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SECTION-I

QUESTION #3:

Part a:

Global warming is the increase in temperature of earth due to presence of abnormal concentration of green house gases that trap the heat from reflected ray of sun from Earth and warm the Earth's atmosphere.

Causes of Global Warming:

Global warming is beast and world is poking at it in numerous ways. Following are these ways:

① Combustion of Fossil Fuels:

Combustion of fossil fuels release green house gases that cause surge in global warming. Human beings depend upon fossil fuel in many ways. They uses fossil fuel in Energy sector, in agriculture sector, industrial sector and in transport sector. According to IPCC, energy sector is responsible for 35% of emissions, agriculture emits 25%, industrial sector releases 21% and transport sector 17%. Human beings till now has no strong committments to switch from fossil fuel. Thus, they are indeed poking the beast

② Surge in Population:

In Nov 2022, human population surged to 8 billion. According to UN, it would se-

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to 9 billion in 2030. More the population, more will be the consumption, production, usage of transport, deforestation and urbanization. All these are related to global warming.

3) **Deforestation:**
According to Global Forest Watch dog, around 10 million land has been deforested. Forests are means to squister CO_2 from atmosphere which causes global warming. On other hand, cutting down of trees release large amount of CO_2 in atmosphere.

4) **Escalation in Urbanization:**
According to World Bank, around 56% of population lives in urban centres. When people shift to urban centre, they build house which is a source of emission. Besides, there will be surge in transport utilization, solid waste generation and etc. These all are source of green house gasses emission

5) **Militarial Activities:**
Military adventures and activities are source of green house gasses. Production of weapon release gasses. Firing of weapons release heat, CO_2 and ash content in environment. According to study, US and USSR's nuclear testing cause tilt in earth axis by 11% which results in Earth moving closer to sun.

How Global Warming is Wild Beast

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Global warming has serious repercussions on animal, plants, human beings, environment and on microorganism

① **Plant:** It cause abcession in plant. It is related to yellowing of leaves. Plants ripe earlier which diminish their growth. Disturbance in rain pattern affected plant

② **Human Beings:** Global warming is larg cause of deaths in plant. According to study published in Lancet Journal, half of deaths are caused by heat waves.

③ **Economic Losses:** Global warming cause surge in the episodes of flood. This result into loss of land, agriculture crops and live-stock. It also causes destruction of houses. It diminishes the growth of crop which affects country's exports.

④ **Social crises:** Global warming indirectly leads to social crises. It cause surge in natural disaster. When these disaster hit developing countries then it cause increase in poverty, inflation rate, and unemployment. It also trigger mass migration.

Part b:

The universe was created 3.7 billion years ago. Entire universe was inside a bubble which was smaller than a pin head. It is called singularity. It was denser than anything that one could imagine.

Suddenly, that bubble burst and universe was created. In a matter of minutes, universe grew from smaller than bubble to larger than galaxy. Time, space and energy created.

Universe started expanding and cooling. Particle of matter and antimatter was created. They started destroying each other. However some were left. More stable particles, proton and neutron, were created when universe was 1 second old. After 3 minutes, temperature of universe was dropped to 1 bn°C. Proton and neutron combined and formed hydrogen and helium. After 30,000 years, the temperature of universe was dropped to 3000°C. Atoms started capturing electron and formed the clouds of hydrogen and helium. This cloud then formed celestial bodies.

Calculation of Age of Universe:

There are different methods for calculating the age of universe. One of these methods is carbon dating. It is done by measuring carbon content in the rocks brough from moon. With this method, the age of universe can be determined. However, there is no method that can give exact age of universe.

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Part C:

Semiconductors are materials that conduct electricity partly. Their conductivity lies between insulator and conductor. They do not have negligible conductivity like that of insulator and not very high like conductor. They are manufactured from germinium, Silicon and etc.

TYPES:-

There are two types of Semiconductors. These are P-type and N type semiconductors.

N-Type Semiconductor:

Doping is the process by which impurity is added into semiconductor. N-type semiconductors are formed by adding dopant in pure semiconductor for regulating its conductivity. Semiconductors usually have four electrons in valance shell. All these four electrons are bonded to four others of neighbouring atom. However, when dopant from group V is added into semiconductor then it has 1 extra electron. Semiconductor atoms make bond with 4 electorn. The extra 5th electron moves in semiconductor and constitute current. As the electron is negative charge, that's why it is called N-type semiconductor.

