CySA # 01
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Q. No. 01

1. b Concave lens
2. c Hydroelectricity
3. a. ATP
4. d None
5. a 17

Q. No. 03

(Ans a)

Atmosphere:

"Atmosphere is defined as the blanket of gases around us."

Various gases around us form the atmosphere. These gases are categorized into two groups some having fixed concentration like N_2 and O_2 and some have variable concentration like ozone, oxides etc.

Five Primary Layers of Earth's Atmosphere:

1. Troposphere
2. Stratosphere
3.
4. Mesosphere
5. Thermosphere
6. Exosphere

These layers are categorized from the bottom to the top.

Characteristics and Composition of Troposphere:

1. Lowest layer of earth's atmosphere
2. It extends upto 12 km
3. Humans live in this sphere aeroplanes fly and weather happens in this layer.
4. Temperature decreases upto -53°C as we go up.

Characteristics and Composition of Stratosphere:

1. Above troposphere lies the stratosphere.
2. Ozone is present in this region.
3. Temperature of this layer decreases and reach upto -03°C.
4. It extends from 12 - 50 km.

Characteristics and Composition of Mesosphere:

1. Above stratosphere lies the mesophere.
2. It extends from 50 - 80 km.
3. Meteors are formed in this sphere
4. It is the coldest sphere where temperature downs to -93°C.

Characteristics and Composition of Thermosphere:

1. It lies above the mesosphere.
2. It extends from 80 km to 120 km.
3. It is the hottest sphere whose temperature rises upto 500°C.
4. Auroras are formed in this sphere.

Characteristics and Composition of Exosphere:

1. It is the outermost layer.
2. It extends from 120 km to undefinished distance.
3. Temperature in this sphere increases from 0°C.
4. It also covers the most part of the atmosphere.

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(Ans 6)

Water cycle:

"In water cycle water evaporates from the surface and form cloud. These clouds cause rain and this water comes again on the surface."

In this water cycle water moves from one phase to another and goes from hydrosphere, atmosphere and lithosphere to carry out the cycle. The cycle has not any starting point and not any ending point.

Various Stages of Water Cycle and their Role:

1. Evaporation
2. Transpiration
3. Condensation
4. Precipitation
5. Infiltration
6. Run off

Evaporation and its Role in Water Cycle:

It is the first and foremost stage in the water cycle in which water from the surface are converted into the vapours and these vapours goes up and form clouds. Water present on the surface are exposed to sunlight which causes it to evaporate.

Transpiration and its Role in maintaining balance of Hydrosphere:

In transpiration water also changes its form, from liquid to vapours from the plant surfaces. In this way water moves from the roots

to the aerial parts of a plant to transpire. Thus, contributing a role in the maintenance of balance of hydrosphere.

Condensation and its Role in Maintaining Balance of Hydrosphere:

Condensation causes the water to convert from vapours to liquid, as the temperature decreases. Therefore, water in the form of liquid comes on the surface and replenish the water reservoirs. In this way, water comes again on the surface maintaing a balance in hydrosphere.

Precipitation and its Role in Maintaining Balance of Hydrosphere:

Precipitation refers to any form of water vapours (mist, fog, hail) that comes on the surface. Hence, the water again comes on the surface, whether from within the soil or from the atmosphere. Therefore, precipitation plays role in maintaining balance of hydrosphere.

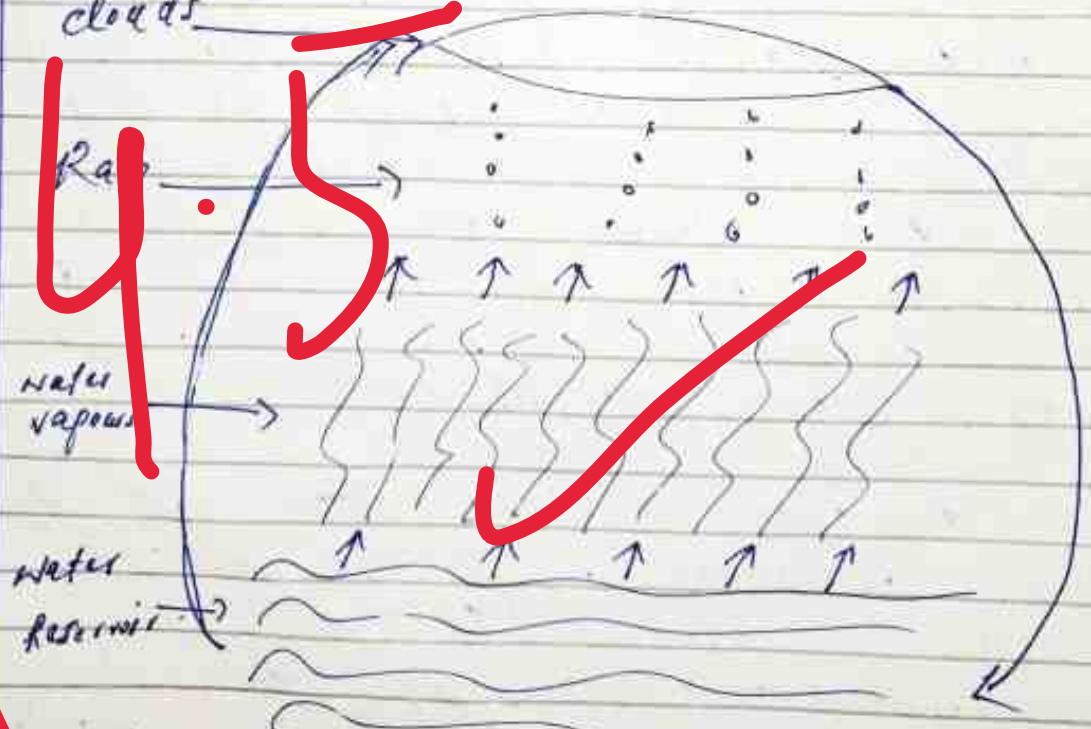
Infiltration and its Role in Maintaining Balance of Hydrosphere:

