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Subject: GSA
Mock # 3

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PART-II (SECTION - I)

(Q-No 3)

(a)

Atoms form chemical bonds because they want to be stable. By sharing or exchanging electrons, atoms achieve a full outer shell, making them more stable and content. This bond helps atoms feel complete and balanced state just by finding the perfect group. Let's consider an example:

Sodium has one electron in its outer shell, while Chlorine has seven electrons in its outer shell. They bond together by Sodium giving its electron to Chlorine, forming a stable bond where both atoms have full outer shells. This sharing or transfer of electrons helps the atoms achieve stability and form a chemical bond.

In a water molecule, the covalent bond between the oxygen atom and hydrogen atom is very strong where they share electrons to feel stable and happy. The oxygen atom shares one electron with each hydrogen atom, creating covalent bond. This sharing of electrons

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allows all atoms to achieve a full outer shell, making the water molecule stable and balanced. This covalent bond holds the water molecule together, forming a unique and essential compound for life.

(b)

Doping in the context of electronics refers to the intentional addition of impurities to a semiconductor material to modify its electrical properties. This process is crucial in creating specific types of conductors or semiconductors, essential for the functionality of electronic devices like transistors and diodes. By doping semiconductors, engineers can tailor the conductivity and other characteristics of the material to suit the desired application, enabling the precise control of electric current flow within electronic circuits. An example of doping is: adding specific impurities like phosphorus or boron to a semiconductor material such as silicon. This process alters the semiconductor's conductivity properties, making it either a better insulator (p-type doping), which is essential for creating different types of

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electronic components.

There are different type of ceramics, each serving unique purposes.

1. Traditional Ceramics:

Traditional ceramics are typically made from naturally occurring raw materials like clay, silica, and feldspar. These ceramics include pottery, porcelain and tiles.

They are shaped and fired at high temperature to create dishes, vases and bricks.

2. Advanced Ceramics:

Advanced ceramics make technical applications due to their exception properties. They are often composed of non-metallic inorganic compounds like oxides, carbides, and nitrides. They are used in electronics, aerospace, and automotive industries.

3. Refractory Ceramics:

Refractory ceramics have high temperature and harsh environments. They are used in kiln,

(4)

furnaces, and industrial processes where traditional materials would melt or degrade. It provides thermal insulation and chemical resistance in applications such as metal casting, glass making, and incineration.

4. Bioceramics:

Bioceramics are material used in medical and dental applications. They can be found in implants, prosthetics and dental crown due to their biocompatibility and ability to integrate with human body. It mimics the structure of natural bone, promoting healing and tissue growth.

(c)

Global Warming:

Global means something that affects the whole world or relates to the entire Earth. So, when we talk about global warming, we mean the warming of the entire planet due to human activities that release greenhouse gases into the atmosphere.

Some of merits and Demerits of Global warming are given below:

Merits of Global Warming

1. **Longer Growing Seasons:** Global warming can lead to longer periods of suitable weather for crops to grow, potentially increasing agricultural yields.
2. **Increased Agriculture Productivity:** In some regions, warmer temperatures and extended growing seasons can boost agricultural productivity and allow for the cultivation of new crops.
3. **Expanded Access to Natural Resources:** Melting ice in regions like Arctic can provide easier access to natural resources such as oil and gas, opening up new economic opportunities.

Demerits of Global Warming

1. **Rising Sea Levels:** Global warming contributes to the melting of glaciers and ice caps, leading to rising sea levels that pose a threat to coastal areas and ecosystem.

2. More Frequent Natural Disasters:

Warmer temperatures can fuel more intense hurricanes, wild fires, and other natural disasters, increasing the risk to human lives and property.

3. Disruption of Ecosystems and Biodiversity:

Changes in climate patterns can disrupt ecosystems, threaten species with extinction, and alter the balance of natural habitats.

4. Adverse Impacts on Human Health:

Heatwaves, the spread of disease, and other health risks are exacerbated by global warming, affecting human well-being and public health.

(d)

Polio: Polio is a viral infection that can cause paralysis and, in severe cases, can be life-threatening. It mainly affects young children and is transmitted through contaminated food, water, or contact with an infected person. Vaccination programs have been crucial in reducing the spread of polio globally. Its symptoms are fever, fatigue, headache, vomiting,

stiffness in the neck, and pain in the limbs.

