

Mehak Sabin

32590 - 59

Answer sheet

General Science

& Ability

Mock-Test 1

PART II

SECTION - I

ANSWER # 2 (A) :

Climate

Climate specifically refers to

- The long-term average atmospheric conditions in a particular region or globally.
- The patterns of temperature, humidity, wind, precipitation, and other meteorological factors.

In other words, climate is a subset of the environment, focusing on the atmospheric conditions that shape our weather and ecosystems.

Environment.

Environment refers to the external surroundings in which living organisms exist, including:

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- Natural elements like air, water, soil, and ecosystems.
- Living things like plants, animals and microorganisms.
- Human-made elements like buildings, infrastructure, and technology.

In other words, the environment encompasses everything that surrounds us, from the natural world to human-created systems and structures.

Causes of air pollution in Pakistan

1. Combustion or burning of fossil fuels:

Fossil fuels are the non-renewable resources; once exploited exhausts forever. Fossil fuels include oil, diesel, coal and natural gases. Burning of these fossil fuels results in emissi.

(3)

Sulphur dioxide, carbon dioxide and carbon monoxide in the atmosphere.

Inter-governmental panel on climate change stated the percentage of global emission by each sector which are;

Energy sector : 35%.

Agricultural sector : 25%.

Industrial sector : 21%.

Transport sector : 15%.

2. Massive Deforestation

As per global forest watch more than 10 million hectares have been deforested in the world due to human activities in last 4 years. Making fuel, furniture, paper making are one of the reasons of cutting down the trees so fast. Forests and plants are also called carbon sinks which means they absorb carbon dioxide (CO_2) and carbon monoxide.

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(CO) produced in the air.

Deforestation results in the decline of carbon sinks and increasing sources of emission of carbon dioxide (CO_2) and carbon monoxide (CO) produced in the air, resulting in an imbalance in the carbon level of atmosphere. Recently National oceanic and atmospheric administration (NOAA) quoted the release of carbon dioxide gas that is 424 parts per million which was 420 parts per million during last years.

3. Rapid Urbanization:

Urbanization is the process of increasing number of people in the cities. Whenever urbanization takes place, the city size expands and it also witnesses infrastructural development.

According to population from 54 urbanized infrastructure making flyovers, houses, construction, atmosphere, cities

4. POP
US
stat

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According to a UN report, 60% of population urbanized increased from 54%. The massive urbanization which includes infrastructural development; making of roads, bridges flyovers, underpasses and housings boosts up the construction industry resulting in atmospheric pollution, moreover cities are the power centres of solid waste generation.

4. Population Explosion :

US census Bureau international database stated the abrupt increase in global population. 1960 : 3 Billion
2000 : 6 Billion, 2022 : 8 Billion
Today more than 8 Billion. It is estimated that it would be increased to 9 Billion in the coming 8-9 years.

Population explosion is one of the main reason of atmospheric

(6)

Pollution. As number of population increases, human activities also increased resulting in increase production, deforestation, solid waste, urbanization transportation and industrialization ultimately add pollutants and hazardous gases into the atmosphere.

ANSWER # 2(b) :

Vitamins

Vitamins are organic compounds which are essential for the growth of the body. They are required in small amount of various bodily functions, such as:

- o) Energy production
- o) Immune function
- o) Growth and development
- o) Cell repair and maintenance
- o) Regulation of metabolism.

Along with their many functions, they enhance the body's use of carbohydrates, proteins, minerals and fats.

Types

There are two main types of vitamins i.e Fat soluble vitamins and water soluble vitamins.

Fat Soluble Vitamins

These are those vitamins which can only be soluble in fats. These vitamins can be stored in the body specially in liver. For example, Vitamin A, D, E and K. Fat containing these vitamins are broken down by bile, a liquid released by the liver and the body then absorbs the breakdown products and vitamins. Excess amounts of fat-soluble vitamins are stored in the body's fat, liver and kidneys. Because the vitamins can be stored in the body, they do not need to be consumed every day to meet the body's needs.