Infiltration results in the refilling of ground water reservoirs by allowing

water to go deep in soil. This process happens when the soil surface is porous and sandy. In this way the underground reservoirs are refilled thus, maintaining a balance of hydrosphere.

Run off and its Role in Maintaining Balance of Hydrosphere:

Run off refers to horizontal movement of water which causes scars on the surface. During the run-off water translocates itself mostly in the case of downpour or heavy floods. In this way water not only replenish the under drought reservoirs but also cause movement of minerals. These refilled reservoirs again undergo evaporation thus maintaining a balance of hydrosphere.



Water cycle

(Ans c)

Aurora:

An adroia is a natural light display that shimmers in the sky. Different colors like blue, red, yellow, green and orange shift gently and change shape like softly blowing curtains.

Auroras are visible only on night and seems like a band of different colors. Most recently an aurora has seen on the sea shores of Turkiye.

Formation of An Aurora:

An Aurora is formed when the solar winds strikes the magnetic fields of earth. The sun is composed of the different gases made up of electrically charged particles called ions. These ions are continuously streaming from the sun's surface forming the solar winds. When these winds approaches the earth it strikes with the magnetic fields of earth. When this happens a band of different colors are seen forming an adrora.

Types of Auroras:

1. Aurora Borealis
2. Aurora Australis

1. Aurora Borealis:

The bright bands of color around the north Pole caused by the solar winds and the Earth's magnetic field.

It is also called the northern lights and mostly seen at lower altitudes.

2. Aurora Australis:

The bright bands of color around the south Pole caused by the solar winds and the Earth's magnetic field.

It is also called the southern lights and mostly seen at higher altitudes.

Reasons of Auroras Formation:

Auroras are formed because of following reasons:

1. Solar Winds:

Solar winds are the clusters of ions emitted from the sun. These winds causes the aurorous to happen.

2. Earth's Magnetic field:

When the solar winds strike the earth's magnetic field. This causes the auroras to happen.

3. Atmospheric Interaction:

At the poles solar winds collide with atmospheric gases like oxygen, nitrogen and helium thus producing different bands of colors.

(Ans d)

Hydrosphere:

The sum total of all the water present above and below the earth called hydrosphere.

It includes water whether on the surface, in the ground or present in the air. Surface water includes rivers, oceans, lakes underground includes reservoirs under earth's crust and in the air — in the form of clouds.

Role of Ground water in the Hydrosphere:

Ground water is playing an important role in the hydrosphere by performing some functions:

1. Ground water acts as storage and supply:

Ground water is a significant fresh water reservoir and it accounts only one percent of the total reservoir. The fresh water apart from the storage also serve for different uses.

2. Recharge and Maintenance of flow:

Ground water recharges the surface water and maintains its flow and levels. Recharging of surface water forms the basis of the hydrosphere.

Importance of Ground Water in Hydrosphere:

1. Support Ecosystem:

Ground water serves as a habitat for the marine ecosystem, thus supporting the marine life.

2. Drought Mitigation:

Ground water is helpful in the mitigation the negative effects of drought. Because of hot weather and delay in the start of rain drought occurs whose negative effects are mitigated by ground water.

Challenges in the Management of Ground Water:

1. Contamination of Water Bodies:

Water bodies are contaminated by the industrial, agricultural and waste disposal waste. Causing a threat not only to marine life but also for human.

