MHT CET 2023 Question Paper Shift 1

Question 1. What is a unit of current?

Answer. Ampere
Solution. The unit of current is the ampere, which is commonly symbolized as "A". It is named after the French physicist André-Marie Ampère, who made significant contributions to the understanding of electromagnetism. The ampere is one of the seven base units of the International System of Units (SI). It is defined as the constant current that, if maintained in two straight parallel conductors of infinite length, negligible circular cross-section, and placed one meter apart in a vacuum, would produce a force between the conductors of exactly 2 × 10^−7 newtons per meter of length. In practical terms, the ampere is the flow of electric charge equivalent to one coulomb per second.

Question 2. What is the order of size of group 16?

Answer. Oxygen (O), sulfur (S), selenium (Se), tellurium (Te), and polonium (Po).
Solution. Group 16 in the periodic table is known as the "Chalcogens" or "Oxygen Group." The elements in Group 16 include oxygen (O), sulfur (S), selenium (Se), tellurium (Te), and polonium (Po). The group is located in the p-block of the periodic table.

In terms of size, the elements in Group 16 generally increase in atomic size as you move down the group. This is due to the addition of more electron shells or energy levels with increasing atomic number. Therefore, oxygen is the smallest element in Group 16, while polonium is the largest.

To give you an idea of their approximate atomic radii, here are the atomic radii values for the elements in Group 16:

- Oxygen (O): Approximately 60 picometers (pm).
- Sulfur (S): Approximately 88 pm.
- Selenium (Se): Approximately 120 pm.
- Tellurium (Te): Approximately 140 pm.
- Polonium (Po): Approximately 168 pm.

Please note that these values are approximate and can vary depending on the specific conditions and reference sources used.

Question 3. What is the type of process in chemistry thermodynamics?

Answer. Endothermic Process,Exothermic Process and Adiabatic Process
Solution. In chemistry thermodynamics, processes are classified into different types based on the changes in energy, heat, and work involved. The three main types of processes in chemistry thermodynamics are:

1. Endothermic Process: An endothermic process is characterized by the absorption of heat energy from the surroundings. During an endothermic process, the system gains heat, resulting in an increase in the internal energy of the system. Examples of endothermic processes include the melting of ice, evaporation of liquid, and photosynthesis.
2. Exothermic Process: An exothermic process is characterized by the release or transfer of heat energy to the surroundings. In this type of process, the system loses heat, leading to a decrease in the internal energy of the system. Examples of exothermic processes include combustion reactions, such as burning wood or fuels, and some types of chemical reactions that release energy.
3. Adiabatic Process: An adiabatic process is a process in which there is no transfer of heat between the system and its surroundings. In an adiabatic process, the system is thermally isolated, and any change in energy is solely attributed to work done on or by the system.

Adiabatic processes are often encountered in thermodynamic systems that are well-insulated, preventing heat exchange with the surroundings.

These types of processes provide a framework for understanding and analyzing energy transfers and transformations in chemical systems, and they are fundamental concepts in the field of thermodynamics.

Question 4. Neutrophils are phagocytic or not?

Answer. Neutrophils are indeed phagocytic cells
Solution. Neutrophils are indeed phagocytic cells. Phagocytosis is the process by which cells engulf and ingest foreign particles, such as bacteria, cellular debris, or other pathogens. Neutrophils are a type of white blood cell, specifically a type of granulocyte, and they play a crucial role in the innate immune response.

When an infection or inflammation occurs, neutrophils are among the first immune cells to migrate to the site of infection. They have the ability to recognize and bind to pathogens through specific receptors on their cell surface. Once bound, neutrophils extend their cellular extensions called pseudopodia to surround and engulf the pathogen, forming a phagosome.

Within the neutrophil, the phagosome then fuses with specialized compartments called lysosomes, which contain enzymes capable of destroying the engulfed material. This process is known as phagolysosome formation. Through the action of these enzymes and reactive oxygen species produced by neutrophils, the engulfed pathogens are broken down and destroyed.

Overall, neutrophils are highly efficient phagocytes that play a crucial role in the body's defense against infections.