Water Soluble Vitamins

These are those vitamins which can only be soluble in water. These vitamins cannot be stored in

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in the body. For example, Vitamin B and C. Vitamin B is composed of eight vitamins, but they are grouped together as vitamin B complex. The B-complex vitamins are B1 (Thiamine) B2 (Riboflavin), B3 (Niacin), B5 (Pantothenic acid), B6 (Pyridoxine) B7 (Biotin), B9 (Folic acid) and B12 (Cyanocobalamin). These cannot be stored and rapidly leave the body in urine if taken in greater quantities than the body can use. Foods that cannot contain water-soluble vitamins need to be eaten daily to replenish the body's need.

ANSWER # 2(L) :

Introduction

COP stands for conference of parties. COP is an international climate meeting held each year by the United Nations. The conference of the parties is the supreme body of the United Nations Framework Convention on climate change (UNFCCC).

The conference of parties assesses the progress in dealing with climate change and negotiates the Kyoto Protocol to establish legally binding obligations for developed countries to reduce their greenhouse gas emissions.

Comparing goals of COP-27 and COP-28.

COP-27

The 27th conference of parties to

The United Nations Framework Convention on climate change, was held from 6 to 20 November 2022 in Sharm El-Sheikh, Egypt. The goals of COP 27 include,

-) Establishing a dedicated fund for loss and damage for vulnerable countries hit hard by floods, droughts and other climate disasters.
-) Maintaining a clear intention to keep 1.5°C within reach. The UN's Intergovernmental Panel on climate change states limiting warming to around 1.5°C requires global greenhouse gas emissions to peak before 2025 at the latest, and be reduced by 43% by 2030.
-) Making sectors, businesses and institutions accountable to the promises and commitments made by them.
-) Mobilizing more financial support

for developing countries to combat climate change and to yield the desired results.

-) Making the pivot towards implementation. All the climate pledges should be turned into concrete action.

COP-28

The 28th conference of parties to the United Nations Framework Convention on climate change was held from 30 November to 13 December of 2023.

The goals of COP-28 are as follows.

-) The first ever Global Stock Take called for a "transition away" from fossil fuels.
-) Triple the global capacity of renewable energy and double the annual rate of

energy efficiency improvements before 2030.

-) Significantly curb non- CO_2 emissions, with a particular focus on reaching near-zero global methane emissions by 2030.
-) Phase out inefficient subsidies for fossil fuels that do not ~~se~~ address energy poverty or facilitate just transitions as soon as feasible.
-) Enhancing resilience to water-related disasters, embedding climate positive approaches in food and water production and use, and ensuring climate-resilient health services.

Conclusion.

In summary, both conferences aimed to address climate change, but COP-27 focused more on establishing

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a fund for loss and damage, while COP28 emphasized transitioning away from fossil fuels and increasing renewable energy capacity. COP-28 built upon the outcomes of COP-27 with a greater emphasis on implementation and action.

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ANSWER # 2(d)

Active Sensors and their Usage in G.I.S :-

Definition :-

An active sensor is a device that sends out a pulse of energy and detects the changes in the return signal. Active sensors have their own source of light or illumination. Active sensors add energy to the measurement environment as the part of the measurement process.

Usage in G.I.S :-

Active sensors in GIS are used for various applications, including:

1. Remote Sensing : Active sensors like radar and lidar are used for remote sensing applications, such as land cover classification,

Crop monitoring and disaster management.

2) Topographic Mapping: Active sensors like lidar are used for topographic mapping, creating high-resolution digital elevation models (DEMs).

3) Feature Extraction: Active sensors are used for feature extraction, such as extracting building footprints, road networks, and other spatial features.

Passive Sensors and their Usage in GIS :-

Definition:

Passive sensors are devices that detect energy emitted or reflected from an object, and include different types of radiometers and spectrometers.

They do not add energy as part of the measurement process, but may remove energy in their operation.

