Group B 1 marks

· **Define scientific notation:**
Scientific notation is a method of writing very large or very small numbers in the form of $a \times 10^n$, where $1 \leq a < 10$ and n is an integer.

· **Write two achievements of astronomy:**
Astronomy has helped in discovering new planets and understanding the motion of celestial bodies in the universe.

· **Why is yeast kept in kingdom Fungi?**
Yeast is kept in the kingdom Fungi because it is a eukaryotic organism that obtains food by absorbing nutrients from organic matter and reproduces by budding.

· **How is poisonous mushroom identified?**
A poisonous mushroom can be identified by its bright colors, strong odor, or by knowing the species, as some mushrooms are toxic when eaten.

· **Write one utility of elasticity:**
Elasticity is useful in designing springs, rubber bands, and other materials that need to return to their original shape after deformation.

· **Write any one information that can be obtained from a balanced chemical equation:**
A balanced chemical equation shows the proportion of reactants and products involved in a chemical reaction.

· **Why do mountain climbers take oxygen cylinders?**
Mountain climbers take oxygen cylinders because the air at high altitudes has low oxygen concentration, which makes breathing difficult.

· **Diamond cannot conduct electricity but graphite can. Give reason:**
Diamond cannot conduct electricity because it has no free electrons, while graphite can conduct electricity because it has delocalized electrons in its layers.

· **Write one difference between compost manure and urea:**
Compost manure is organic and improves soil fertility, whereas urea is chemical and provides only nitrogen to plants.

Group c 2 marks

1. **Describe the importance of telecommunication in modern era in two points:**
   Telecommunication is important because it allows instant communication over long distances and helps in transmitting information for education, business, and emergency services.
2. **Write down the method of writing scientific name of living beings with example:**
   The scientific name of a living being is written in italics or underlined, with the genus name first (capitalized) and the species name second (small letter), for example, *Homo sapiens*.
3. **Mention the main points of Darwin's theory:**
   Darwin's theory states that organisms produce more offspring than can survive, there is variation among individuals, and those with favorable traits survive and reproduce, passing traits to the next generation.
4. **Draw a neat and labelled figure showing central nervous system of human being:**
   Answer in exam: Draw brain and spinal cord, label them as 'Brain' and 'Spinal Cord', optionally add 'Cerebrum', 'Cerebellum', 'Medulla'.
5. **Define commensalism and parasitism:**
   Commensalism is a relationship where one organism benefits and the other is unaffected, such as barnacles on a whale. Parasitism is a relationship where one organism benefits and the other is harmed, such as a tapeworm in human intestine.
6. **The efficiency of simple pulley is 75%. Calculate the effort required to lift a load of 300N in that pulley system:**
   Efficiency = (Load / Effort) × 100
   0.75 = 300 / Effort → Effort = 300 / 0.75 = 400 N
7. **Draw a diagram showing two waves having same wavelength but different amplitude:**
   Answer in exam: Draw two sine waves of same length but one taller than the other; label wavelength (λ) and amplitude (A1, A2).
8. **If 10 seconds time is required to move 60 coulomb charge in an electric circuit, calculate the current flowing through the circuit:**
   Current, I = Charge / Time = 60 / 10 = 6 A

9. **What is meant by law of conservation of energy? Write with examples:**
   The law of conservation of energy states that energy cannot be created or destroyed, only transformed from one form to another, for example, a moving pendulum converts potential energy to kinetic energy and back.
10. **How is electrovalent bond formed? Write with an example:**
    An electrovalent bond is formed by the transfer of electrons from a metal to a non-metal, such as in NaCl, where sodium gives an electron to chlorine.
11. **Write any two limitations of the given chemical equation: $CaCO_3 \rightarrow CaO + CO_2$**
    The equation does not show the heat required for decomposition, and it does not indicate the rate or conditions under which the reaction occurs.
12. **Silver is called a metal and silicon is called a non-metal. Why?**
    Silver is a metal because it is shiny, malleable, and conducts electricity, whereas silicon is a non-metal because it is brittle and does not conduct electricity well.
13. **Prepare a list of various sources of carbon in the form of element, compound and gas:**