2. Over-Extraction:

Ground water is in danger due to the over-extraction. Most of the ground water is extracted for the agricultural purposes causing a threat for its over-extraction.

Strategies for Sustainable Use of Ground Water:

1. Water Conservation:

Water conservation is an effe-

ctive strategy for the sustainable use of ground water. Water is conserved by implementing efficient irrigation system and reducing waste.

3. Water Recycling and Reuse:

For the sustainable use of water recycling and reuse is an effective strategy. It includes treating and re-using waste water for non-potable purposes.

Good answers

Q. NO. 04

(Ans a)

Data Given:

Sum of ages of wood and bronze plague = 20 years

four years ago bronze plague = 1/2 age of wood plague.

To Find:

percentage age of each plague.?

Calculation:

Let,

Current age of Wood Plague = W

" " Bronze plague = B

Sum of their ages: W + B = 20 years ... (i)

Four years ago

B − 4 = (1/2)(W − 4) ... (ii)

B = (1/2)W − 4 + 4

B = 1/2 W ... (iii)

Add it into 4 - (i)

W + B = 20 years

W + 1/2 W = 20

(2W + W)/2 = 20

3W = 40

W = 40/3

Percentage age of W = 40/3 × 100

and

Put value of W in eq. (i)

40/3 + B = 20

(40 + 3B)/3 = 20

40 + 3B = 60

3B = 60 − 40

3B = 20

B = 20/3

Percentage of B = 20/3 × 100

3.5

Simplify the equations and write the final answers in the form of statements

(Ans b)

Given Data:

no. of students appeared = 300

Got first division students = 28%

" 2nd division students = 54%

To Find:

No. of passed students = ?

Calculations:

First division students = 28% of 30

= 28/100 × 30 = 8

Second division students = 54% of 30

= 54/100 × 30

= 16

Total students getting first and second division = 8 + 16 = 24

Since no students failed

30 − 24 = 6

So,

16 students just passed

(Ans c)

Types of Questions in Problem Solving Reasoning:

1. Logical Reasoning
2. Analytical Reasoning
3. Evaluative Reasoning.

(Ans d)

Given Data:

No. of tests = 5

Percentage of each test = Given

To Find:

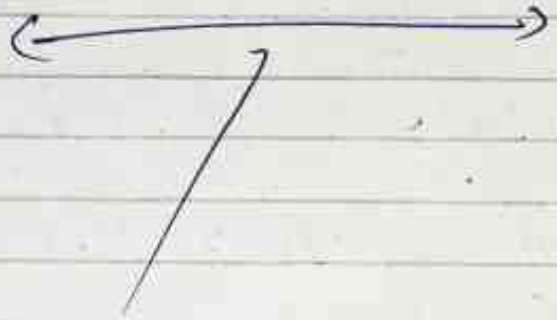
Probability of students getting more than 70% marks = ?

Probability = $\frac{\text{Possible outcomes}}{\text{Total outcomes}}$

$= 3/5 = 0.6$

So,

Probability of students getting more than 70% marks = 0.6



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PART – II

Attempt any ONE of the following Questions from General Science. The question of General Ability is mandatory to attempt.

Q. No. 2

a. Discuss the prevailing theories about the origin of the universe, elaborating on the Big Bang theory, the cosmic inflation model, and their respective evidence supporting the evolution of the universe.

b. Describe the formation of galaxies within the universe. Describe the various types of galaxies, including spiral, elliptical, and irregular, outlining their distinct features.

c. Analyze the impact of electronic waste on land pollution. What are some effective ways to manage and recycle e-waste sustainably?

d. What is remote sensing? How does it contribute to the study of climate change?

Q. No. 3

a. What are the five primary layers of the Earth's atmosphere? Describe the characteristics and composition of each layer.

b. Explain the water cycle, detailing its various stages and the role of each stage in maintaining the balance of the hydrosphere.

c. How are Auroras formed? Describe their different types and reasons of formation?

d. Analyze the role of groundwater in the hydrosphere. Discuss its importance, challenges in its management, and strategies for sustainable use.

Q. No. 4

a. The sum of the ages of a wood plaque and a bronze plaque is 20 years. Four years ago, the bronze plaque was one-half the age of the wood plaque. Find the present age of each plaque.

b. In an examination, 300 students appeared. Out of these students; 28 % got first division, 54 % got second division and the remaining just passed. Assuming that no student failed; find the number of students who just passed.

c. Discuss various Types of question in Problem Solving Reasoning.

d. The percentage of marks obtained by a student in the monthly tests are given below:

Test	1	2	3	4	5
Percentage of marks obtained	69	71	73	68	74

Based on the above table, find the probability of students getting more than 70% marks in a test.