Usage in GIS :

Some usage of passive sensors in GIS includes :

- 1) **Multispectral and Hyperspectral imaging** : Passive sensors like multispectral and hyperspectral sensors are used to collect data in various spectral bands, enabling analysis of vegetation health, soil moisture, and land cover classification.
- 2) **Thermal Imaging** : Thermal passive sensors are used to measure temperature, useful for applications like urban heat, island analysis, heat stress monitoring, and environmental monitoring.

3) Satellite Imagery : Passive sensors on satellites like Landsat, Sentinel-2, and MODIS provide valuable data for GIS applications like land cover classifications, crop monitoring and disaster management.

4) Aerial Photography : Passive sensors in aerial photography are used for high-resolution imagery, useful for applications like urban planning, infrastructure planning, monitoring and environmental assessments.

Thus Active and passive sensors provide valuable data for various GIS applications, enabling researchers and analyst to extract meaningful insights from spatial data.

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ANSWER # 5 (a):

Cyclones

Definition :

Cyclones are large systems of circulating wind that rotate around a centre of low atmospheric pressure, with characteristics including a low-pressure centre, rotating winds, counterclockwise rotation, and association with rain or snow.

Formation of Cyclone :

Cyclones are formed through the following steps.

- 1) **Preconditions :** A preexisting atmospheric circulation must be located near the surface warm layer. The atmosphere must cool quickly enough with height to support the formation of deep convective clouds. The middle

atmosphere must be relatively humid at a height of about 5,000 meters (16,000 feet) above the surface. The developing system must be at least 500 kilometers (300 miles) away from the equator. The wind speed must change slowly with height through the troposphere.

- 2) **Formation:** The fuel for a tropical cyclone is provided by a transfer of water vapor and heat from the warm ocean to overlying air, primarily by evaporation from the sea surface. As the warm, moist air rises, it expands and cools, quickly becoming saturated and releasing latent heat through the condensation of water vapor. The column of air in the core of the developing disturbance is warmed and moistened by this process.

3) **Intensification**: The dynamics of a storm being cooler than its core, so it is necessary that of a tropical cyclone rely on the exterior of a storm being cooler than its core, so it is necessary that the temperature of the atmosphere drop sufficiently rapidly with height. The warm, saturated air rising in the centre of the circulation tends to keep rising as long as surrounding air is cooler and heavier. The vertical movement allows deep convective clouds to develop. The rising air in the core also draws in some air from the surrounding atmosphere at altitudes of around 5,000 meters (16,000 feet). If this external air is relatively humid, the circulation will continue to intensify.

4) **Dissipation**: Tropical cyclones dissipate when they can no longer extract

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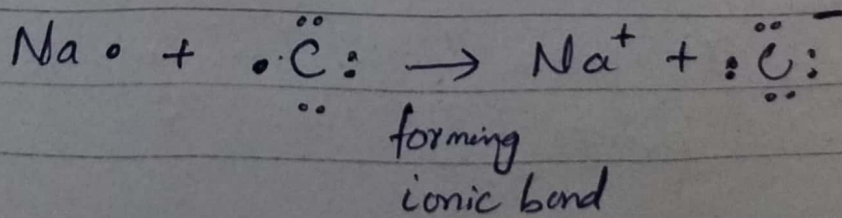
Sufficient energy from warm ocean water. A tropical cyclone that remains over the ocean and moves into higher latitudes will change its structure and become extratropical as it encounters cooler water.

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ANSWER # 5 (b) :-

Differentiate Ionic and Covalent bond

Ionic Bond

Ionic Bonding involves a transfer of an electron, so one atom gains an electron while one atom loses an electron. One of the resulting ions carries a negative charge (anion) and the other ion carries a positive charge (cation). Because opposite charges attract, the atoms bond together to form a molecule.



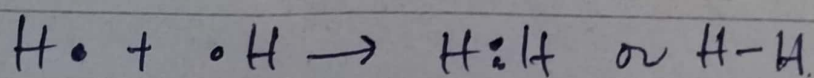
In the above example, sodium contributes electron, leaving it with a closed shell, while chlorine gains that electron forming ionic bond.

