

Dated:

Section II

- Q6. a) Farmer cuts 300 ft fence
longer piece = x
shorter piece = y

$$x = 4y - \textcircled{1}$$

$$x + y = 300 - \textcircled{2}$$

Substituting 1 in 2

$$\therefore 4y + y = 300$$

$$5y = 300$$

$$y = \frac{300}{5} = 60$$

$$x = 4 \times 60 = 240$$

\therefore shorter piece = 60 ft
longer piece = 240 ft

b)-

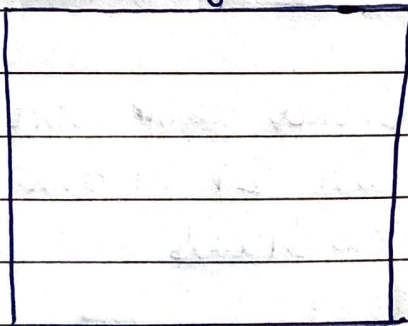
length of rectangle = x

width of rectangle = y

$$x = 2y + 3 - \textcircled{1}$$

x

y



perimeter = 20 m

$$\text{perimeter} = 2x + 2y$$

$$2x + 2y = 20 - \textcircled{2}$$

Dated:

Substituting 1 in 2

$$2(2y+3) + 2y = 20$$

$$4y + 6 + 2y = 20$$

$$6y + 6 = 20$$

$$6y = 14$$

$$y = \frac{14}{6} = \frac{7}{3}$$

$$x = 2\left(\frac{7}{3}\right) + 3$$

$$= \frac{14}{3} + \frac{3 \times 3}{1 \times 3}$$

$$= \frac{23}{3}$$

Hence, the length = $\frac{23}{3}$ ($7\frac{2}{3}$ or 7.66) inches

the width = $\frac{7}{3}$ ($2\frac{1}{3}$ or 2.33) inches

- c) Cricket team won 60% of its matches
lost 24 in all
no draws

$$\% \text{ loss} = 100 - 60 = 40\%$$

x = total no of matches

Dated:

$$\therefore \frac{40}{100} \times x = 24$$

$$40x = 2400$$

$$x = \frac{2400}{40}$$

$$x = 60$$

= total matches 60, 24 lost, 36 won

d) $x = 1^{\text{st}} \text{ no}$
 $y = 2^{\text{nd}} \text{ no}$

$$x : y = 3 : 2$$

$$x + 2 : y + 6 = 4 : 5$$

$$\frac{x}{y} = \frac{3}{2} \quad \text{--- ①}$$

$$2x = 3y$$

$$y = \frac{2x}{3}$$

$$\frac{x+2}{y+6} = \frac{4}{5} \quad \text{--- ②}$$

Substituting 1 in 2

$$\frac{x+2}{\frac{2x}{3} + 6} = \frac{4}{5}$$

Dated:

$$\frac{x+2}{2x+18} = \frac{4}{5}$$

3

$$\frac{3x+6}{2x+18} = \frac{4}{5}$$

$$5(3x+6) = 4(2x+18)$$

$$15x+30 = 8x+72$$

$$7x = 42$$

$$x = \frac{42}{7} = 6$$

$$y = \frac{2(6)}{3} = 4$$

$c \quad 1^{st} \text{ no} = 6, \quad 2^{nd} \text{ no} = 4$

Q8. b) 12 cards numbered 1 to 12

probability = $\frac{\text{expected outcome(s)}}{\text{total no of outcomes}}$

i) $P(8) = \frac{1}{12}$

Dated:

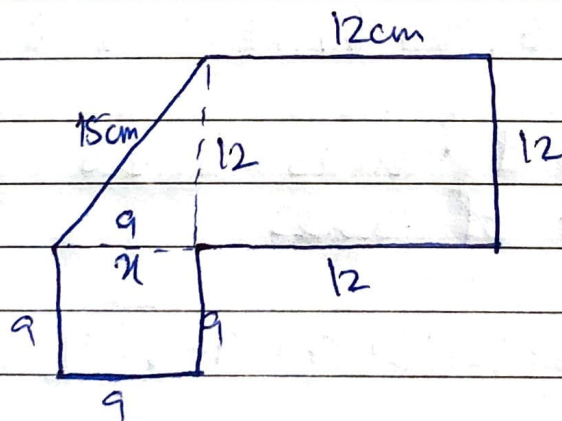
$$\text{ii) } P(\text{even no}) = 2, 4, 6, 8, 10, 12 \\ = \frac{6}{12} = \frac{1}{2}$$

$$\text{iii) } P(\text{perfect square}) = 1, 4, 9, 16 \\ = \frac{4}{12} = \frac{1}{3}$$

$$\text{iv) } P(\text{negative no}) = \frac{0}{12} = 0$$

$$\text{v) } P(\text{no less than 13}) = 1, 2, 3, \dots, 10, 11, 12 \\ = \frac{12}{12} = 1$$

c)



Area = ?
Perimeter = ?

$$12^2 + x^2 = 15^2$$

$$144 + x^2 = 225$$

$$x^2 = 81$$

$$x = 9$$

Dated:

Perimeter = sum of all sides

$$\begin{aligned} &= 12 + 12 + 12 + 15 + 9 + 9 + 9 \\ &= 36 + 15 + 27 \\ &= 78 \text{ cm} \end{aligned}$$

Area = sq1 + triangle + sq2

$$\begin{aligned} &12^2 + \frac{1}{2} \times 9 \times \frac{6}{2} + 9^2 \\ &144 + 54 + 81 \\ &= 198 + 81 \\ &= 279 \text{ cm}^2 \end{aligned}$$

$\therefore \text{perimeter} = 78 \text{ cm}, \text{ area} = 279 \text{ cm}^2$

d) Nine students

Ages: 15, 15, 16, 16, 16, 17, 17, 18, 19

Mean: It is the sum of values divided by the total number of values

$$\frac{15 + 15 + 16 + 16 + 16 + 17 + 17 + 18 + 19}{9}$$

$$= \frac{30 + 48 + 34 + 18 + 19}{9}$$

$= \frac{149}{9} = 16.62$

$$\begin{array}{r} 16.62 \\ 9 \overline{) 149} \\ \underline{-9} \\ 59 \\ \underline{-54} \\ 50 \\ \underline{-48} \\ 20 \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 20 \end{array}$$

Dated:

Median: It is the middle value in an arranged set of value
in this case

15, 15, 16, 16, 16, 17, 17, 18, 19

$$= 16$$

Mode: It is the most frequently repeated value,
in this case 16 is repeated thrice
hence, mode = 16

Range: It is the difference between the maximum value of the set and the minimum value

$$19 - 15 = 4$$

a)

B	R	O	T	H	E	R	-	Q	D	G	S	N	Q	A
S	I	S	T	E	R	-	Q	D	S	R	H	R		

$$= Q D S R H R$$

Dated:

Section I

Q2.

a) The question of climate financing is at the fulcrum of all the discussions to mitigate the deleterious effects of climate change specially in the developing countries. In the Paris agreement, the provision of \$100 billion grant by the developed nations in the cause of climate sustainable projects was pledged. Moreover, the COP26 brought into light the discussions regarding the loss and damage fund. According to UNEP, an annual financing of \$190 billion to \$350 billion is needed to ameliorate the climate risks and prevent further climate degradation.

- Loss and Damage Fund

The concept behind loss and damage fund is that the developed countries contribute to majority of the greenhouse emissions. However, the effects are far greater witnessed in the developing countries. India is the third largest global emitter of CO_2 , whereas Pakistan contributes to less than 1%. However, climate devastation has no territorial limitations and such was the case seen in the 2022 floods.

