

Q No 2.

1 Heavy Floods During 2022. COP 28 UAE

Climate change is posing a serious threat to developing and developed countries. However, developing countries like Pakistan are more vulnerable as Pakistan has suffered a huge financial and social loss due to the consequences of climate change in the form of flooding. It is a critical moment for global stage to have a reality check of the prevailing climatic issues. COP 28 is going to be held from 30 November to 2 December in order to discuss the climate related issues and possible solutions under the theme "Unite, Act, and Deliver". It also includes climate financing. As Pakistan has faced more than \$40bn loss, so COP 28 will help the country to secure funding for climate adaptation and mitigation project with the help of Green Climate Fund. Thus Pakistan can have benefits from the adaptation and loss damage funds.

2 Water Soluble and Fat Soluble vitamins:

Water Soluble and fat soluble vitamins are the two categories of essential nutrients that play important role in various physiological functions. The primary distinction is based upon their solubility characteristics.

Water Soluble vitamins:

- ① Solubility: water soluble vitamins dissolve in water
- ② Storage: They are not stored in the body to a significant extent, usually excreted in Urine. Therefore, they required daily consumption.
- ③ Examples: Vitamin C and Vitamin B Complex.

Fat Soluble Vitamins:

- ① Solubility: Fat soluble vitamins dissolve in fats (lipids).

② Storage: They can be stored in body's fatty tissues and the liver and their excessive intake can lead to toxicity.

③ Examples: Vitamin A, D, E, K

Diets Containing Different Vitamins:

① Diets Rich in Water-Soluble Vitamins includes: fruits,

• Vegetables, Wholegrains, Legumes and meat.

• Fruits: Citrus Fruits (Oranges, lemon, grapes e.t.c)

• Vegetables: Leafy greens (Spinach, Kale)

• Wholegrains: Brown Rice, Oats,

• Legumes: Beans, Lentils

• Meats: Lean meat, Poultry, Fish

② Diets rich in Fat-soluble vitamins includes: eggs, dairy products, fatty fish, nuts seeds etc.

• Vitamin A: Found in liver, eggs, dairy products, carrots, sweet potatoes.

• Vitamin D: Obtained from fatty fish (Salmon e.t.c), fortified dairy products e.t.c.

• Vitamin E: Present in nuts, seeds, vegetable oils

• Vitamin K: Green leafy vegetables, broccoli etc.

③ Structure of Eye

Human eye is a complex organ responsible for vision. It consists of various structures that work in harmony altogether to capture, focus and process the visual information.

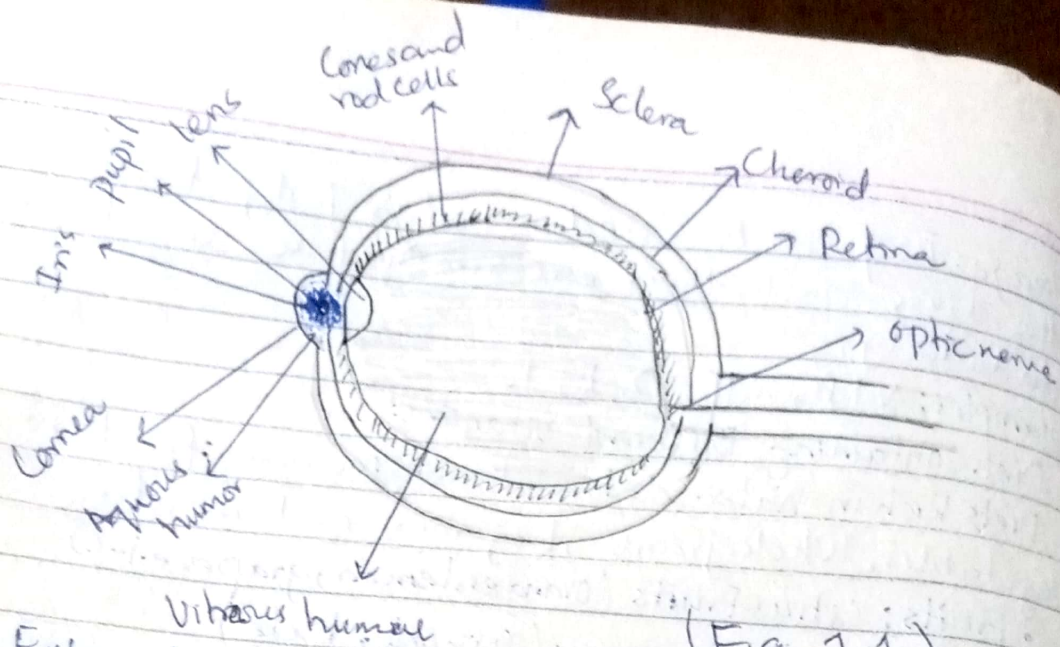
The structure of human eye can be broadly categorized into 4 divisions such as:

