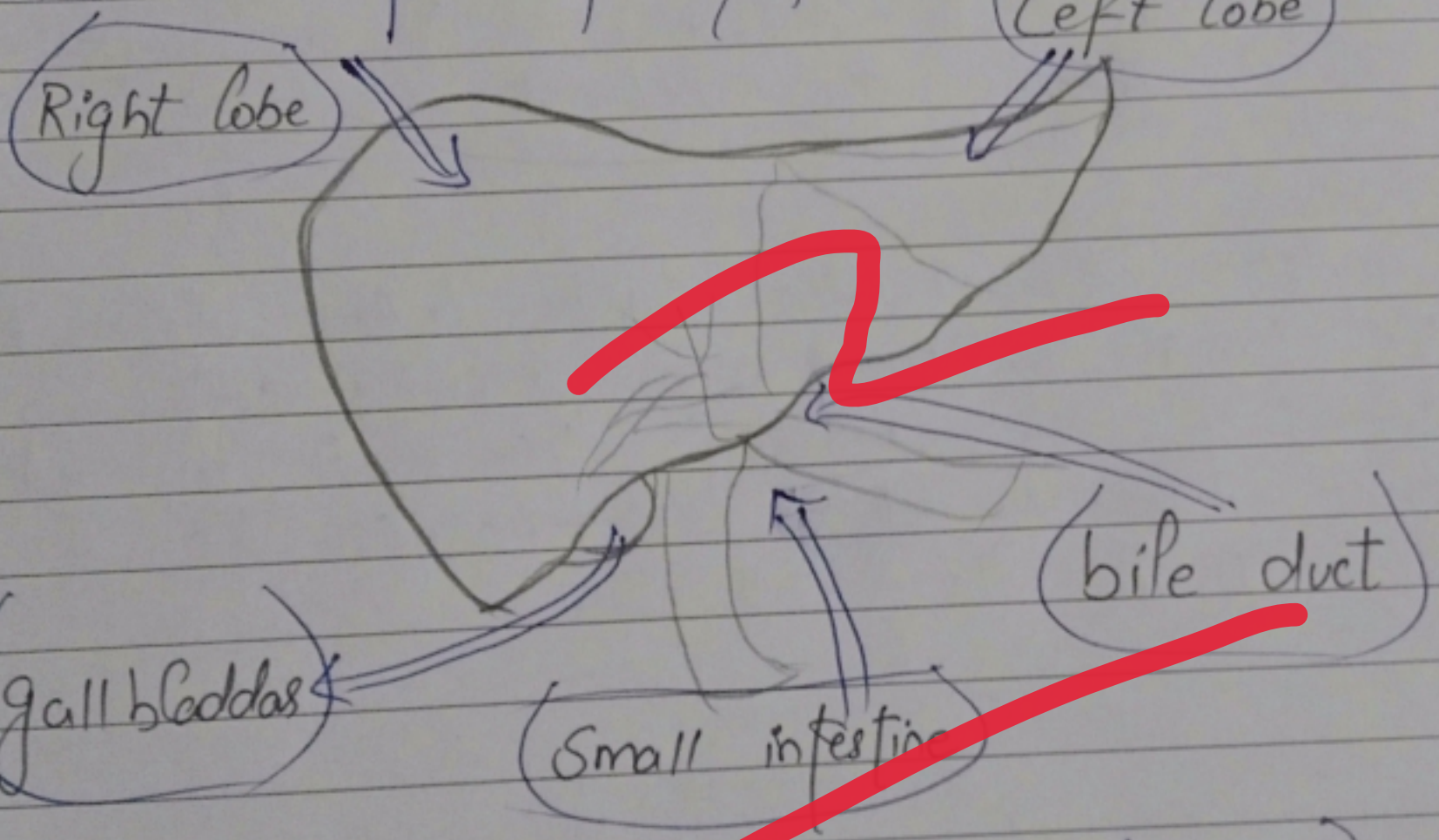


Date

Q No 3: (b) Lives is a Chief Chemist. Comment.