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- Annual budget for climate sustainable projects

It is essential that the developed countries and the developing countries to shift towards a green economy. The transition from thermal sources of energy to the cleaner sources of energy will need the help from the affluent nation. Hence, it is responsibility of the developed world to abet the resource stricken developing world.

- Global and national restructuring of economic policies

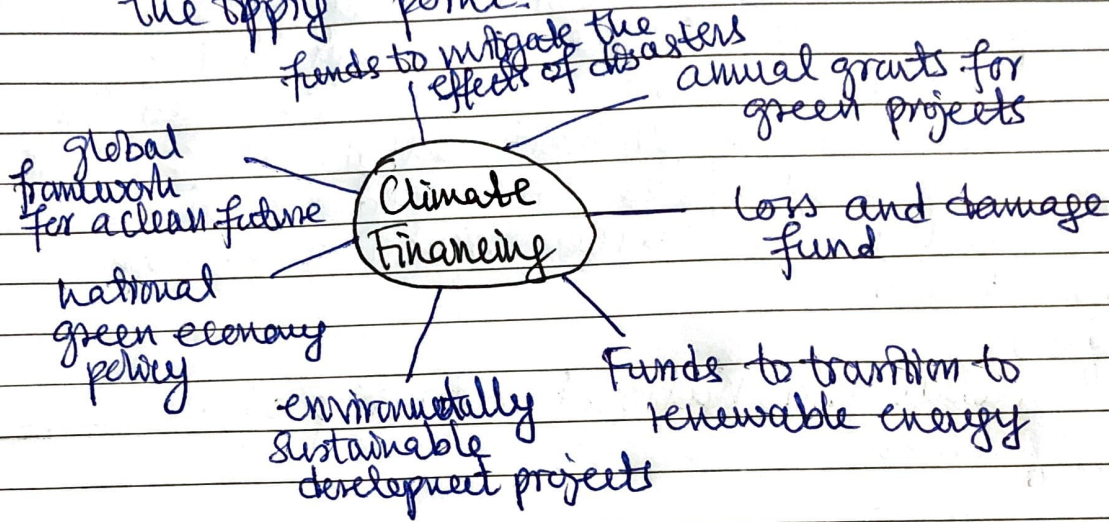
It is essential for nations to develop framework for directing their economy in environmentally sustainable projects. Moreover, finances should be allocated to deal with the damaging effects that the inevitable natural disasters can have.

- COP 28 : a new start towards climate sustainability

Thus far the efforts to protect the environment have been abysmal. However, the upcoming COP gives another chance

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to mend the ways. Countries should focus on developing policies, framework and strategies with regards to climate finance and ensure that legally binding steps are taken because the situation is at the tipping point.



Therefore, in light of the upcoming COP28, countries need to take serious decisions and ensure regular accountability. Moreover, developing countries like Pakistan should also transform their economic to make them climate adaptable. Moreover, developed nations have a key role in contributions to climate finance.

Dated:

Dated:

b) Vitamins are essential components of our diet. They play a role in the growth, nourishment and immunity of our body. They can be classified as water soluble or fat soluble vitamins.

Fat soluble vitamins

- Readily dissolve in lipids
- Include vitamin A, D, E, K

Vitamin	Function	Deficiency can cause
A	Vision	Night blindness
D	Strength of bones	Rickets, Osteomalacia, osteoporosis
E	Immunity	Immune dysfunction, infections
K	Clotting	Bleeding disorders

Water soluble vitamins

- Readily dissolve in water
- Include vitamins B₁ - B₁₂, Vitamin C

Dated:

Vitamin	Function	Deficiency can cause
B ₁	Maintenance of nerves	Neuropathy, encephalopathy
B ₃	Immunity	Pellagra
B ₉	DNA, blood	Anemia, Defects in protein synthesis
B ₁₂	Blood, Nerves	Megakoblastic anemia, Neuropathy
C	Cures	Scurvy

