Section - I

Answer to Q2

(a)

The heavy floods in Pakistan in 2022 resulted in a significant economic loss of $40 billion, highlighting the severe impact of climate change on vulnerable nations. In the context of COP-28, which is set to take place in the UAE, the focus on climate finance becomes central. Climate finance involves providing funds to developing countries to help them adapt to the impacts of climate change and mitigate its effects.

Developing countries often bear the brunt of climate change, even though they may contribute less to greenhouse gas emissions. Climate finance is crucial for these nations to implement measures that enhance resilience, such as building infrastructure to withstand extreme weather events. The upcoming COP-28 provides a global platform for discussions on climate-related issues, and addressing the financial needs of developing countries is likely to be a significant part of these discussions. The aim is to ensure that financial support is available for these countries to pursue sustainable development while dealing with the challenges posed by climate change.

(B)

Water-soluble vitamins and fat-soluble vitamins differ in their solubility and storage in the body.

Water-Soluble Vitamins:

- Solubility: Dissolve in water.
- Storage: Not stored extensively in the body; excess is usually excreted in urine.
- Examples: Vitamin C (ascorbic acid) and the B-vitamins (e.g., B1, B2, B3, B6, B12).

Examples of Diets Containing Water-Soluble Vitamins:

- Vitamin C: Found in citrus fruits (oranges, lemons), strawberries, bell peppers, and leafy greens.
- B-vitamins: B1 (thiamine) in whole grains, B2 (riboflavin) in dairy products, B3 (niacin) in meat and legumes, B6 in poultry and fish, B12 in meat and dairy.

Fat-Soluble Vitamins:

- Solubility: Dissolve in fat.
- Storage: Can be stored in the body's fat tissues; excess intake may lead to toxicity.
- Examples: Vitamins A, D, E, and K.

Examples of Diets Containing Fat-Soluble Vitamins:

- Vitamin A: Found in carrots, sweet potatoes, and dark leafy greens.
- Vitamin D: Obtained from sunlight exposure; also found in fatty fish and fortified dairy products.

- Vitamin E: Present in nuts, seeds, and vegetable oils.
- Vitamin K: Found in leafy green vegetables like kale and spinach.

Balancing the intake of both water-soluble and fat-soluble vitamins is essential for maintaining overall health and preventing deficiencies or excesses.

(C)

The human eye is a complex organ with various structures that work together to facilitate vision. Here's a brief overview of its main components:

1. Cornea:
   - The transparent outermost layer.
   - It helps focus light into the eye.
2. Sclera:
   - The white, tough, outer layer that maintains the eye's shape.
3. Iris:
   - Colored part of the eye.
   - It adjusts the size of the pupil to control the amount of light entering the eye.
4. Pupil:
   - The black circular opening in the center of the iris.
   - It regulates the amount of light reaching the

retina.

5. Lens:

- Transparent, flexible structure behind the iris.
- It further focuses light onto the retina.

6. Retina:

- Innermost layer, containing photoreceptor cells (rods and cones).
- Converts light into electrical signals for the brain.

7. Macula:

- Small, central part of the retina.
- Responsible for detailed central vision.

8. Optic Nerve:

- Bundle of nerve fibers.
- Carries visual information from the retina to the brain.

9. Vitreous Humor:

- Gel-like substance filling the space between the lens and retina.
- Helps maintain the eye's shape.

10. Aqueous Humor:

- Clear fluid between the cornea and lens.
- It provides nutrients and helps maintain eye pressure.

These structures work together to capture, focus, and

transmit visual information to the brain, allowing us to perceive the world around us. The eye's ability to refract light, adjust to different lighting conditions, and process visual information contributes to our sense of sight.

Answer to Q3

(A)

Global warming is a serious and complex issue that affects the entire planet and all living beings. It is caused by the accumulation of greenhouse gases in the atmosphere, mainly from the burning of fossil fuels. These gases trap heat and cause the Earth's temperature to rise, leading to changes in the climate and the environment. Some of the effects of global warming are melting ice caps, rising sea levels, extreme weather events, droughts, floods, wildfires, loss of biodiversity, and threats to human health and food security.

The metaphor of global warming as a wild beast and we all are poking at it with sticks is a vivid way of expressing the danger and urgency of the situation. It implies that global warming is a powerful and unpredictable force that can harm us in many ways, and that our actions are provoking it and making it worse. It also suggests that we are not taking the

problem seriously enough and that we are acting foolishly and irresponsibly. It is a warning that we need to stop poking the beast and start taking action to reduce greenhouse gas emissions and adapt to the impacts of climate change. Otherwise, we may face dire consequences for ourselves and future generations.

(B)

The origin of the universe is a fascinating and complex topic that has been explored by many scientists and philosophers over the centuries. The most widely accepted scientific theory of the origin of the universe is the Big Bang theory, which states that the universe began as a very hot and dense state of matter and energy that expanded rapidly and cooled down over time, forming the stars, galaxies, and other structures we observe today.

The age of the universe is the time that has elapsed since the Big Bang. There are different methods to estimate the age of the universe, but one of the most common ones is based on the Hubble constant, which is a measure of how fast the universe is expanding. By measuring the distances and velocities of distant galaxies, astronomers can calculate how long it took for them to reach their current positions from a common origin. The

reciprocal of the Hubble constant gives an estimate of the age of the universe, which is approximately 13.77 billion years.

(C)

Semiconductors are materials that have a conductivity between conductors and insulators. They can be pure elements, such as silicon and germanium, or compounds, such as gallium arsenide and indium phosphide.

