Important Questions for Class 10 Science Maharashtra Board

1. State any two applications of baking soda.

Answer: Sodium bicarbonate or the baking soda is used to make soft and spongy cakes, bread and dhoklas. Since it is an alkaline it also helps to reduce the acidity in the stomach. Other uses include help in preparing CO_2 gas as well as a content of fire extinguishers.

2. Define magnetic field and state the two properties of magnetic field lines.

Answer: A vector field in the neighbourhood of a magnet, electric current, or changing electric field, in which magnetic forces are observable is called the magnetic field. A magnetic field is produced by moving electric charges and intrinsic magnetic moments of elementary particles associated with a fundamental quantum property known as the spin. Magnetic field and electric field are both interrelated to each other and are components of the electromagnetic force, one of the four fundamental forces of nature. Meanwhile, the properties of the magnetic field lines are as follows:

- The magnetic field lines always originate from the north pole and end in the south pole
- The magnetic field lines never cross each other

3. Differentiate between Normal elements and Transition elements.

Answer: Transition elements (also known as transition metals) are elements that have partially filled d orbitals. According to IUPAC, transition elements have a d subshell that is partially filled with electrons, or they are elements that has the ability to form stable cations with an incompletely filled d orbital. Normal elements, in the meantime are are s and p block elements also called main group elements placed on the side of the periodic table, whereas transition elements are at the middle of the periodic table.

4. Define corrosion. What is meant by rust? Write the chemical formula of rust.

Answer: When the surface of any element slowly decays as a result of acting with the atmospheric gases, then the process is then known as corrosion. It is the process in which metals are slowly eaten up caused by oxidation on exposure to air, moisture, chemicals(acids) and so on. Meanwhile, rust is an iron oxide or reddish brown oxide that is formed by the reaction of iron and oxygen in the presence of water and air moisture. Rust so is a form of corrosion. Also, the chemical formula for rust is $Fe_2O_3.xH_2O$.

5. What do you do in the following situations:

i. Exposed to exhaust fumes in traffic.

ii. Exposed to a series of firecrackers with high sound level.

iii. Get turbid drinking water during monsoon.

Answer: i. If ever you are exposed to exhaust fumes in traffic, then you should immediately use a handkerchief and cover your nose. After that, move away from the polluted area. You could also request the vehicle owners to get their vehicles tested for Pollution Under Control so that they would not continue to add to the air pollution due to exhaust fumes. . To reduce exhaust fumes we should also change our oil and oil filter regularly.

ii. If you are exposed to a series of firecrackers with high sound level, you can use cotton balls to plug you ears so as to avoid any kind of ear damage. We could also complain in case the crackers are being burst in prohibited areas.

iii. In case drinking water is turbid during monsoon, we can use water filter and even chlorine to further purify the water.