Pakistan is facing multiple challenges in eradication of polio from the country. Some of the challenges are written below:

1. **Access to Remote Areas:** Difficulty in reaching remote or conflict-affected regions hinders vaccination efforts.
2. **Vaccine Hesitancy:** Misinformation and misconceptions about vaccines lead to reluctance among some communities to vaccinate their children.
3. **Healthcare Infrastructure:** Inadequate healthcare facilities and resources pose challenges in delivering vaccination campaigns effectively.
4. **Reaching All Children:** Ensuring all children receive vaccines is challenging due to logistical issues and reaching marginalized populations.

Efforts to address these challenges require collaboration among government

agencies, health care workers, and communities to achieve successful polio eradication in Pakistan.

Q. No. 4 (a)

Bile : The liver juice, also known as 'Bile', is liver's essential secretion for digestion. Bile, a greenish-yellow fluid produced by the liver and stored in the gallbladder, plays a pivotal role in the breakdown and absorption of fats in the digestive process. When dietary fats enter the small intestine, bile is released to emulsify these fats, breaking them down into smaller particles to facilitate the absorption by the body. This process is crucial for optimal nutrient absorption and overall digestive efficiency.

Bile acts as a key player in ensuring the smooth digestion of fats, highlighting its indispensable function in the digestive system.

(b)

Role of kidney in excretion : The kidneys

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are pivotal organs responsible for the filtration of waste products and excess fluids from the bloodstream, leading to the formation of urine. This filtration process is essential for maintaining the body's internal environment in balance, known as homeostasis.

Additionally, the kidneys play a crucial role in regulating electrolyte levels, such as sodium and potassium, in the body to ensure optimal functioning of cells and organs. Moreover, the kidneys contribute significantly to blood pressure regulation through the renin-~~ang~~ angiotensin-aldosterone system, which helps maintain blood volume and pressure within a narrow range. The kidney's multifaceted functions in waste removal, fluid balance, electrolyte regulation, and blood pressure control highlight their indispensable role in the excretory system.

(c)

Solid Waste Management: Solid waste management refers to the systematic handling, disposal, and recycling of solid waste materials to minimize environment impact

and promote sustainability. It involves the collection, transportation, treatment, and disposal of solid waste to ensure the protection of public health and the environment.

Different Methods of Solid Waste Management:

1. **Source Reduction**: Involves reducing waste generation at the source by promoting the use of eco-friendly products, minimizing packaging, and practicing waste prevention strategies.
2. **Recycling**: Involves the collection and processing of recyclable materials like paper, glass, plastic, and metal to convert them into new products, reducing the amount of waste sent to landfills.
3. **Composting**: Involves the decomposition of organic waste such as food scraps and yard waste into nutrient-rich compost, which can be used to enrich soil and promote plant growth.
4. **Incineration**: Involves the controlled

burning of solid waste at high temperatures to reduce its volume and generate energy through the combustion process.

5. **Landfilling:**

Involves the disposal of non-recyclable and non-compostable waste in designated landfills, where waste is compacted and covered to minimize environmental contamination.

6. **Waste-to-Energy (WTE) Conversion:**

Involves the conversion of solid waste into energy through processes like anaerobic digestion, gasification, or pyrolysis, which can produce electricity, heat, or fuel.

(d)

Define the terms:

(i)

Anaemia: Anemia is a medical condition characterized by a deficiency in the number of red blood cells or hemoglobin in the blood, leading to reduced oxygen-carrying capacity. This deficiency can result from various factors such as inadequate iron intake, blood loss,

impaired red blood cell production, or increased red blood cell destruction.

Common symptoms of anemia include fatigue, weakness, pale skin, shortness of breath, and dizziness. Treatment for anemia typically involves addressing the underlying cause and may include iron supplementation, blood transfusions, or other interventions based on the specific type and severity of the conditions.

(ii)

Appendicitis: Appendicitis is a medical condition that involves the inflammation of the appendix, a small pouch-like organ located in the lower right abdomen. This inflammation is often due to blockage of the appendix, typically by fecal matter, a foreign body, or infection.

