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Batch:- OB-060

Mock exam:- General Science and
ability.

Section:- 1

Q2(a) Differentiate between climate and Environment? What are causes of air pollution in Pakistan?

Climate:- Climate refers to the long-term pattern and trends in temperature, precipitations and other atmospheric conditions in a specific region or globally. It encompasses factors like temperature, humidity, wind patterns, and other climatic variables.

Environment:- Environment refers to the surrounding conditions or surroundings in which living organisms and non-living organisms coexist. This includes the air, water, land and the interactions between living organisms and their surroundings.

Causes of air pollution in Pakistan:-

Following are the causes of air pollution:-

Burning of fossil fuels:-

The combustion of fossil fuels emits a large amount of sulphur dioxide. Carbon monoxide released by incomplete combustion of fossil fuels also result in air pollution.

Automobiles:-

The gases emitted from vehicles pollute the environment. These are major sources of greenhouse gases and also result in diseases among individuals.

Agricultural activities:-

Ammonia is one of the hazardous gases emitted during agricultural activities. The insecticides, fertilizers emit harmful chemicals in atmosphere and contaminate it.

Factories and Industries:-

Factories and industries are main source of carbon monoxide, organic compounds, hydrocarbons and chemicals. These are released into air, and degrade quality of air.

Mining activities:-

In mining process minerals below the earth are extracted using large pieces of equipment. The dust and chemicals released during the process pollute the air.

(b) Write note on vitamins and their role in human body.

Vitamins are essential organic compounds that are required by human body in small amounts to maintain good health. They play crucial roles in various physiological processes and support overall well-being. There are 13 essential vitamins classified as water soluble

and fat soluble.

Each vitamin has specific function in the body such as supporting the immune system, aiding in metabolism, promoting health vision, maintaining strong bones and act as antioxidants to protect cells from damage.

Vitamin C is important for collagen production and immune function, while vitamin D is essential for bone health and calcium absorption.

A deficiency or excess of any vitamin can lead to various health problems. Therefore it is important to consume a balanced diet that include variety of vitamin-rich foods.

(c) Compare goal of Cop-27 and Cop-28 on climate change.

The goal of Cop-27 and Cop-28 on climate change would likely be similar, focusing on enhancing and implementing the commitments made under

Paris Agreement to reduce greenhouse gas emissions and limit global warming to well below 2°C above pre-industrial levels. Both conferences would also aim to address issues such as adaptation, financing, and technology transfer to support developing countries in their efforts to combat climate change. The specific priorities and targets for each Cop may vary based on the progress made since the previous conference and emerging challenges in global climate landscape.

(d) What are Active and Passive sensors. How they are used in G.I.S?

Active sensors emit energy such as radar or LIDAR and measure the reflection or return of that energy to gather information.

Passive sensors do not emit energy but rely on detecting natural source of energy such as sunlight or thermal radiation.

In GIS active sensors like LiDAR (Light detection and ranging) are used to collect high-resolution elevation data and create detailed terrain models. Radar sensors are also commonly used in remote sensing applications to capture information about Earth's surface by measuring the reflection of radar waves.

Passive sensors such as optical sensors like cameras or satellite-based sensors are widely used in GIS for capturing imagery, detecting land cover. These sensors provide valuable information for mapping and analyzing spatial data in GIS application.

Q5(a) How cyclones are formed?

Cyclones are formed through a complex process involving several key factors such as warm ocean water, atmospheric instability and Earth's rotation.

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Warm ocean water:-

Cyclones are formed over warm tropical ocean waters where the surface temperature is around 26.5 degree Celsius. The warm water provides the heat and moisture needed to fuel the storm.

Atmospheric instability:-

As the warm & moist air rises from ocean surface it cools and condenses, forming clouds and releasing latent heat energy. This process creates an area of low pressure at the surface and helps to further intensify the storm.

Earth's rotation:-

The Earth's rotation causes the air to spin in a cyclonic or counterclockwise direction in the Northern hemisphere and a clockwise direction in Southern hemisphere. This spinning motion is known as Coriolis effect.

As the storm continues to intensify and organize it may eventually be classified as tropical depression, tropical storm or hurricane, depending on its wind speed. Cyclones can pose a significant threat to coastal areas due to their destructive winds, heavy rainfall.

(b) Differentiate between Ionic and Covalent bond.

Ionic bond
Ionic bonds form when electrons are transferred from one atom to another resulting in the formation of positively and negatively charged ions that are attracted to each other due to their opposite charges.

Ionic bonds are typically formed between metals and non-metals.

Covalent bond
Covalent bond form when atoms share electrons to achieve a more stable electron configuration.

Covalent bonds are formed between non-metals.

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Ionic bonds tend to have higher melting and boiling points.

Covalent bonds have low melting and boiling points.

Ionic bonds are stronger than covalent bonds.

Covalent bonds are weaker.

Ionic bonds are ~~liquid~~ ~~gas~~ solid at room temperature.

Covalent bonds are ~~solid~~ ^{liquid} ^{gas} at room temperature.

Ionic bonds have high ~~low~~ polarity.

Covalent bonds have ~~high~~ ^{low} polarity.

Ionic bonds are brittle.

Covalent bonds are soft.

(c) Give uses of Gamma rays, X-rays and radio waves.

