

General Science And Ability Part - II (Section - 1)

Question # 2

Part a:

Pakistan suffered a loss of \$40 bn due to heavy floods of 2022; in this context climate finance is the central question for developing countries. Discuss in the light of COP-28 going to start in UAE?

Answer:

Introduction:

Pakistan has a history of grappling with natural disasters, but the floods of 2022 distinguished themselves as one of the most severe in recent memory. The flood was triggered by intense monsoon rains, the flooding damaged vast areas, affecting millions of lives and causing substantial damage to infrastructure, agriculture, and livelihoods. The floods also affected multiple provinces. This devastating floods resulted in staggering loss of \$40 billion, underscoring the immediate need for effective climate finance mechanisms and addressing this in 28th conference of the parties (COP-28) in UAE, comes to the forefront.

Climate Finance and Developing Countries:

Climate finance involves providing financial resources to developing nations to mitigate and adapt to the impacts of climate change. Developing countries often bear extreme weather events which threaten their socio-economic stability. Pakistan's economic setback due to floods highlights the urgency of proper climate finance strategies.

COP-28:

COP-28 serves as a pivotal platform for nations to discuss climate policies and actions. Addressing climate finance is expected to be a key focus. It will shape the future of climate financing mechanisms with support, as this platform provides an opportunity to address these challenges, and will help Pakistan to recover from climate-induced losses.

Part b:

Distinguish water-soluble and fat-soluble vitamins. Give example of diets containing different vitamins?

Answer:

Vitamins:

A vitamin is an organic molecule, an essential micronutrient that an organism

needs in small quantities for the proper functioning of its metabolism.

Their absence can lead to deficiency diseases.

Classification of Vitamins:

Vitamins can be classified on the basis of being water soluble or fat soluble:

1- Water Soluble Vitamins:

These vitamins dissolve in water, and excess amounts are usually excreted from the body. They are not stored in the body for extended periods, and regular intake is essential. They do not cause toxicity.

For example:

Vitamin C (Ascorbic Acid): Found in citrus fruits, strawberries, broccoli, and bell peppers etc.

Vitamin B complex (B₁, B₂, B₃, B₅, B₆, B₇, B₉, B₁₂): Found in different foods such as meat, dairy products, whole grains, green vegetables etc.

Diet containing different vitamins:

Diet rich in water soluble vitamins is a diet with variety of fruits (citrus fruits), vegetables, whole grains, and lean proteins. They play a key role in energy metabolism, immune function, and maintaining skin health.

2- Fat soluble vitamins:

These vitamins dissolve in fat and are stored in the body's fatty tissues. Excess fat-soluble vitamins can lead to toxicity. They can be stored in the body for more extended periods.

For Example:

Vitamin A: Found in liver, fish oil, dairy products, and orange and yellow vegetables.

Vitamin D: Found in fortified dairy products, egg yolks, and can be obtained from sunlight.

Vitamin E: Present in nuts, seeds, vegetable oils etc.

Vitamin K: Found in green vegetables, and soybean oil.

Diet containing different vitamins:

Diet rich in fat-soluble vitamins includes sources of healthy fats like fatty fish, nuts, seeds, dairy products, and green vegetables etc. These are essential for vision, bone health, blood clotting and antioxidant protection.

Deficiency diseases:

- 1- Vitamin C deficiency can lead to Scurvy.
- 2- Vitamin D deficiency can lead to Rickets.
- 3- Vitamin A deficiency can lead to night blindness.
- 4- Vitamin K deficiency can lead to bleeding diathesis.

Part c:

Explain the structure of Eye?

Answer:

Human Eye:

Human eye is a complex organ responsible for sense of sight. Its structure involves various components working together to capture, focus, and transmit visual information to brain.

Structure of Eye

Sclera: It is the outermost layer of the eye, commonly known as the white part of the eye. It provides structural support and protection to inner eye.

Cornea: It is the transparent, dome-shaped front part of the eye. It helps to focus light entering the eye.

Conjunctiva: It is a thin, clear membrane covering the sclera and lining inside of the eyelids. It protects the eye and helps keep it moist.

Iris: The colored part of the eye surrounding the pupil. It regulates the amount of light entering the eye by adjusting the size of the pupil.

Pupil: The black circular opening at the center of the iris. It controls the amount of light entering the eye.

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Lens: It is a transparent, flexible structure located behind the iris. It refracts light to focus it on the retina.

Retina: It is the innermost layer of the eye containing light sensitive cell (rods and cones). Its function is to convert light into electrical signals that are sent to the brain.

Optic Nerve: It is a bundle of nerve fibers that carries visual information from retina to the brain.

Vitreous humor: A gel-like substance that fills the space between the lens and the retina. It helps to maintain the eye's shape.

Aqueous humor: A clear fluid between cornea and lens. It provides nutrients to the cornea and lens, and helps maintain eye pressure.