① External structures

② Middle structures

③ Inner structures

④ Supporting structures



(Fig 1.1)

External structures:

- (i) Sclera: The outermost layer, known as the white of the eyes. It provides structural support.
- (ii) Cornea: The transparent front part of the eye that covers the Iris and pupil. It helps to focus light into retina.
- (iii) Iris: The colored part of the eye that controls the size of pupil, consequently, the amount of light entering into the eye.
- (iv) Pupil: The black circular opening in the center of Iris. It regulates the amount of light that enters the eye.

Middle structures:

- Lens, Aqueous humor, Vitreous humor.
- Lens: A transparent flexible structure that changes shape to focus light on to the retina.
- Aqueous humor: A clear fluid that fills the space between cornea and lens, maintaining eye shape and providing nutrients.
- Vitreous humor: A gel like substance that fills the space between lens and retina, maintaining the shape of eye.

Internal structures:

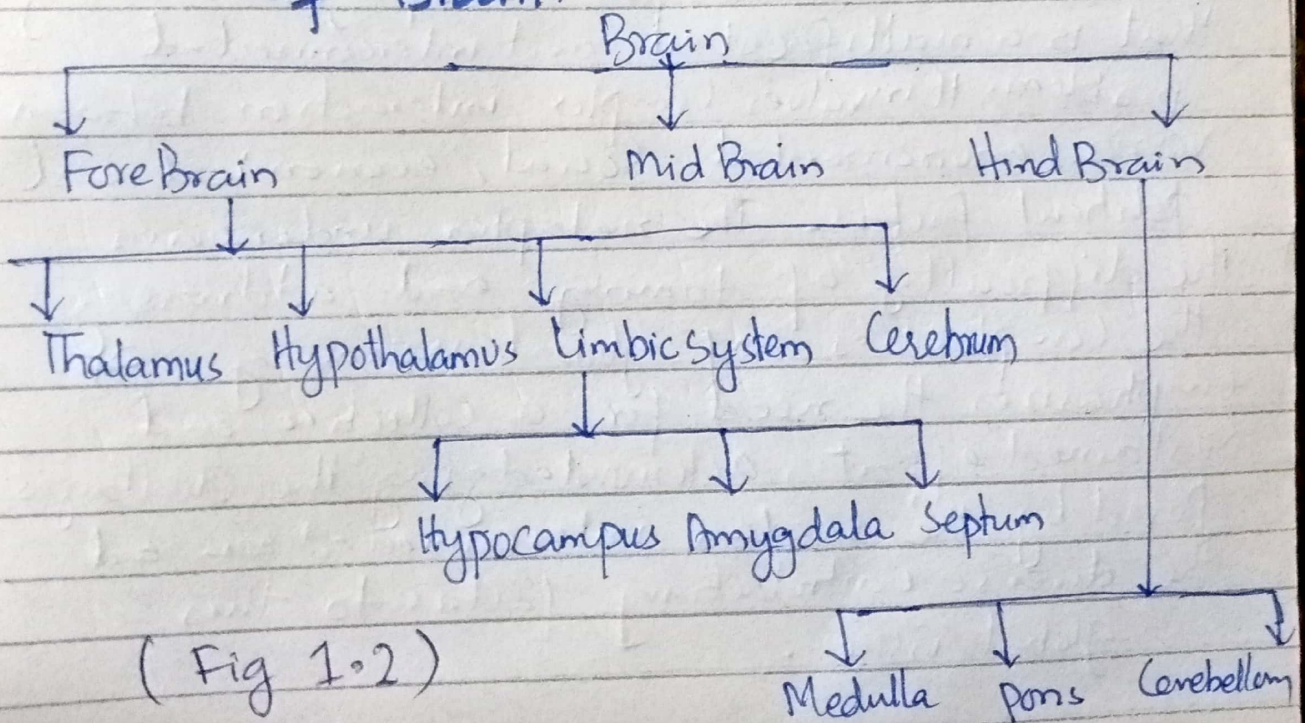
Retina: The innermost layer at the back of eye that contains photoreceptor cells (rod and cones) responsible for detecting light and transmitting signals to brain.