Lives as a Chief Chemist:

The Liver is often called the body's "chief chemist" because it performs many essential chemical processes. It helps detoxify harmful substances like drugs and alcohol, turning them into less harmful forces / forms



The Lives also plays a key role in processing nutrients from the food we eat, including sugars, fats and proteins. It makes important proteins for blood clotting and maintaining blood volume.

Date _____

Q No 3: (c)

Comment, the greenhouse effect is a blessing. Also discuss enhanced greehouse effect and its relation in global warming?

The Greenhouse Effect: A Blessing:

The greenhouse effect is beneficial because it keeps Earth warm enough to support life. It happens when gases like Carbon dioxide (CO_2), methane (CH_4) and water vapor in the atmosphere trap heat from the Earth's surface. Without this natural process, Earth would be extremely cold about $-18°C$ ($0°F$), making it impossible for most life forms to survive. By trapping heat, the greehouse effect helps to maintain a stable climate and supports the life cycle, which is essential for life.

"The natural greenhouse effect is Earth's gift of warmth, essential for our survival"

(James Lovelock)

Date

II. Enhanced Greenhouse Effect and its Relation to Global Warming:

Enhanced Greenhouse Effect:

The enhanced greenhouse effect occurs when human activities increase the levels of greenhouse gases in the atmosphere. Activities like burning fossil fuels (which release CO_2) and farming (which release methane and nitrous oxides) and industrial processes (which release gases than natural processes add more greenhouse more heat to be trapped in the atmosphere, this cause leading to higher global temperatures.

GHG Effects Relation to Global Warming:

i- Rising Temperature:

The extra heat trapped by the enhanced greenhouse effect raise Earth's average temperature, leading to more frequent and intense heatwaves and storms.

ii. Melting Ice and Rising Sea Levels:

Higher temperature cause ice at the poles to melt, which raises sea levels and can lead to flooding in coastal areas.

Date _____

iii- Changing weather Patterns:

Global warming disrupts weather Patterns, causing more extreme and unpredictable weather which can affect farming and natural habitats.

"Weather is a great way to measure the changes we are making to our planet" (Al-Gore)

iv- Ocean Acidification:

Increased CO_2 also makes oceans more acidic, which can harm marine life like Coral reefs and Shelfish that need Calcium to build their shells and skeletons.

"As the oceans become more acidic, the life within them becomes more vulnerable" (Jacques Cousteau)

Date

SECTION-II

Q NO6:
(a) A Primary School had an enrollment of 850 pupils in January 2022. In January 2023, the enrollment was 1120. What was the increase percentage for the enrollment?

Solution:
To Calculate the percentage increase in enrollment.

1) Determine the Increase in Enrollment:
Increase = Enrollment in January 2023 - Enrollment in January 2022.

= 1120 - 850

Increase = 270

2. Calculate the Percentage Increase:

$$\text{Percentage Increase} = \left(\frac{\text{Increase}}{\text{Original Enrollment}}\right) \times 100$$

$$= \left(\frac{270}{850}\right) \times 100$$

Percentage Increase = 31.76

Date

Q No(6) (C)

A man has some hens and cows if the no of heads be 48 and no of feet is eqval to 140, Find the number of hens.

Solution:

To solve this problem, let h represent the number of hens and c represent the number of cows.