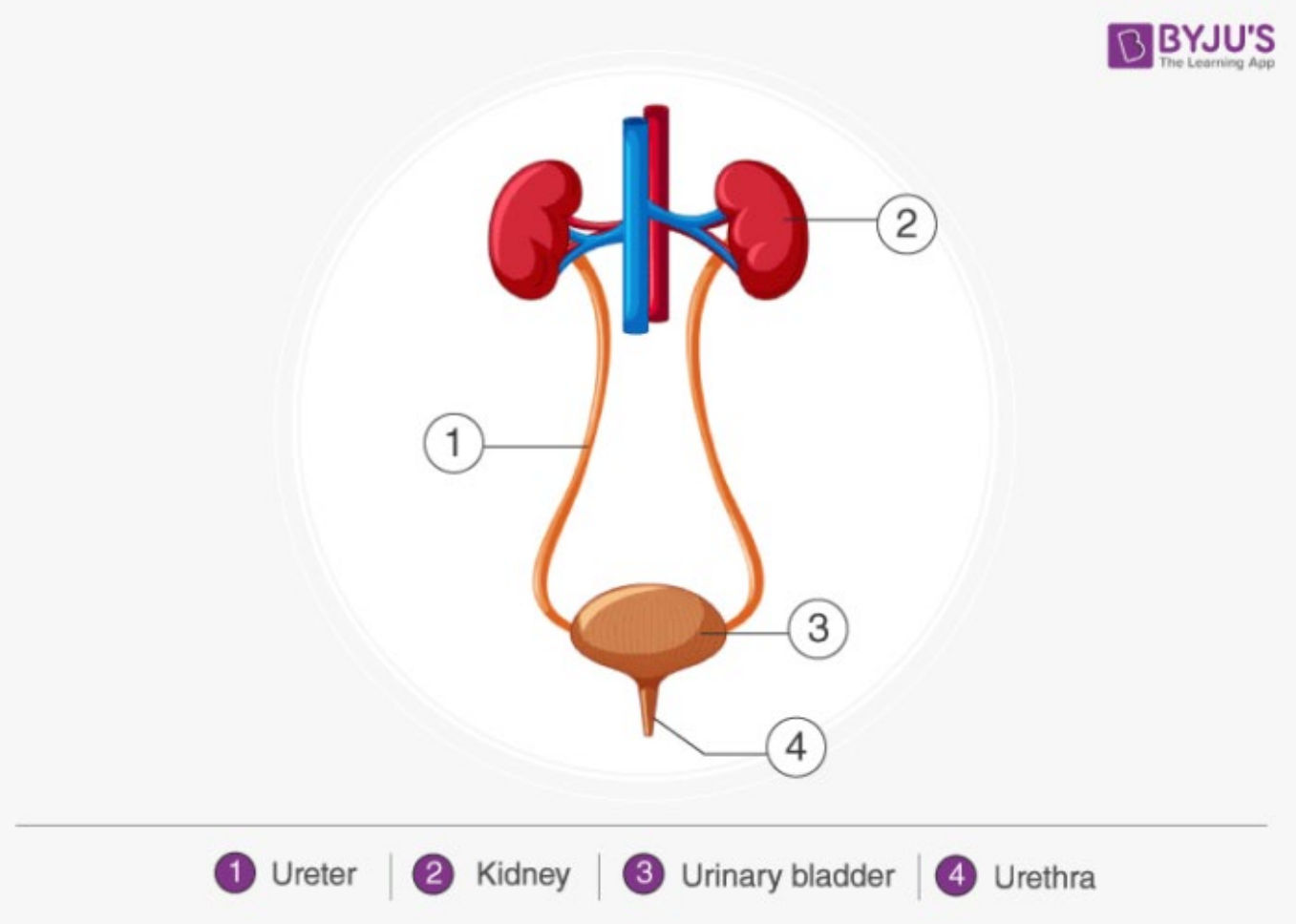
6. State any three demerits of Mendeleev's periodic table.

Answer: Given below are some of the demerits of Mendeleev's periodic table:

- Hydrogen is untraceable in the periodic table
- Increase in atomic mass was not regular while moving from one element to another. Hence, the number of elements yet to be discovered was not predictable.
- Later on, isotopes of elements were found which violated the Mendeleev's periodic law.

7. Draw a neat labelled diagram of the human excretory system.

Answer:



8. Differentiate between Mendel's monohybrid cross and dihybrid cross.

Answer: The hybrid of two individuals with homozygous genotypes which result in the opposite phenotype for a certain genetic trait is monohybrid cross. That is the cross between two monohybrid traits (TT and tt) is called a Monohybrid Cross. Whereas, the cross between two different genes that differ in two observed traits is known as dihybrid cross. You can find more about monohybrid cross and dihybrid cross here.

9. Explain the following reaction with the help of a balanced chemical equation: Magnesium reacts with hot water.

Answer: Magnesium when it reacts with water is known to replace hydrogen from it, in the situation if the water is boiling or it is in the form of steam. Given below is the balanced chemical equation for this reaction:

$Mg(s)+H2O(g)\rightarrow MgO\ (s)+H2O(g)$

10. What is recycling? Give one example.

Answer: Recycling is a process of collecting and selling products made from old materials and is also considered as the best solution for garbage disposal. One example is of reusing metals as natural resources. Manufacturers can make use of use metals, such as steel and aluminium, to produce household appliances, cars, construction materials and food and drink containers and so on.

11. What are vestigial organs? Give one example.

Answer: Vestigial organs are organs, tissues or cells in a body which are not functional anymore, the way they were in their ancestral form of the trait. It is authentication of evolution and hence, were helpful in explaining adaptation. Appendix is one of the most commonly known vestigial organ.