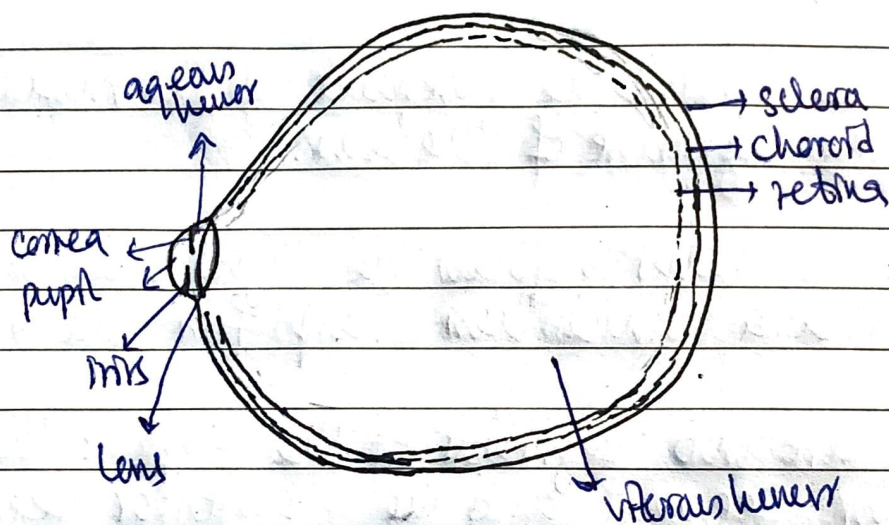
Sources of diet

A balanced diet ensures availability of necessary vitamins. Fruits, vegetables, milk, meat are good sources of vitamins.

- Citrus fruits such as oranges are rich in vitamin C
- Milk and dairy products are rich in vitamin D
- Carrots are abundant in vitamin A
- Green vegetables, lentils, liver and meat are rich sources of vitamin B complex

Dated:

- c) Eye is a ball like structure that helps humans with vision and generation of images. It has multiple important components.



Three layers surround the eyeball.

Retina: The inner most layer. It is photosensitive. It contains rods and cones. The light signals are transmitted to the rods and cones which then convert them and carry it to the brain via the optic nerve.

Choroid: It is the middle layer. It contains the blood vessels for the nourishment of the eyeball.

Dated:

Sclera: It is the outermost layer which helps in the protection of the eyeball.

Further components of the eye include:

Pupil: It allows the entry of light into the eyeball.

Iris: It controls the movement of the muscles and the curvature of the lens.

Lens: It helps to focus the light onto the retina which then helps form the image.

There are two segments of the eye: The anterior segment and the posterior segment. Anterior segment contains the aqueous humor and the posterior segment contains the vitreous humor. These together contain nutrients to nourish the inside of the eyeball.

Dated:

- d) The brain comprises of three parts: the hindbrain, the mid brain and the forebrain. It is divided into two parts: the right and the left hemisphere. Moreover, it has different sections such as frontal, temporal, parietal and posterior which play different roles.

Hind brain

(consists of medulla oblongata, which is part of the brain stem. It controls breathing, blood pressure and heart rate)



Mid brain

(consists of pons and cerebellum. Pons play a role in deep breathing. Cerebellum plays an important part in balance and coordination of body movements)



Forebrain

(consists of the cerebrum, thalamus, amygdala, hypothalamus, hippocampus. The cerebrum

plays multiple roles in both sensory and motor manoeuvring of the body.

Dated:

The thalamus receives all the sensory input of the body and then transmits it for further process. The hypothalamus helps to maintain homeostasis in the body. Amygdala is a part of the limbic centre of the body, it has a role in the control of emotions of the body. Hippocampus is essential for processing and storing of the memory.)