Optic nerve: The bundles of nerve fibers that carry visual information from retina to the brain.

Supporting structures include choroid, optic disk, tear glands, eyelids and eyelashes.

Thus the process of vision involves the eye capturing light, converting it into electrical signals in the retina and then transmitting these signals to the brain via optic nerve for interpretation. The brain processes these signals into images and that we perceive.

④ Draw a flowchart of different parts of Brain:



Brain is the complex and vital organ of human body that serves as the center of the nervous system. It plays a crucial role in controlling and coordinating various bodily functions and processes. It consists of three major parts as mentioned in the above diagram.

Q No 3. Global warming

The metaphorical expression of "Global warming as a wild beast" highlights the challenges and complexities associated with the issue.

Global warming is a wild beast because of its complexity, interconnectedness at global scale and collective impacts, delayed consequences, global coordination challenges, technological and economic dependencies along with political and policy challenges.

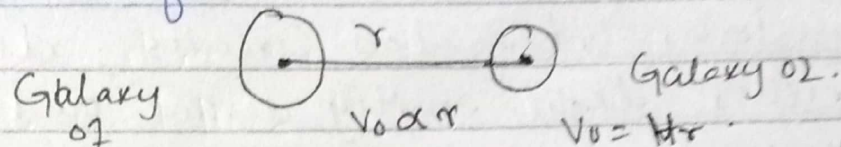
It is the intricate complex web of global warming that is a multifaceted and interconnected problem. It involves complex interaction between various environmental, social, economical and political factors. The metaphor underscores the difficulty of taming and addressing the complexities of global warming. It emphasizes the need for a collective and sustained effort, acknowledging the challenges posed by the scale, interconnectedness and the diverse contributing factors to this global issue.

2. Origin of Universe and age calculation of Universe.

The origin of Universe is a complex and theoretical topic in cosmology. The prevailing scientific explanation is the Big Bang Theory which suggests that the Universe began as an extremely hot and dense state about 13.8bn years ago and has been expanding ever since.

Evidence is Hubble's law:

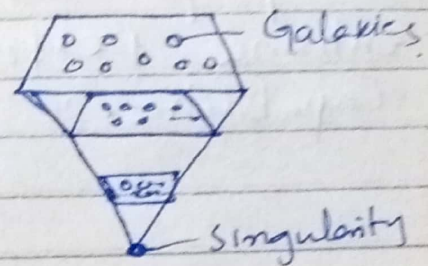
"All the galaxies are moving away with a certain receding speed ($V_0 = H_0 r$) evidenced by Redshift.



" V_0 " is the receding speed (freely moving speed)

" r " is the distance between the center of the two galaxies.

- Initially $V_0 = H_0 r$
- ① Singularity \rightarrow
 - ② Expansion \rightarrow
 - ③ Formation of matter \rightarrow
 - ④ formation of structures.



$$\text{Age of Universe} = t = \frac{1}{H_0}$$

" H_0 " is the Hubble's Constant.

If $t = 13.7$ bn of years then Age of Universe could be estimated.

③ Semi Conductors:

Semiconductors are a class of material that exhibit the properties that are intermediate between conductors (metal) and insulators. Semiconductors are playing a pivotal role in the development of electronic devices that has revolutionized the modern world.

Key characteristics of Semiconductors:

Conductivity, energy band structure and doping are the key characteristics.

They have electrical conductivity between conductors and insulators. The behavior of electrons in Semiconductors is often described by using the energy band model. Moreover, Semiconductors can be modified through the process of doping in which a small amount of impurity is intentionally added.

Applications of Semiconductors can be seen in transistors, Integrated Circuits, diodes, Solar cells, light-emitting devices and memory devices etc.