12. Write a short note on Catenation.

Answer: The property of a carbon element by which the atoms in it can link to one another and form long carbon chains is known as Catenation. It can also be defined as *the self-linking of atoms of an element to form chains and rings.* This definition can be extended to include the formation of layers like two-dimensional catenation and space lattices like three-dimensional catenation. Know more at Catenation.

13. What is the need to use eco–friendly technology?

Answer: Eco-friendly technology makes use of sustainable source of energy and leaves on adverse affect on the environment. It is also energy efficient in terms of the percentage of its energy output and input. This would be useful for the earth and helps to save the energy. Eco friendly technology, thus looks to improve in two major areas inclusive of energy efficiency and reduction of harmful waste.

14. What is embryology? How does its study lead us to understand evolution?

Answer: A branch of biology that discusses the principles of the embryos from the stage of ovum fertilization till their development is known as Embryology. This also includes the developmental process of a single cell, embryo to a baby within an average of 266 days or 9 months. However, the term Embryology, usually refers to the parental development of embryo and foetus. Now, if you take the embryology of various vertebrates, you will get strong evidence of different vertebrates showing striking resemblances. The embryos of fish, amphibians, reptiles, birds and mammals are all alike and if you compare this, you will find that all had gil slits which was later removed in life (except for fishes). This seem to support the idea of a common ancestor. Thus, we can also conclude that the developmental process for all these species are similar despite the changes that occur during their divergence.

15. What would be the consequences of the deficiency of haemoglobin in the human body?

Answer: Deficiency of haemoglobin could cause anaemia, as it is the haemoglobin present in the red blood cells that carries the oxygen to cells of the body. A reduction in this amount could cause a decrease in the oxygen-carrying capacity of blood. This would result in breathlessness and fatigue for the person. These are symptoms of anaemia.

16. Answer the following questions with respect to the sexual reproduction in plants:

i. State the name of the functional unit concerned with sexual reproduction.

ii. Name the part made up of the stigma, style and ovary.

iii. Name the swollen lower part of the carpel.

iv. Name the male part of the flower.

v. Where are the pollen grains produced?

Answer: i. Flower is the functional unit concerned with the sexual reproduction of plants

ii. Pistil is the name given for the entire female reproductive system of a flower that contains the stigma, ovary and style

iii. Ovary is the swollen part of the carpel

iv. The male part of the flower is the Stamen consisting of an anther and a filament

v. Pollen grains are produced by the male-structures of the seed-bearing plants and then transported to female structures. It is the anthers of the stamen that produces the pollen grains.

17. The velocity of light in a medium is 1.5 x10^8 m/s. What is the refractive index of the medium with respect to air, if the velocity in the air is 3 x 10^8 m/s?

Answer: Here, v_1 is given as 3 x 10^8 m/s , while v_2 is 1.5 x10^8 m/s

Now, applying the formula to calculate the refractive index of the medium with respect to air, $n = v_1/v_2$

Replacing values you get n= (3 x 10^8) / (1.5 x10^8) =2

So, the refractive index with respect to air is 2

18. State Fleming's Right Hand Rule.

Answer: According to Faraday's law of electromagnetic induction, when a moving conductor is placed inside a magnetic field, a current will be induced in it. If the conductor is forcefully moved inside the magnetic field, there will be a relationship between the direction of applied force, magnetic field and the current. This relation between these three directions is determined by Fleming's right-hand rule. Know more about right-hand and left-hand rule, here.

19. Distinguish between oxidation and reduction.

Answer: Oxidation means gaining oxygen in a chemical reaction, while reduction is about losing loss of oxygen. Now, oxidation and reduction can be considered in terms of oxygen, hydrogen as well as electron transfer. Know more about oxidation and reduction reaction here.

20. What major harms are done to human beings due to air pollution?

Answer: The hazardous effects of air pollution on the human beings include diseases. Air pollution cause several respiratory disorders, hay fever, asthma, bronchitis and heart diseases among humans. The cases of lung cancer have increased over the last few decades. Children living near polluted areas are also more prone to pneumonia and asthma. Many people die every year due to the direct or indirect effects of air pollution. Know more about the harmful effects of air pollution here.