Common ~~systems~~ symptoms of appendicitis include abdominal pain that starts near the belly button and moves to the lower right abdomen, loss of appetite, nausea, vomiting, and fever. If left untreated, appendicitis can lead to complications such as the rupture of the appendix, which can be a ~~serious~~ serious medical

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emergency requiring immediate surgical intervention to remove the infected appendix. Early diagnosis and prompt treatment are crucial in managing appendicitis effectively and preventing complications.

(iii)

Spleen: The spleen is an organ located in the upper left part of the abdomen, near the stomach and behind the left ribs. It plays essential roles in the immune system, blood filtration, and storage of blood cells. The spleen helps filter out and destroy old or damaged red blood cells, produces certain types of white blood cells, and stores blood platelets. Additionally, the spleen acts as a reservoir for the blood that can be released into circulation in cases of emergency, such as during bleeding or when the body needs extra blood cells.

(iv)

Myopia: Myopia, commonly known as nearsightedness, is a refractive

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error of the eye that causes distant objects to appear blurry while close objects can be seen clearly. This condition occurs when the eyeball is too long or the cornea is too curved, leading to light rays focusing in front of the retina instead of directly on it. Myopia can be corrected with eyeglasses, contact lenses or refractive surgery to help focus light on the retina properly, allowing for clearer distance vision.

(v)

Isotones: Isotones are nuclei of atoms that have the same number of neutrons ~~number~~ but different number of protons. This means isotones belong to different chemical elements but have the same neutron number. The concept of isotones is important in nuclear physics and helps in understanding the stability and properties of atomic nuclei.

SECTION-II

(Q No. 6)

(a)

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(b)

$$\text{Discount price} = 15\% \text{ of } \$80$$

$$= \frac{15}{100} \times \$80$$

$$= 0.15 \times 80$$

$$= \$12$$

$$\text{Original Price} - \text{Discount Price}$$

$$= \$80 - \$12$$

$$= \$68$$

$$\text{Price of sale tax} = 10\% \times 68$$

$$= \frac{10}{100} \times 68$$

$$= 0.10 \times 68$$

$$= \$6.80$$

(16)

$$\begin{aligned}\text{Final Price} &= \text{Discounted Price} + \text{Sales Tax} \\ &= \$68 + \$6.80 \\ &= \$74.80\end{aligned}$$

Therefore, the final price of the pair of shoes after a 15% discount and a 10% sales tax is \$74.80.

(c)

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$\text{Distance} = 42 \text{ kilometers}$$

$$\text{Speed} = 36 \text{ km/hr}$$

$$\text{Time} = \frac{42}{36}$$

$$\text{Time} = 1.17 \text{ hours.}$$

$$\begin{aligned}\text{Time hours into minutes} &= 0.17 \times 60 \\ &= 10.2\end{aligned}$$

Departure time: 4:00 pm

Adding 4:00 pm + 1 hour 10 minutes

$$= 5:10 \text{ pm ans.}$$

(d)

(i) intersuted

(ii) theiw

(Q.No.7)

(a)

$$V = \pi r^2 h$$

$$V = \cancel{0.3} \times \cancel{0.09}$$

$$V = (0.3)^2 \times 0.09(1) = 0.09 \pi$$

(b)

$$3 : 5 : 7 = 3 + 5 + 7 \\ = 15$$

15 is the average age = total sum of the age of 3 boys

$$= 15 \times 15 \times 15 \\ = 15 \times 3 \\ 45$$

$$\text{Age of the youngest boy} = \frac{3}{15} \times 45 \\ = \frac{45}{5} \\ = 9$$

Therefore, the age of youngest boy is 9 years.

(c)

(i)

8, 9, 52, 151, 447, —

$$8 + 1^2 = 9$$

$$9 + 2^2 = 13 \text{ (not 52)}$$

$$52 + 3^2 = 61 \text{ (not 151)}$$

$$151 + 4^2 = 167 \text{ (not 447)}$$

The wrong number in the series is 447.

(ii)

11, 13, 17, 19, 23, 25.

12 14, 15, 16 18 20, 21, 22

After 23, 25 comes.

The next prime number is 25.

(d)

Sides of triangle = 5cm, 4cm, 6cm