Gamma rays:-

Gamma rays are used in cancer treatment, imaging of object in space, sterilization of medical equipment and food preservation.

X-rays:-

X-rays are used in medical imaging for detecting bone fractures, dental exams, security screening at airports and industrial inspection.

Radio waves:-

Radio waves used in communication systems such as radio, television, mobile phones, Wi-Fi, radar systems and satellite communication.

(d) What are tides. Write note on L.F.D.

Tides are the rise and fall of sea levels caused by the gravitational forces exerted by the moon and the sun on the earth. The gravitational pull of the moon is predominantly responsible for the tides, as it is closer to earth compared to the sun.

L.E.D stands for Light Emitting Diode. It is semiconductor device that emits light when an electric current passes through it. LEDs are known for their energy efficiency, durability and small size, making them popular for wide range of applications such as lighting, displays and indicators. LEDs are commonly used in electronics, signage and automotive lighting.

Section - II

Q(6) (a) Radius of cylinder is 8cm and height is 15cm. Find its volume.

Given:-

$$\text{Radius} = 8\text{cm}$$

$$\text{Height} = 15\text{cm}$$

To find:-

Volume of cylinder.

Formula:-

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

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Solution:-

$$\begin{aligned}V &= \bar{\pi} \times 8^2 \times 15 \\ &= \bar{\pi} \times 64 \times 15 \\ &= \boxed{960\bar{\pi} \text{ cm}^3}\end{aligned}$$

(b) Al Aqsa Mosque in Jerusalem, Israel has a dome of rock in regular octagonal shape. What will be the angle of each side.

In regular octagon, the interior angles are all equal. To find measure of each interior angle in regular octagon we use formula.

Interior angle = $(180 \times (n-2)) / n$
where n is the number of sides of polygon, which in this case is 8 of an octagon.

$$\begin{aligned}\text{Interior angle} &= (180 \times (8-2)) / 8 \\ &= (180 \times 6) / 8 \\ &= 1080 / 8 \\ &= \boxed{135 \text{ degree}}\end{aligned}$$

(c) Maximum length and depth of Dal Lake in Srinagar is 4.6 mile and maximum width is 2.2 mile. Find surface area.

Given :-

$$\begin{aligned} \text{Length} &= 4.6 \text{ miles} \\ \text{Width} &= 2.2 \text{ miles} \end{aligned}$$

To find :-

Surface area = ?

Formula :-

$$\text{Surface area} = L \times W$$

Solution :-

$$\text{Surface} = L \times W$$

$$\text{area} = 4.6 \text{ miles} \times 2.2 \text{ miles}$$

$$= \boxed{10.12 \text{ square miles}}$$

(d) A ladder is leaning against the side of a 10m tall house. If the base of ladder is 3m away from house how tall ladder.

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To find height of a ladder
we use pythagorean theorem.

According to pythagorean
theorem :-

$$h^2 = 10^2 - 3^2$$

$$h^2 = 100 - 9$$

$$\sqrt{h^2} = \sqrt{91}$$

$$h = \boxed{9.54 \text{ meters}}$$

Height of ladder is 9.54 meters.

Q(18) (a) Write the formula of I.Q.
What are factors which
can affect I.Q?

$$I.Q = (\text{Mental age} / \text{chronological age}) \times 100$$

Factors that can affect
I.Q include genetics, environment,
education, nutrition, socio-economic
status and childhood experiences.

(b) Find the number of triangles
in the below equilateral
triangle.

To find the number of triangles in an equilateral triangle, we can apply the triangle number formula.

$$\text{Total triangles} = n(n+1)/2$$

In an equilateral triangle the number of rows is 3.

$$\begin{aligned} \text{Total triangles} &= 3(3+1)/2 \\ &= 3 \times 4/2 \\ &= 12/2 \\ &= 6 \end{aligned}$$

Therefore equilateral triangle contains 6 triangles.

(c) A letter is chosen at random from the word superintendent. What is probability the word is vowel.

In this word superintendent there are 4 vowels (u, e, i, e) and 10 consonants.

Total number of letter is 14.

Number of favourable outcomes = 4
Total number of outcomes = 14

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$$

$$= \frac{4}{14}$$

$$= \frac{2}{7}$$

(d) Distribute Rs 4320 among Zain, Aslam and Ashraf in such a way that if Zain gets 2 parts then Aslam gets three parts and Ashraf get 7 parts.

To distribute Rs 4320 among Zain, Aslam and Ashraf in ratio of 2:3:7

$$2+3+7=12$$

Now, we find value of each part

$$\text{Total amount} = \text{Rs } 4320$$

$$\text{value of each part} = \frac{\text{Total amount}}{\text{Total number of parts}}$$

$$= \frac{4320}{12}$$

$$= 360$$

Now distribute amount according to ratio:

Zain : 2 parts

$$\text{Amount of Zain} = 2 \text{ part} \times \text{Rs } 360 = \text{Rs } 720$$

Aslam : 3 parts

$$\text{Amount of Aslam} = 3 \text{ parts} \times \text{Rs } 360 = \text{Rs } 1080$$

Ashraf : 7 parts

$$\text{Amount of Ashraf} = 7 \text{ parts} \times \text{Rs } 360 = \text{Rs } 2520$$

Therefore Zain will get Rs 720, Aslam will get Rs 1080 and Ashraf will get Rs 2520.