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P-Type Semiconductor:

When an impurity of group III of periodic table is added into semiconductor then it result in the creation of hole. The dopant has only 3 electrons for making bonds. This left hole which is then occupied by other atom which create hole in shell of that atom. Thus, hole starts moving which constitute current. Due to positive charge on hole, this type of semiconductor is called as P-type semiconductor.

Part d:

Eclipse is a phenomenan that occurs when one heavy body comes into shadow of another heavy body. There are 2 types of eclipse. These are solar and lunar eclipse.

DIFFERENCE BETWEEN THE TWO:

(i) **Definition of Solar Eclipse and Lunar Eclipse:**

SOLAR ECLIPSE: Solar eclipse occurs when moon comes between Earth and Sun. Moon blocks sunlight reaching earth and cast its shadow.

LUNAR ECLIPSE: Solar eclipse occurs when earth comes in between moon and sun and cast its shadow on moon while blocking sunlight reaching moon.

(ii) **Frequency of occurence:**
Solar eclipse occurs once after 18 month.
Lunar eclipse occurs every month

(iii) **Safe to look or not:**
It is not safe to look at solar eclipse
It is safe to look at Lunar eclipse

(iv) **Type of Solar and Lunar Eclipse:**

Solar eclipse has 3 types. Following are these
Total Solar Eclipse:- When moon completely covers so sun.
Partial Solar Eclipse:- When Earth, sun and moon are not in straight line then moon cover only disc of sun. This is called partial Solar eclipse
Annular Solar Eclipse:- When moon cover centre of sun. Sun look like a ring of fire.

Lunar eclipse also has 3 types. Following are these:
Pneumbra Eclipse:- When moon comes in Pneumbra part of Earth's shadow
Partial Umbra Eclipse:- When moon partially comes under the Umbra part of Earth Shadow
Umbra Lunar Eclipse:- When moon completely comes in Umbra part of Earth shadow

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QUESTION 4:

Part a:

Pesticide is a material that is used for preventing, destroying, mitigating and repealing pest. Pesticides perform this function in many ways. There are various types of pesticides.

- On the basis of target
  - Rodenticides
  - Insecticides
  - Herbicides
- On the basis of constituents and manufacturing
  - Organic
  - Inorganic
  - Natural
  - Synthetic
- On the basis of operation
  - Contact
  - Stomach
  - Fumigants

Herbicides are type of pesticides which is used to destroy or prevent the growth of unwanted plants e.g weeds.

Insecticides are type of pesticides which are used to prevent, kill or repeal harmful insects

Ceramics are inorganic, non-metallic solid made up of clay that is shaped and hardened by heating at high temperature. Ceramic have many useful properties like they are extremely hard and show stiffness and bending on force. They are inert, electric insulator and non-corrosive.

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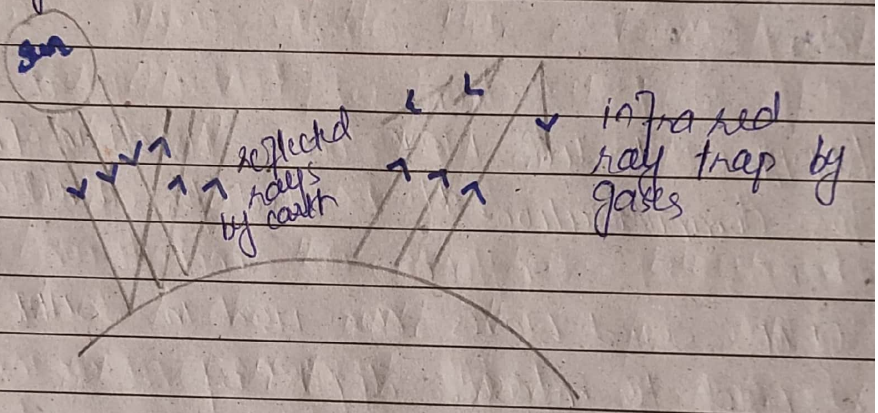
They are used in variety of applications. They are used to build automobile parts. They have biological applications. They are used in manufacturing of parts of space shuttle.

GreenHouse Effect:-

Green house effect is a phenomena in which gases present in atmosphere trap the reflected infrared ray from Earth and cause warming of Earth's atmosphere. This phenomena is very important as it regulate the temperature of Earth, drives water cycle, rise crop and source of heating.



