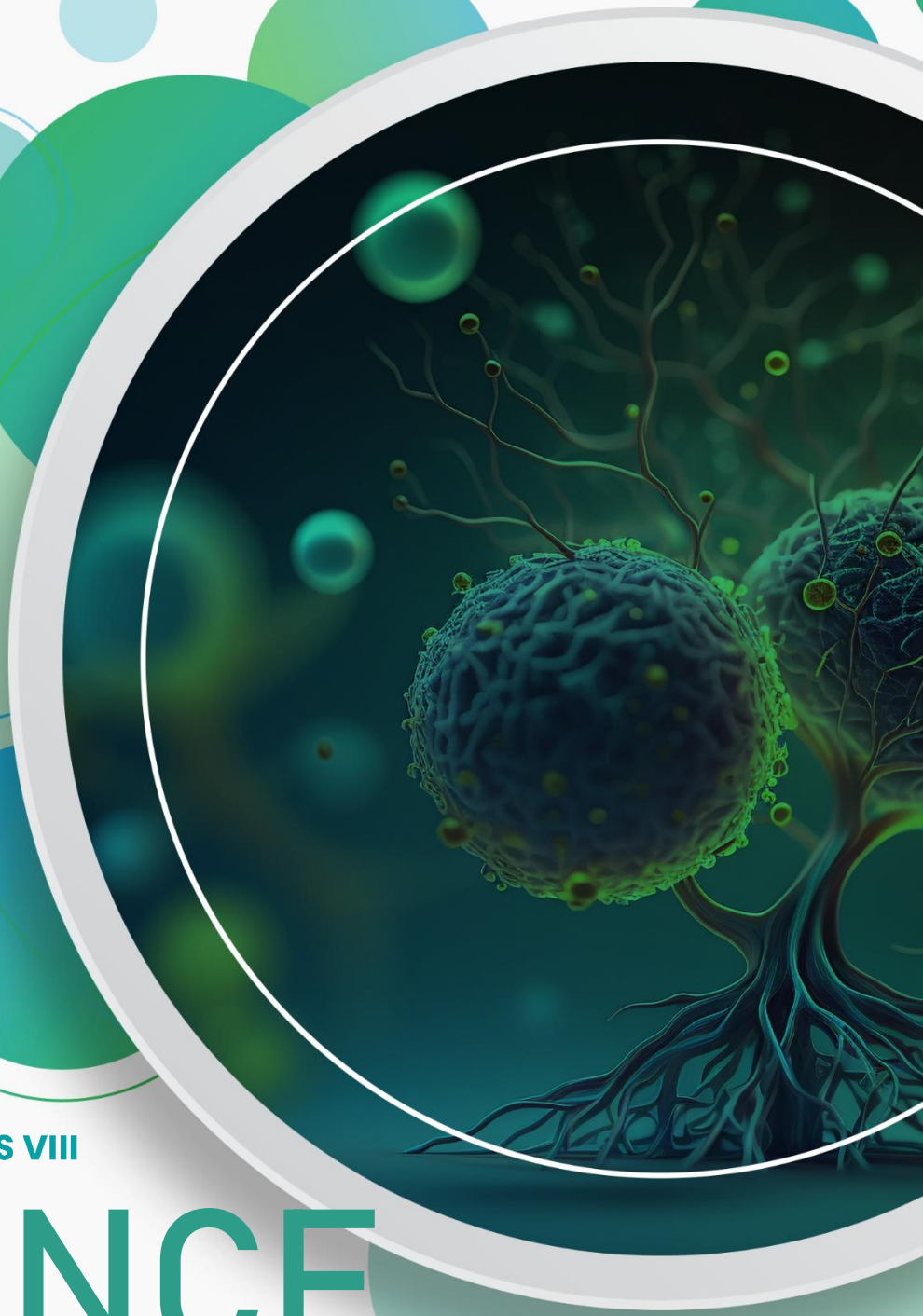
SET SOLUTIONS



CLASS VIII

SCIENCE AND TECHNOLOGY

BY

SEBS STUDENT CLUB

SET SOLUTIONS

About The Author

The SEBS Students Club is a vibrant community of Sagarmatha English Boarding School-SEBS students, supported by SEBS. Our mission is to promote student involvement in education, endorsing participation in various activities, events, and programs. Through collaboration and engagement, we create a space where students can thrive academically and socially. 🌟📚