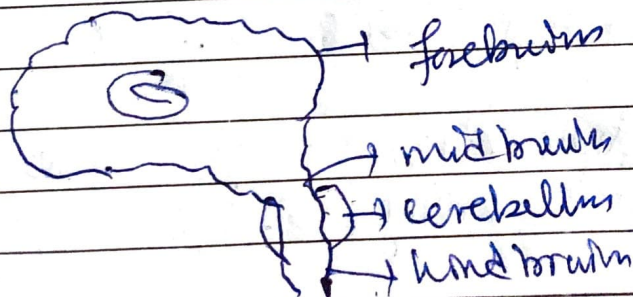
→ Moreover, the zones of the brain have different functions:

Frontal cortex → decision making & behavior

Parietal cortex → motor functions of the body

Temporal cortex → language comprehension and processing

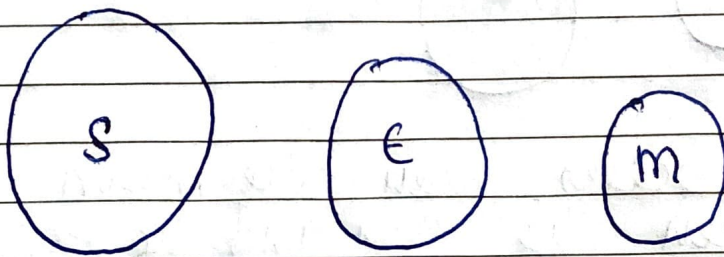
Posterior cortex → For vision integration and processing



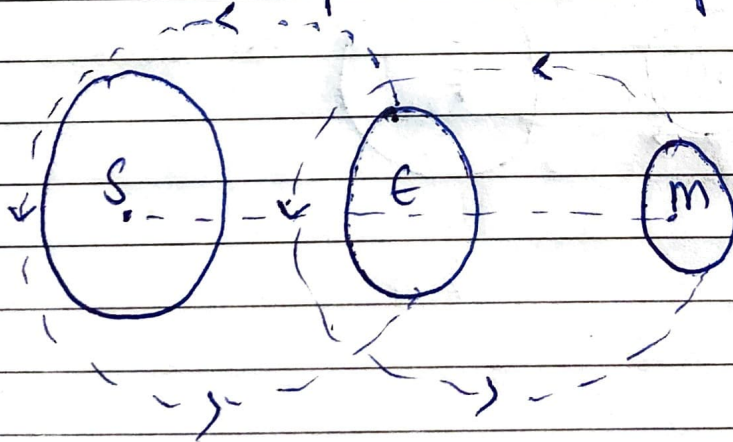
Dated:

- Q3. d) The term 'eclipse' refers to the obscuring caused by one celestial body of another. There are two types of eclipses that we witness: Solar eclipse and the lunar eclipse.

Lunar eclipse:



The lunar eclipse occurs when the earth blocks the sunlight path to the moon, hence, covering the moon. The lunar eclipse can be partial or complete.

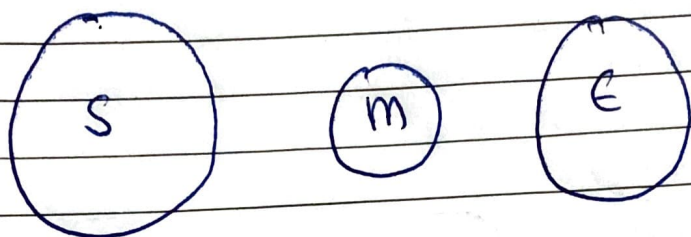


The complete lunar eclipse occurs when earth is in the centre of the line joining the centre of sun and the moon.