(b)

The bonding in water molecule is hydrogen bonding. Hydrogen bonding is defined as the interaction of hydrogen atom with a lone pair on nearby highly electronegative atom. Water is composed of 2 hydrogen atoms and one oxygen atom. Oxygen atom has two lone electron pairs. These lone elec-

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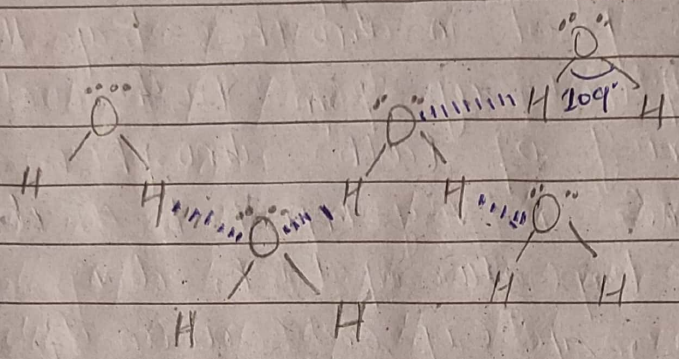
lone pair bond the structure of water molecule - Bond angle in water molecul in 109° - Hydrogen atom in water molecule attract to lone electron pair on oxygen atom and this result into formation of bond between two



Part C :

RADAR : Radio waves are used in RADAR for communication. It is used for surveillance.

SONAR : Sound waves are used in SONAR - It is used to measure depth of sea.

LIDAR : Light waves are used in LIDAR It is used to collect information about object

Mobile Phone : Electromagnetic waves are used mobile phone - It used for instant communication - It has many other applications also

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Thermister : Heat waves are used in thermisters. It is used to measure temperature of various object.

Part d:

ADVANTAGES OF AI:

AI has lots of advantages. Following are some

1) AI has vast application in medical field. It can do surgeries and operation with precision. It can also scan X-rays of patients
2) AI is 24/7 avilable. Human have limitation but AI is free from all kinds of limitation. It can perform any work for entire day and night
3) It has eased the education. Now, everyone has teacher with them for 24 hours. AI Chatbots have vast knowledge in matter of seconds.
4) AI has also made the automatic driving possible. With automatic daiving, many of the human blunders can be avoided.
5) AI performs very crucial role in data analysis and compiling.
6) AI has made the customization of many thing possible
7) AI has made the automation of many tasks possible. Hundreds of workers were

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employed previously for completion of any task- AI has saved lot of money and prevented many risks

DISADVANTAGES:-

There are certain disadvantages of AI

1) Data and Privacy Breach: AI has caused surge in data and privacy breach of personals- This has cause rise in crimes
2) Human displacement: There is a great risk of AI replacing human in future- Many of the tasks will be performed by machines- It will result in unemployment and social divide
3) Surge in production of lethal weapon: AI is used to produce lethal weapons in less time. This has increased the chances of conflicts or annihalition of world
4) Changing in Public opinion: AI is involved in formation of many false news- Many people are involved in creation of fake images through AI for changing public opinion- AI is widely used to alter the election result.

SECTION-II

QUESTION 6:-

(a) Let the length of smaller part is x
so the length of larger part will be $4x$.
Total length is 300 ft

$$x + 4x = 300$$
$$5x = 300$$
$$x = \frac{300}{5}$$
$$x = 60$$

length of larger part is $= 4 \times 60$
$= 240$ ft

Length of smaller part is 60 ft

(b) Let the width of rectangle is x
3 times more than twice the width $= 2x + 3$
Length is $2x + 3$
Perimeter is 20 inches
Perimeter of rectangle is $2(L + W)$

$$20 = 2(L + W)$$
$$10 = L + W$$
$$10 = 2x + 3 + x$$
$$10 - 3 = 3x$$
$$7 = 3x$$
$$x = \frac{7}{3}$$

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length $= 2x+3$

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

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

$= \frac{14+9}{3} \Rightarrow \frac{23}{3}$

length is $\frac{23}{3}$ inches and width is $\frac{7}{3}$ inches

(c)

Percentage of winning is 60%

Percentage of lose is $100-60 = 40\%$

So

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

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

$x = 60$

Total number of matches are 60

(d) Enitial ratio of number x & y is $\frac{x}{y} = \frac{3}{2}$ —(i)

Adding 2 to first and 6 to second modifies ratio to 4:5

$\frac{x+2}{y+6} = \frac{4}{5}$ —(ii)

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Taking (i)

$$x = \frac{3y}{2} \quad -(iii)$$

Put (iii) in (ii)