- Element: Diamond, Graphite
- Compound: Sugar, Calcium carbonate ($CaCO_3$)
- Gas: Carbon dioxide (CO_2), Carbon monoxide (CO)

1. **Write any two differences between organic fertilizer and potassium fertilizer:**
   Organic fertilizers are natural and improve soil fertility, whereas potassium fertilizers are chemical and provide only potassium; organic fertilizers act slowly while potassium fertilizers act quickly.

1. **Describe the working principle of telecommunication with examples:**
   Telecommunication works on the principle of sending and receiving information over a distance using electrical signals or electromagnetic waves. For example, in a telephone, voice signals are converted into electrical signals, transmitted through wires or air, and then converted back to sound at the receiver.
2. **Write any two differences between parenchyma and sclerenchyma:**

- Parenchyma cells are living, thin-walled, and help in storage, photosynthesis, and tissue repair, whereas sclerenchyma cells are dead, thick-walled, and provide mechanical support.
- Parenchyma cells are flexible, but sclerenchyma cells are rigid and hard due to lignin deposition.

1. **Write any two differences between brain and spinal cord:**

- The brain controls voluntary and involuntary actions and is located in the skull, while the spinal cord mainly transmits messages between the brain and body and is located in the vertebral column.
- The brain is responsible for thinking, memory, and coordination, whereas the spinal cord mainly controls reflex actions.

Group D

1. **How are passengers affected when a bus at rest starts to move suddenly? Explain with reason:**
   When a bus starts suddenly, passengers are thrown backward because their bodies tend to remain at rest due to inertia, as stated by Newton's first law of motion.

2. **The mass of stone is 2 kg. If it takes 6 seconds to reach the maximum height, calculate the initial velocity. (Air resistance is zero)**
   Time to reach maximum height, t = 6 s
   Acceleration due to gravity, g = 9.8 m/s²
   Initial velocity, u = g × t = 9.8 × 6 = 58.8 m/s
3. **Write any two differences between nuclear fusion and nuclear fission:**

- Nuclear fusion is the process of combining light nuclei to form a heavier nucleus with the release of energy, while nuclear fission is the splitting of a heavy nucleus into smaller nuclei with energy release.
- Fusion releases more energy than fission, but fission is easier to control for energy generation.

1. **Why is development and use of alternative energy sources necessary in today's world? Explain:**
   Alternative energy sources are necessary because fossil fuels are limited, cause environmental pollution, and their excessive use leads to climate change. Renewable sources like solar, wind, and hydro energy provide sustainable and clean energy.
2. **Study the given figure and answer the following questions:**

- **Which type of combination is shown in fig(a) and fig(b)?**
  Fig(a) shows a **series combination**, and fig(b) shows a **parallel combination** of electrical components.
- **How much current flows in the circuit in fig(a) and fig(b)?**
  (You would calculate using Ohm's law: I = V/R, depending on the given resistances in the figure.)

1. **Answer the following questions on the basis of given elements:**

- **A = Atomic no 8, B = Atomic no 11, C = Atomic no 17**
- Name the elements: A = Oxygen (O), B = Sodium (Na)
- Valency of A and C: Oxygen (A) has valency 2 because it needs 2 electrons to complete its octet; Chlorine (C) has valency 1 because it needs 1 electron to complete its octet.
- Compound formed by B and C: Sodium chloride (NaCl) is formed. It is an electrovalent bond because sodium transfers one electron to chlorine.

1. **Write any two uses of infrared waves:**

- Infrared waves are used in remote controls to operate electronic devices.
- They are used in thermal imaging to detect heat in objects and humans.

1. **Write any two uses of ultrasonography:**

- Ultrasonography is used in medical imaging to examine internal organs, such as monitoring a fetus during pregnancy.
- It is used to detect kidney stones or tumors in the body.