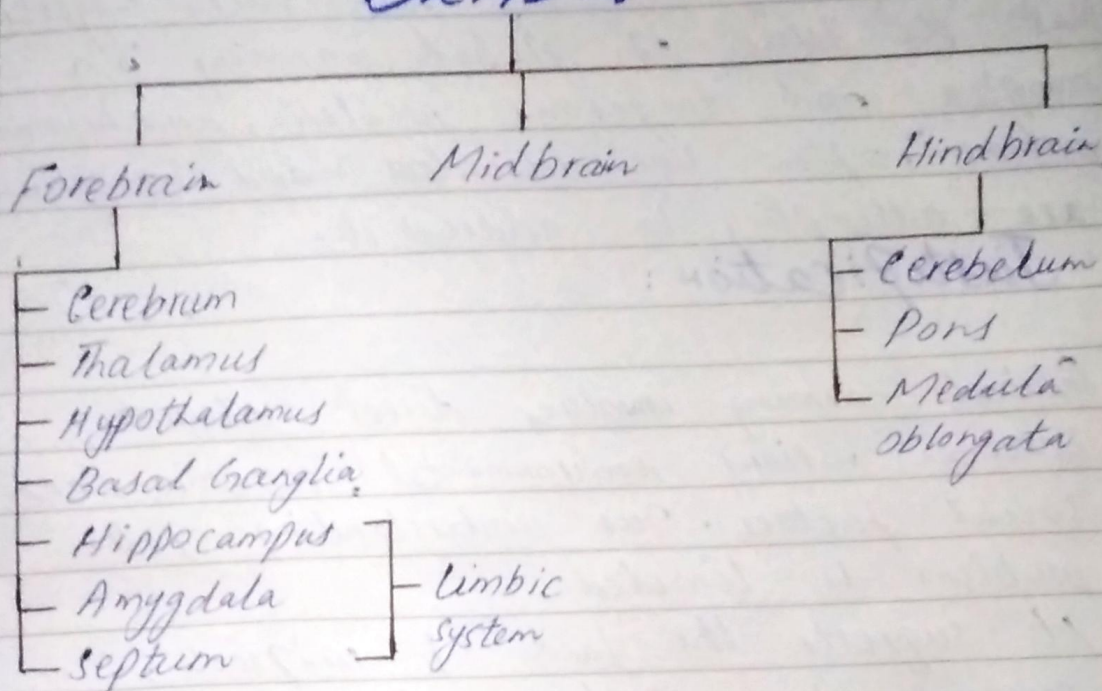
The co-ordinated function of these structures is crucial for clear vision. Any disruption in the normal structure or function of these components can lead to vision problems.

Part d:

Draw a flow chart of different parts of Brain?

Answer:

BRAIN



Question # 3

Part a:

Global warming is a wild beast and we all are poking at it which sticks. Justify?

Answer:

Global Warming:

Global warming refers to the long-term increase in Earth's average surface temperature due to human activities, primarily the emission of green house gases such as carbon dioxide, methane, and nitrous oxide. These gases trap heat in atmosphere leading to a warming effect. It is a major driver of climate change, impacts on ecosystem, and human health risks.

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"Global warming is a wild beast, and we all are poking at it with sticks" suggests that the issue of global warming is a complex and dangerous problem, and human actions, often unco-ordinated and insufficient, are attempting to address it.

Justification:

- 1- Global warming involves direct interaction between various environmental, economic, and social factors. Our understanding of the problem is limited.
- 2- It suggests the lack of unified, comprehensive strategy. Global efforts to combat climate change are often fragmented, with different nations implementing varied measures.
- 3- The actions taken to combat global warming might be insufficient, and there could be a need for more co-ordination.
- 4- Some measures might have unforeseen side effects or may lead to environmental issues.
- 5- There is the urgency and need for careful, well-thought-out solutions. Urgent and collective action is required.

Part b :

What is the origin of universe, how age of universe can be calculated?

Answer:

Origin of the Universe:

The origin of the universe is a complex and fascinating topic. The prevailing scientific explanation for the origin of universe is the Big Bang theory.

Big Bang theory:

The theory proposes that the universe began as an extremely hot and dense state about 13.8 billion years ago. All the matter and energy in the universe were concentrated in an extremely small hot point. Then, it rapidly expanded and cooled, leading to the formation of matter, atoms that make up stars, galaxies etc.

Evidence for this theory is the red shift of galaxies that supports the idea of an expanding universe, abundance of light elements such as hydrogen and helium, observed in the universe are consistent with this theory.

Age of the Universe:

The age of the universe is estimated using various methods:

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- 1- key tools being the observation of cosmic microwave background.
- 2- Measuring distances to distant galaxies and studying the oldest star clusters.
- 3- Observations from satellites like the Planck satellite provided measurements of CMB. The current accepted age of the universe is approximately 13.8 billion years.

Part C:

Write a short note on semi-conductors?

Answer:

Semi Conductors:

Semiconductors are materials which have a conductivity between conductors (metals) and non-conductors (ceramics).

Types:

1- Intrinsic Semé-conductors:

Pure semi-conductors like silicon and germanium have limited number of charge carriers. Their conductivity can be enhanced by adding impurities.

2- Extrinsic Semi-conductors:

These introduces impurity atoms into the semiconductor lattice, creating N-type or P-type semi-conductors.

Applications:

- 1- Semiconductors form the basis of transistors, which are fundamental components in electronic circuits.
- 2- Photovoltaic cells, often made of semiconductors like silicon, convert sunlight into electricity. This technology is the basis for solar panels.

Part d:

What is eclipse? Distinguish between solar and lunar eclipse?

Answer:

Eclipse:

An astronomical event in which one astronomical object is temporarily obscured either by passing into the shadow of another body or having another body pass between it and the viewer.

Solar Eclipse:

when moon orbits Earth, it moves between the sun and Earth and blocks the light of the sun from reaching Earth.

Types:

- 1- Total solar eclipse occurs when moon completely covers the sun, as seen from earth in Umbra region.

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- 2- Partial solar eclipse occurs when earth, moon and sun do not align in a perfectly straight line. Moon only partially covers the disc of sun.
- 3- Annular solar eclipse occurs when moon appears smaller than the sun as it passes centrally across the solar disk and a bright ring of sun remains visible.

Lunar Eclipse:

when Earth orbits the sun, it moves between the sun and moon and block the sunlight falling on moon.

Types:

- 1- Total lunar eclipse occur when entire moon passes through the umbral region of earth's shadow and moon is totally obscured.
- 2- Partial lunar eclipse occur when only part of earth's shadow covers the moon at penumbral region.