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

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

$$\frac{3y+4}{2} = \frac{4(y+6)}{5}$$

$$5(3y+4) = 2\times 4(y+6)$$

$$15y + 20 = 8y + 48$$

$$15y - 8y = 48 - 20$$

$$7y = 28$$

$$y = 4$$

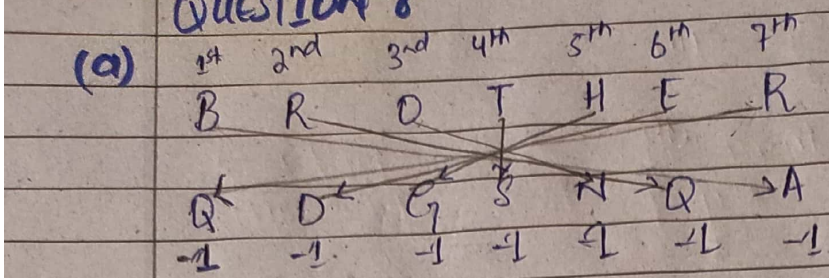
Put $y = 4$ in (iii)

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

Two numbers are 6 & 4

QUESTION 8

(a)



S I S T E R

Q D R H R

1st element of code for BROTHER is obtained by reversing 7th element of BROTHER by one place
2nd element is found by reversing 6th element of BROTHER by -1
3rd element is found by reversing 5th element by -1
4th element by reversing 4th element of BROTHER by -1
5th element by reversing 3rd element of BROTHER by -1
6th by reversing 2nd and 7th by reversing 1st by -1

Same operation is performed in for SISTER

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(b) Sample space is $S = \{1, 2, 3 \cdots 12\}$

(i) Number of elements in sample space are 12

Probability of drawing 8 is $= \frac{1}{12}$

(ii) Even number $= \{2, 4, 6, 8, 10, 12\}$

There are 6 even numbers

Probability of drawing Even number is $= \frac{6^1}{12_2}$

$= \frac{1}{2}$

(iii) Perfect Squares $= \{4, 9\}$ of number in S

Probability of drawing Perfect square $= \frac{2^1}{12_6}$

$= \frac{1}{6}$

(iv) There is no negative number in sample space so Probability of this event is

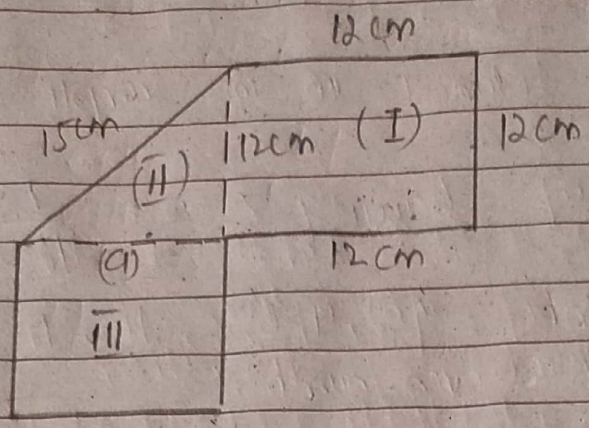
$= \frac{0}{12} \Rightarrow 0$

(v) Set of number less than 13 $\{1, 2, 3 \cdots 12\}$

Probability of number less than 13 is

$\frac{12}{12}$ 1

1



Finding a, apply pythagores theorem

$H^2 = P^2 + B^2$

$15^2 = 12^2 + B^2$

$225 - 144 = B^2$

$\sqrt{81} = \sqrt{B^2}$

$9 = B$

$a = 9$

Area of I which is square

$= 12 \times 12$

$= 144 cm^2$

Area of II which is rectangle

$= \frac{1}{2} \times h \times b$

$= \frac{1}{2} \times 12 \times 9$

$= 54 cm^2$

Area of III which is square

$= 9 \times 9$

$= 81$

Total area of figure is $144 + 54 + 81$

$= 289 cm^2$

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Total perimeter is obtained by summing all sides

$12 + 12 + 12 + 9 + 9 + 9 + 15$

$78\,cm$

(a)

$15 + 15 + 16 + 16 + 16 + 17 + 17 + 18 + 19$

Mean = $\frac{\text{sum of observation}}{\text{number of observation}}$

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

$= 16.5$

Mean is the average of all observation. It is obtained by dividing sum of all observation to number of observation

medium is the middle of all observation It is obtained by arranging data in ascending order & then select middle value

In this case $n = 9$

medium $= \frac{n+1}{2}$

$= \frac{9+1}{2} = 5^{th}$ observation

So 16 is medium

Mode is the observation that most occur in data.

In this case 16 occured most so 16 is mode.

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Range is the subtraction of lower value in data from higher value

Higher value = 19
lower value = 15
Range: 19-15
= 4