Semiconductors have unique properties that make them useful for various electronic devices, such as diodes, transistors, and integrated circuits.

The electrical behavior of semiconductors is determined by their band structure, which describes the energy levels of the electrons in the material. In semiconductors, there is a gap between the valence band, which is the highest energy band occupied by electrons, and the conduction band, which is the lowest energy band available for electrons to move. The size of this gap is called the band gap, and it varies for different semiconductors.

In intrinsic semiconductors, the number of electrons in the valence band is equal to the number of holes in the conduction band. Holes are the absence of electrons in the valence band, and they act as positive charge carriers. Intrinsic semiconductors have very low conductivity

at room temperature, because there are not enough free electrons and holes to carry current.

In extrinsic semiconductors, the conductivity is increased by doping, which is the process of adding impurities to the material. The impurities can be either donors or acceptors, depending on whether they provide or accept electrons. Donors create n-type semiconductors, which have more electrons than holes, and acceptors create p-type semiconductors, which have more holes than electrons. By combining n-type and p-type semiconductors, various devices can be created, such as pn junctions, bipolar junction transistors, and field-effect transistors.

Semiconductors have many applications in the fields of electronics, optoelectronics, solar cells, lasers, sensors, and quantum computing. They are the basis of the modern microelectronic industry, and they have revolutionized the fields of communication, information, and entertainment.

(D)

An eclipse is an astronomical phenomenon that occurs when one celestial object comes within the shadow of another celestial object. This blocks the observer from seeing one of them in space. There are two types of eclipses that can be observed from the Earth: solar and lunar.

A solar eclipse happens when the Moon passes between the Sun and the Earth, blocking the light of the Sun from reaching the Earth's surface and casting a shadow on it. This occurs in a new moon phase, when the Moon is aligned with the Sun. Depending on the distance of the Moon from the Earth during the event, different types of solar eclipses can be observed, such as partial, annular, or total. A solar eclipse can only be seen from a limited area of the Earth, and it is advised that one should not look at the Sun directly during the solar eclipse as it can permanently damage the eyes.

A lunar eclipse happens when the Earth passes between the Sun and the Moon, blocking the light of the Sun from reaching the Moon's surface and casting its shadow on the Moon. This occurs in a full moon phase, when the Moon is opposite to the Sun. Depending on how the Sun, the Moon, and the Earth line up, different types of lunar eclipses can be observed, such as partial or total. A lunar eclipse can be seen from anywhere on the night side of the Earth, and it is safe to view the lunar eclipse directly.

SECTION - II

Solution of Q6

(A)

- The sum of the two pieces is equal to the original length of the fence: $x + y = 300$ ---- (i)
- The longer piece is four times as long as the shorter piece: $y = 4x$ ---- (ii)

We can substitute y with 4x in the first equation and solve for x:

$X + 4x = 300$

$5x = 300$

$X = 60$

Then, we can plug x into the second equation and solve for y:

$Y = 4x$

$Y = 4 * 60$

$Y = 240$

Therefore, the two pieces of fence are 60 ft. And 240 ft. Long, respectively.

(B)

Let's denote the width of the rectangle as (w) and

the length as (l). The given information can be translated into two equations:

1. The length is three more than twice the width: (l = 2w + 3).

2. The perimeter is 20 inches: (2l + 2w = 20).

Substitute the expression for (l) from the first equation into the second equation:

[2(2w + 3) + 2w = 20]

4w+6+2w = 20

6w = 20 - 6

w = 14/6

w = 7/3 inch

Now, for Length

I = 2 (7/3) + 3

I = 14/3 + 3

I = (14 + 9)/3

I = 23/3 inch.

So, the length of the rectangle is 23/3 inch and width of the rectangle is 7/3.

(C)

Matches won = 60 %

Matches lost = 24

Matches drawn = 00

To find :

Total matches played in a year

Solution:

Let the Total Number of matches played in a year =

x

No. Of matches won = 24 which is 40 % of total matches.

40/100 (x) = 24

4x / 10 = 24

4x = 24 x 10

X = 240 / 4

X = 60 matches.

So, the total number of matches played that year is 60.

(D)

Let the two numbers be 3x and 2x, where x is a constant.

According to the given information:

(3x + 2) / (2x + 6) = 4/5

Cross multiply

5 (3x + 2) = 4 (2x + 6)

15x + 10 = 8x + 24

15x - 8x = 24 - 10

7x = 14

X = 14/7

X = 2

So the first number is :

3(2) = 6

And the second number is:

2(2) = 4.

Solution to Q7

(A)

Total capacity = 400 seats

Occupied = 325 seats

To find :

Total percent attendance = ??

Solution:

Percent attendance = (Occupied seats/Total capacity) x 100.

Percent attendance = (325 / 400) x 100

Percent attendance = 0.8125 x 100

Percent attendance = 81.25 %

So, the total percent of attendance is 81.25% out of total capacity of 400 seats.

(B)

Person	Sugar	Days
30	40 kg	10
80	320 kg	X

$X/10 = 30/80 \times 320/40$

$X = 10 \quad (3)$

$X = 30$ days.

Hence, it would take 30 days for 80 people to consume 320kg sugar.

(D)

Radius (r) = 10cm

Height (h) = 36cm

To find :

Volume (V) of cylinder = ??

Solution:

Formula

$V = \pi r^2 h$

Substituting the values of r and h

$V = \pi \quad (10)^2 \quad (36)$

$V = 11,310 \quad cm^3$

The volume of the cylinder is $11,310 \quad cm^3$.