As technology advances, there is a continuous attempt for new Semiconductormaterials to enhance performance and power consumption capabilities.

d) Eclipse? Solar and Lunar eclipse.

An eclipse occurs when one celestial body moves into the shadow of another celestial body, resulting in a temporary darkening or obscuring the light from eclipsed body. There are two main types of eclipses such as solar and lunar eclipse.

Solar eclipse occurs when the moon passes between the earth and the sun blocking part or all of sun's light.

Visibility: Solar eclipses are visible from specific regions on earth where the moon's shadow consisting of partial or total falls.

Types: Total solar eclipse, partial solar eclipse and Annular solar eclipse.

Lunar eclipse occurs when the earth comes between the sun and the moon, causing earth's shadows fall on the moon.

Visibility: Lunar eclipses are visible from anywhere on the nighttime side of the earth where the moon is above the horizon.

Types: Total lunar, partial lunar and Penumbral lunar eclipse.

The key differences lie in the position of celestial bodies, the visibility of eclipses, the frequency and appearances.

	Solar eclipse	Lunar eclipse
Position of celestial body	Moon between earth and sun.	Earth between sun and moon.
Visibility	Specific region	everywhere at nighttime
Frequency	less frequent	frequent comparatively
Appearance	observes daytime darkness	reddish hue on moon.

Data

Total length = 300ft

longer piece = 4 times small piece.

Small piece = unknown = x

let suppose small piece = x

then larger piece = $4x$

$x + 4x = 300ft$

$5x = 300ft$

$x = \frac{300ft}{5}$

$x = 60$

Smaller piece = 60ft

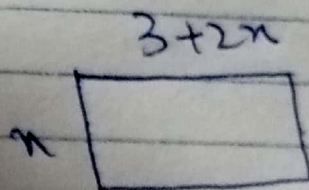
larger piece = $4(x) = 4 \times 60 = 240ft$
(60ft 240ft)

QNo (b) Data =

$P = 20$ inches

$L = 3 + 2x$

$W = x$



$P = 2L + 2W$

$P = 2(3 + 2x) + 2(x)$

$P = 20 = 6 + 4x + 2x$

$20 = 6 + 6x$

$20 - 6 = 6x$

$14 = 6x$

$x = \frac{14}{6}$

$x = 2.33$ inches.

$W = x = 2.33$

$L = 3 + 2(x) = 3 + 2(2.33) = 7.66$ inches.

$W = 2.33$ inches

$L = 7.66$ inches.

Q6) Data: Total no. of matches = n

60% won matches = $0.6n$

lost matches = $n - 24$

Therefore,

$$0.6n + 24 = n$$

To find value of n

$$0.6n = 24$$

$$n = \frac{24}{0.6}$$

$$\boxed{n = 40}$$

no. of total matches = 40

Q7

(a)

Data: Total seats = 400

325 occupied

percent (%) of capacity = ?

$$\%age = \frac{325}{400} \times 100 = \boxed{81.25\% \text{ present}}$$

(b)

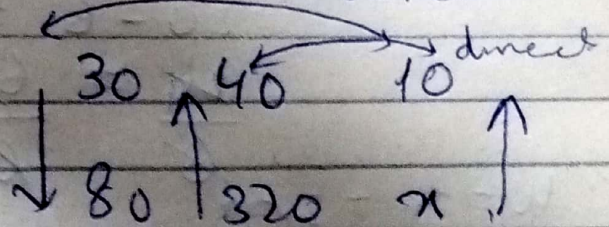
Data:

30 people \rightarrow 40 kg \rightarrow 10 days

80 people \rightarrow 320 kg \rightarrow x = ?

Use Arrow method

inverse relation



$$\frac{x}{10} = \frac{320}{40} \times \frac{30}{80}$$

$$\frac{x}{10} = 3 \quad x = 10 \times 3$$

$$\boxed{x = 30 \text{ days}}$$

d) Volume of Cylinder = ?

$$r = 10\text{cm}$$

$$h = 36\text{cm}$$

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

$$V = \frac{22}{7} \times (10)^2 \times (36)$$

$$\frac{22}{7} \times 100 \times 36 =$$

$$3.147 \times 100 \times 36 = 11329.2\text{cm}^2$$

$$11329.2\text{cm}^3$$