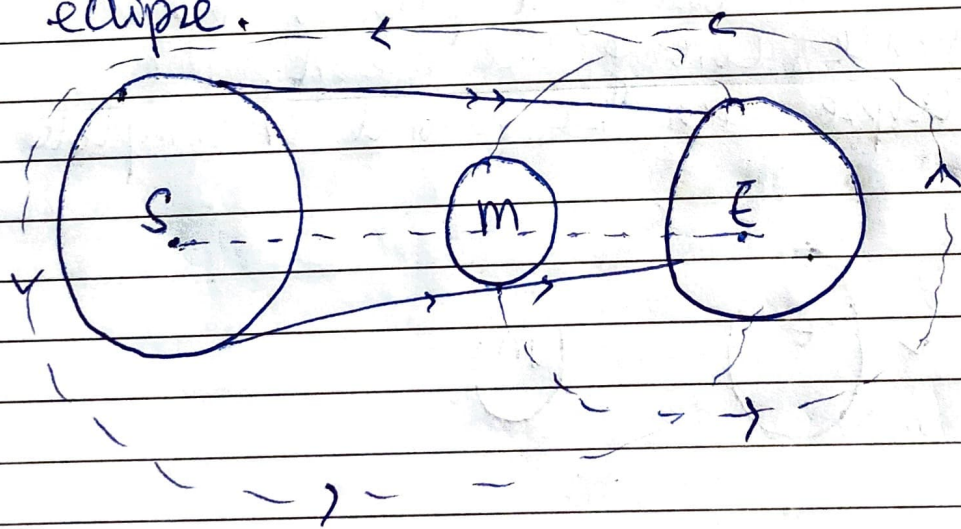
Dated:

Partial lunar eclipse occurs when the earth is above or below the line joining the centre of the sun and the moon.

Solar eclipse:



Solar eclipse occurs when the moon comes in between the sun and the earth and hence, prevents the sunlight reaching the earth. There are 3 types of solar eclipse.



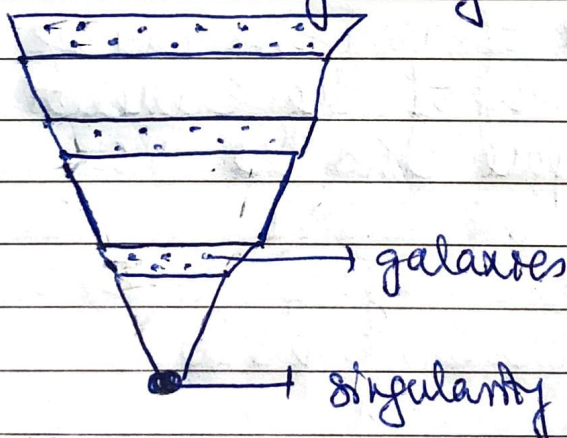
Total solar eclipse occurs when the moon is in the centre of the line joining the centre of the sun and the earth. Moreover, the partial solar

Dated:

eclipse occurs when the ~~sun~~^{moon} is above or below the line joining the centre of the sun and the earth. A third type of solar eclipse is the annular eclipse. It is because the size of moon is small to completely block the sun rays, some of the rays pass through to the earth creating a beads like appearance. This occurs a few seconds before and after the total solar eclipse.

b) Origin of the universe

The origin of the universe occurred around 13.7 billion years ago. It is said to be the result of a phenomenon known as the 'Big Bang'.



According to the Big Bang Theory, 13.7 billion years ago, a singularity exploded, and from this explosion arose the numerous galaxies and the present day

Dated:

galaxies and planets. After the explosion immense energy was released and then the cooling of temperatures resulted in balls of gases and clouds and this formed the galaxies of the present. The evidence of big bang theory is through the red shift phenomenon. The universe is expanding and on the spectroscope a red shift can be visualised. V_0 & r , V_0 is the receding velocity and r is the radius. As the radius & distance increases so does the receding speed and the planets and large bodies can break free from each other influence = a red shift, due to increasing wavelengths is visualised.

How the age of universe is calculated

The age of universe can be calculated by a thorough study of the elements of the universe in the outerspace and the natural elements present in the earth. The use of geological metrics and study of trees and volcanoes and fossil fuels helps to understand the chronology of earth. Moreover, study of celestial bodies using spectrometry and detailed analysis of universe can guide to the age of the universe. Moreover, carbon dating is another method utilised in the process.