-) Ionic bond also known as electrovalent bond formed from electrostatic attraction between oppositely charged ions in a chemical compound.
-) These kinds of bonds occur mainly between a metallic and non-metallic atom.
-) Ionic bond have high melting point.
-) It has high polarity.
-) It has no definite shape.
-) It has high boiling point.
-) It is in solid state at room temperature.
-) It has a brittle consistency.

-) Typical of ionic bonds are those in the alkali halides such as sodium chloride, NaCl.

Covalent Bond.

Covalent chemical bonds involve the sharing of a pair of valence electrons by two atoms in contrast to the transfer of electron in ionic bonds.



Hydrogen gas forms the simplest covalent bond in the diatomic hydrogen molecule.

-) In contrary to ionic bonds, covalent bonds formed between two non-metals that have similar electronegativities. Neither atom is strong enough to attract electrons from the other so they share their electrons from outer

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molecular orbit with
others.

-) Unlike ionic bond,
covalent bond have
- High low melting
point.
 - low polarity
 - in liquid or gaseous
state at room temperature
 - have soft consistency.

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SECTION - II

ANSWER # 6(a)

Given :

$$\text{Radius } (r) = 8\text{cm}$$

$$\text{Height } (h) = 15\text{cm}$$

Required :

$$\text{Volume} = ?$$

Formula :

$$\text{Volume} = \pi r^2 h$$

Solution :

Putting the given values in the formula, we get :

$$\begin{aligned}\text{Volume} &= (3.142) (8)^2 (15) \\ &= (3.142) (64) (15) \\ &= (3.142) (960) \\ \text{Volume} &= 3014.4 \text{ cm}^3\end{aligned}$$

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Hence, the volume of
cylinder is 3014.4
cubic centimeters.

ANSWER # 6(b):

The angle of each side
of a regular octagon
can be found by using
the formula.

$$\text{Angle} = 360/8$$

$$\text{Angle} = 45 \text{ degrees.}$$

This is the exterior angle. To
find the interior angle,
subtract the exterior angle
from 180.

$$\text{Interior Angle} = 180 - 45$$

$$\text{Interior angle} = 135 \text{ degrees.}$$

So each side of the regular
octagonal shape of
Al Aqsa mosque and
dome in Israel

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has an exterior angle of 45 degrees and interior angle of 135 degrees.

ANSWER # 6(C)

Given :

Maximum length of Dal
Lake = 4.6 mile

Maximum width of Dal
Lake = 2.2 mile.

Required :

Surface Area of Dal Lake = ?

Formula :

To find the surface of the
Lake, we will use the formula
for the area of a rectangle

$$\text{Area} = \text{Length} \times \text{Width}.$$

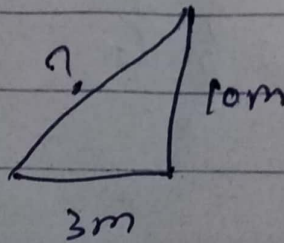
Solution :

$$\text{Area} = 4.6 \times 2.2$$

$$\text{Area} = 10.12$$

Hence the surface area of Dal Lake is 10.12 square miles.

ANSWER # 6(d) :



Given :

length of house = 10m
(height)

Distance from the house (Base) = 3m

Required :

length of the ladder = ?
(Hypotenous)

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Formula :

$$(\text{Hypotenous})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$$

$$x^2 = (3)^2 + (10)^2$$

$$x^2 = 9 + 100$$

$$x^2 = 109$$

Taking $\sqrt{\quad}$ on b/s.

$$\sqrt{x^2} = \sqrt{109}$$

$$\sqrt{109}$$

$$x = \sqrt{100+9}$$

$$= \sqrt{(10)^2 + (9)^2}$$

$$= \sqrt{(100+9)}$$

$$x = 10.44 \text{ m}$$

Hence the length of the ladder is approximately
10.44m -