Given:

1. To The total number of heads = 48
2. The total number of Feet = 140

Formulate the Equation:

1. Each hens and Cow has one head.

Therefore:

$$h+c = 48 \longrightarrow (I)$$

2. Hens have 2 feet each and Cow have 4 feet each.

Therefore:

$$2h + 4c = 140 \longrightarrow (II)$$

Solve the equation:

From first equation

$$h = 48 - c$$

Substitute $h = 48 - c$ into the second equation

$$2(48-c) + 4c = 140$$

$$96 - 2c + 4c = 140$$

$$2c = 140 - 96$$

Date _____

$2c = 140 - 96$

$2c = 44$

$c = \frac{44}{2}$

$\boxed{c = 22}$

Now putting the values $c = 22$ into first equation

$h + 22 = 48$

$h = 48 - 22$

$\boxed{h = 26}$

The number of hens = 26

$\Longleftrightarrow$

Date _____

Q No6: (d)

A car runs at a speed of 40km/h during the first half of the journey and at the 2nd half of the journey at a speed of 60km/h in the speed of a journey. What is the average car?.

Solution: To find the average speed of the car over the entire journey.

Let the total distance of the journey = D
The journey splits into two parts.
Therefore, each part of a journey covers a distance of $\frac{D}{2}$

1) Calculate the Time for Each Part:
For the first half of the journey at 40km/h

$$Time_1 = \frac{\frac{D}{2}}{40} = \frac{D}{80}$$

For the Second half of the journey at 60km/h.

$$Time_2 = \frac{\frac{D}{2}}{60} = \frac{D}{120}.$$

Date _____

2) Calculate the Total Time:

Total Time = Time$_1$ + Time$_2$

$$= \frac{D}{80} + \frac{D}{120}$$

To add these fractions, find a common denominator

$$\frac{D}{80} = \frac{3D}{120}$$

$$\frac{D}{120} = \frac{2D}{240}$$

$$\text{Total Time} = \frac{3D}{240} + \frac{2D}{240} = \frac{5D}{240} = \frac{D}{48}$$

$$\text{Average Speed} = \frac{D}{\frac{D}{48}}$$

$$= \boxed{48 \text{ Km/h}}$$

Date

Q.No 7: (a) A numbers is divided by 6 and then 50 is added. If the total is 60, what is that numbers?

Solution: To find the numbes, follow these steps.

1. Let x be the numbes.

2. Set up the equation based on the problem statement:

$$\frac{x}{6} + 50 = 60$$

3. Solve the equation for x:

Substract 50 from both sides

$$\frac{x}{60} = 60 - 50$$

$$\frac{x}{6} = 10$$

Multiply by 6 on both sides to isolate x:

$$x = 10 \times 6$$

$$\boxed{x = 60}$$

The number is 60.

$\Longleftrightarrow$

Date _____

Q No 7 (b) Find the odd one out:

8, 16, 24, 34, 40, 48.

Solution:

To identify the odd one out from the list 8, 16, 24, 34, 40, 48. Examine the pattern or properties of each number.

1. Check if the numbers are even:
   All the numbers in the list are even.

2. Check the difference between Consecutive numbers:
   16 - 8 = 8
   24 - 16 = 8
   34 - 24 = 10
   40 - 34 = 6
   48 - 40 = 8.

Most of the differences are 8, except for 10 and 6.

3. Identify any numbes that disrupts the pattern.
   34 stand out because the difference between 24 and 34 is 10, which is different from the other differences of 8.

The odd one out is 34.

Date _____

Q No 7: (C) A tower is 15m tall. If I am standing 20m from the base of the tower what is my aerial distance from the top of the tower?

Solution:

1. Identify the right triangle formed:

The height of the tower (15 meters) is one leg of the triangle.

The horizontal distance from the base of the tower to where you are standing (20 meters) is the other leg.

2. Use the Pythagorean theorem:

$(\text{Distance})^2 = (\text{Height})^2 + (\text{Horizontal Distance})^2$

$\text{Distance}^2 = (15)^2 + (20)^2$

$\text{Distance}^2 = 225 + 400$

$\text{Distance}^2 = 625$

$\sqrt{(\text{Distance})^2} = \sqrt{625}$ ∴ Square root both sides.

$\text{Distance} = 25$

The aerial distance from the top of the tower to where you are standing is 25 meters.

THE END