Dated:

a) Global warming is the term used to describe the rising temperatures around the globe as a result of man made activities. It is the result of the enhanced greenhouse effect, that is the trapping of the heat by the gases in the atmosphere. Due to this the average global temperatures have risen over the past decades. According to scientific bodies an average rise of temperatures above 1.5°C the pre-industrial times would have disastrous effects on the climate and subsequently the human life. Moreover, if it reaches 2°C above the ~~pre~~ pre-industrial times it is clear that 70% of the humanity would be at the point of extinction.

Global warming as a wild beast

Without an iota of doubt, global warming is a wild beast which is eating alive the planet. The consequences of global warming can be seen in the form of i) increased incidence of natural disasters: the 2023 floods of Libya, China and Bangladesh and the 2022 floods in Pakistan, testify that due to the rising temperatures, there ~~is~~ is melting of glaciers and rising sea levels that have resulted in the flooding across many nations.

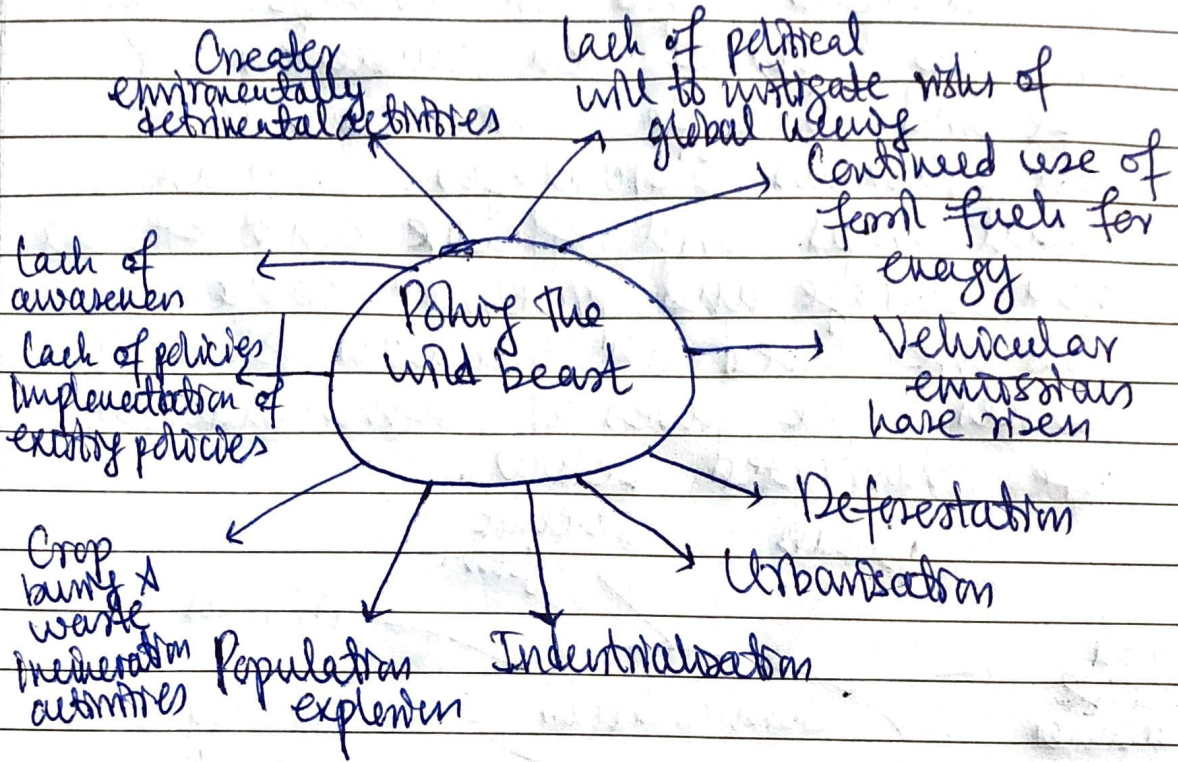
Dated:

- ii) Global temperatures have peaked. Previously 2016 was the hottest year in the Earth's history. However, with record hot months such as September, 2023 is set to be the hottest year in the planet's history. This makes life difficult for humans.
- iii) Effect on agriculture and crops: Other than directly affecting the humans, many indirect mal consequences on the people can be witnessed. Many losses of agriculture and crops have been recorded in the recent years owing to the rising temperatures.
- iv) Melting of glaciers and rising sea levels: According to NASA, the Himalayan glaciers are at the highest risk of being melted. Already large masses of glaciers have melted in Nepal, Peru and Antarctica. Moreover, sea levels are on the rise. This will have disastrous effects on the coastal countries and maritime life.
- v) Era of 'global boiling': UN secretary general, Antonio Guterres, has termed the world is moving into an age of global boiling and the calamitous effects of global warming would further exacerbate if necessary steps are not taken.

How we are posing strides at global warming

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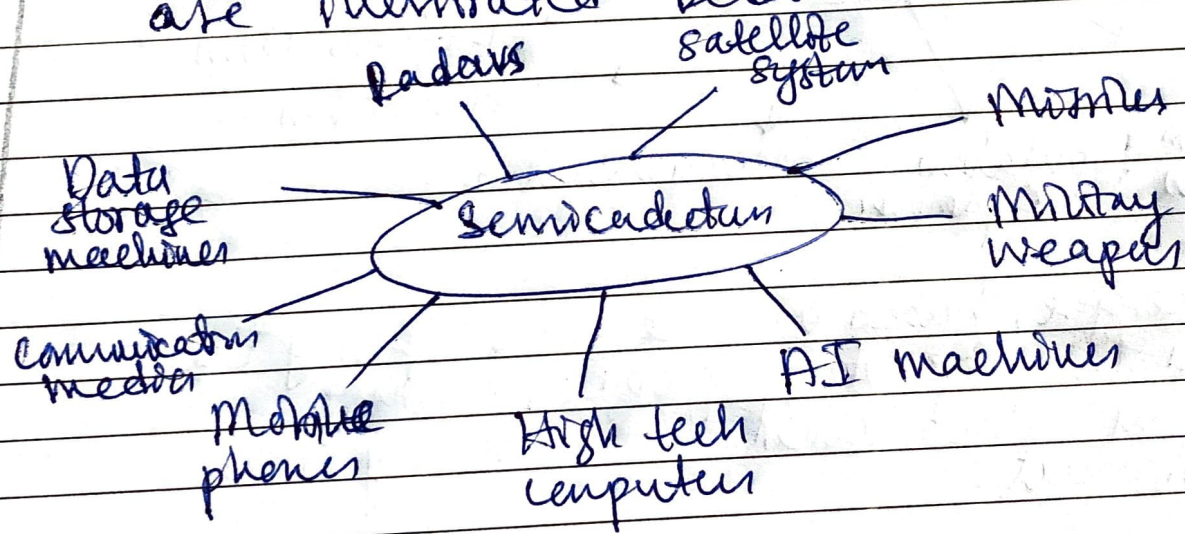
Humans have continued with the damaging activities to the environment, which has further escalated the issue of global warming. These are highlighted below:



Therefore, based on the mishaps by the humans the beast of global warming continues to grow and continues to destroy our environment.

Dated:

c) Semiconductors are the new revolutionary technology that are central to the progress of modernism. The recent US-China conflicts are also based on semiconductors and microchips. There are two types of semiconductors: P type and N type. Semiconductors have numerous advantages. They are small chips with effective and efficient data storage and processing capacity and are used in numerous electronic devices. The uses of semiconductors are illustrated below.



Hence, semiconductors are the necessary equipment for the contemporary world and they will play a great role in the ongoing information technology.