

QUESTION PAPER - 04

SCIENCE, TECHNOLOGY AND ENVIRONMENT

CHEMISTRY

- **Which dye is used in hair colouring?**

Ans. It is phenyl para diamine.

- **What is lime water?**

Ans. A solution of calcium hydroxide in water is called lime water.

- **What are acidic and basic radicals?**

Ans. Radicals carrying positive charge are called basic radicals and acid radicals are negatively charged .

- **Define melting point?**

It is defined as the constant temperature as which solid melts.

- **Define boiling point?**

Boiling point is defined as the temperature at which the vapour pressure of the liquid becomes equal to the atmospheric pressure.

CONTD.....

BIOLOGY

- **What is the location of the salivary glands in humans?**

Ans. There are 6 major salivary glands and they are located one in each parotid gland, two beneath the mandibles (submandibular) and two in the base of the tongue (sublingual). More than 700 other minor salivary glands exist dispersed on the lip mucosa, gingiva, palate and pharynx.

- **How different are intracellular and extracellular digestion?
What is the
evolutionary advantage of extracellular digestion?**

Ans Intracellular digestion is that in which the breaking down of macromolecules takes place within the cell. Extracellular digestion is that in which macromolecules are broken down in places outside the cell (in the extracellular space, in the surrounds, in the lumen of digestive tubes, etc.)

The advent of extracellular digestion in evolution allowed organisms to benefit from a greater variety of food. The breaking down of larger molecules into smaller ones outside the cell permitted the use of other foods than those that, due to the size of their molecules, could not be interiorized by diffusion, phagocytosis or pinocytosis.

- **Explain different digestive enzymes.**

Ans- Digestive enzymes are enzymes that break down polymeric macromolecules into their smaller building blocks, in order to facilitate

their absorption by the body. Digestive enzymes are found in the

digestive tract of animals (including humans) where they aid in the digestion of food as well as inside the cells, especially in their lysosomes where they function to maintain cellular survival. Digestive enzymes are diverse and are found in the saliva secreted by the salivary glands, in the stomach secreted by cells lining the stomach, in the pancreatic juice secreted by pancreatic exocrine cells, and in the intestinal (small and large) secretions, or as part of the lining of the gastrointestinal tract.

Oral cavity

Complex food substances that are taken by animals and humans must be broken down into simple, soluble, and diffusible substances before they can be absorbed. In the oral cavity, salivary glands secrete an array of..

- **Explain respiratory system of mammals briefly?**

Ans. The **respiratory system** is the anatomical system of an organism that introduces respiratory gases to the interior and performs gas exchange. In humans and other mammals, the anatomical features of the respiratory system include airways, lungs, and the respiratory muscles. Molecules of oxygen and carbon dioxide are passively exchanged, by diffusion, between the gaseous external environment and the blood. This exchange process occurs in the alveolar region of the lungs.

Inhalation

Inhalation is initiated by the diaphragm and supported by the external intercostal muscles. Normal resting respirations are 10 to 18 breaths per minute, with a time period of 2 seconds. During vigorous inhalation (at rates exceeding 35 breaths per minute), or in

approaching respiratory failure, accessory muscles of respiration are recruited for support. These consist of sternocleidomastoid, platysma, and the scalene muscles of the neck. Pectoral muscles and latissimus dorsi are also accessory muscles.

Under normal conditions, the diaphragm is the primary driver of inhalation. When the diaphragm contracts, the ribcage expands and the contents of the abdomen are moved downward. This results in a larger thoracic volume and negative pressure (with respect to atmospheric pressure) inside the thorax. As the pressure in the chest falls, air moves into the conducting zone. Here, the air is filtered, warmed, and humidified as it flows to the lungs.

During forced inhalation, as when taking a deep breath, the external intercostal muscles and accessory muscles aid in further expanding the thoracic cavity. During inhalation the diaphragm contracts.

Exhalation

Exhalation is generally a passive process; however, active or *forced* exhalation is achieved by the abdominal and the internal intercostal muscles. During this process air is forced or *exhaled* out.

The lungs have a natural elasticity: as they recoil from the stretch of inhalation, air flows back out until the pressures in the chest and the atmosphere reach equilibrium.

During forced exhalation, as when blowing out a candle, expiratory muscles including the abdominal muscles and internal intercostal

muscles, generate abdominal and thoracic pressure, which forces air out of the lungs. Gas exchange

The major function of the respiratory system is gas exchange between the external environment and an organism's circulatory system. In humans and mammals, this exchange facilitates oxygenation of the blood with a

concomitant removal of carbon dioxide and other gaseous metabolic wastes from the circulation. As gas exchange occurs, the acid-base balance

of the body is maintained as part of homeostasis. If proper ventilation is not maintained, two opposing conditions could occur: respiratory acidosis, a life threatening condition, and respiratory alkalosis. Upon inhalation, gas exchange occurs at the alveoli, the tiny sacs which are the basic functional component of the lungs. The alveolar walls are extremely thin (approx. 0.2 micrometres). These walls are composed of a single layer of epithelial cells (type I and type II epithelial cells) close to

the pulmonary capillaries which are composed of a single layer of endothelial cells. The close proximity of these two cell types allows permeability to gases and, hence, gas exchange. This whole mechanism of gas exchange is carried by the simple phenomenon of pressure difference.

When the atmospheric pressure is low outside, the air from lungs flow out. When the air pressure is low inside, then the vice versa.

- **Blood:-** A liquid connective tissue consisting of erythrocytes, leucocytes, and platelets suspended in a liquid matrix, the plasma.
- **Blood pressure:-** Force exerted against artery walls by blood being pumped from the heart.
- **Bowman's Capsule:-** Cup-like body where wastes, salts and fluid are filtered from the blood by the kidney.
- **Diabetes insipidus:-** A disease in which kidneys do not reabsorb water normally so urine is highly diluted; can be caused by tumor in posterior pituitary gland.
- **Diabetes mellitus:-** Disease caused by inadequate insulin secretion in which sugar is improperly metabolized; high blood sugar, weakness, frequent urination and some times death are the result.

- **Describe blood clotting.**
- **Explain function and composition of blood?**

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