SET SOLUTIONS

by

SEBS STUDENTS CLUB

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SET

Group B

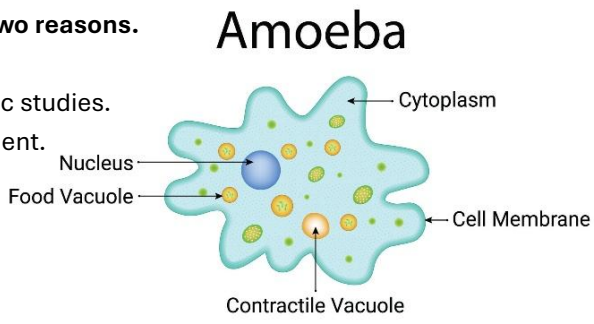
Very short answer questions

10. **What is hypothesis?**
    → Hypothesis is a vital component or the scientific method, often requiring experimentation in a laboratory or in the field.
11. **What is meant by parthenogenesis?**
    → Parthenogenesis is a asexual method in which development of embryo forms in a unfertilized cell.
12. **Why are seeds not stored in moist or wet places while storing?**
    → Seeds are not stored in moist or wet places because moisture can cause them to store start germinating before they are planted.
4. **Why are the seed not store in moist or wet places?**
    → Seeds are not stored in moist or wet places because moisture can cause them to store start germinating before they are planted.
5. **In which condition concave mirror forms virtual image?**
    → If the object is kept between pole and focus, it forms virtual image.
6. **Which class lever is a fire tongs?**
    → Fire tongs is a third-class lever.
7. **Write any one application of citric acid.**
    → It is used in food, cosmetics, and cleaning products.
8. **Write the name of ions formed after the ionization of sodium chloride.**
    → It forms one positive ion Na^+ and negative ion Cl^-.
9. **In a certain area, it is found that the acidity of water sources such as river, lakes, and pond is increasing and monuments of archaeological importances are destroying. Write the causes of this effect.**
    → The cause of this effect is Acid rain.

Group C

Short answer questions

10. **Why is scientific report written? Give any two reasons.**
    → Scientific report is written to:
    - Communicate the results of scientific studies.
    - Allow others to replicate the experiment.
11. **Draw a labelled diagram of amoeba.**



- **Write any two roles of firewall on internet security.**
  → Any two roles of firewall on internet security are:
  i) It secures the network by cyber-attack.
  ii) It monitors and controls incoming and outgoing network traffic based on pre-determined security rules.
- **Write any two differences between nucleoplasm and cytoplasm.**

Nucleoplasm	Cytoplasm
i) It is found inside nucleus.	It is found inside the cell and outside the nucleus.
ii) It is enclosed by nuclear envelope.	It is enclosed by cell membrane.

- **Mention any two importance of sustainable development.**
  → Any two importance of sustainable development are:
  i) For long lasting use of natural resources.
  ii) To balance the environment.
- **How does dispersal of seeds occur by gravity? Write with example.**
  → When fruits such as apples fall to the ground, their seeds are dispersed by gravity.
- **Why does the tail of a comet appear when it approaches near the sun? Explain.**
  → Comets revolve in very long elliptical orbits around the sun. Sometimes, they come very close and sometimes go far away from the sun. When they come closer to the sun, a part of them evaporates and forms a tail-like structure. Due to this reason, the tail of a comet appears when it approaches near the sun.

1. **How can you detect hardness of water collected from different sources? Write any two ways.**
   → Water hardness can be easily measured using a simple soap test kit that will measure in grains of hardness.

Group D

Long answer questions

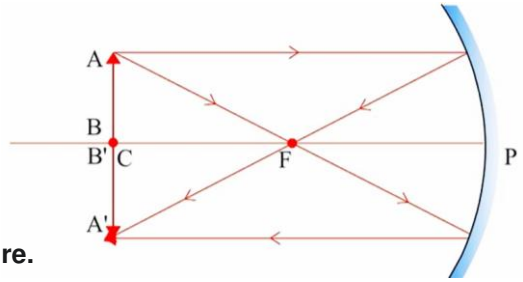
18. **A person has created a fake Facebook account in the name of a famous person, sending friend requests to more and more people and doing mental trauma to someone. On this basis, answer the following questions.**
    a. What is called for the above-mentioned activities?
       → Cybercrime is called the above-mentioned activities.
    b. Write any two measures to be safe from above activities.
       → Any two measures to be safe from it are:
          i. Do not use pirated software.
          Ii. Do not keep your password secret.
    c) Write the name any two social media that is used to spread spam and malware.
       → WhatsApp → Facebook Messenger

- **Study the adjoining ray diagram and attempt the given questions.**
  a) Complete the ray diagram.
  b) What type of mirror is it?
  → It is a concave mirror.

c) Write any two features of the image formed.

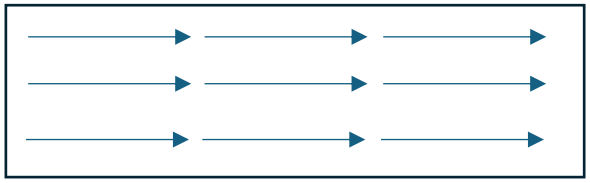
→ Any two features of the image formed are:

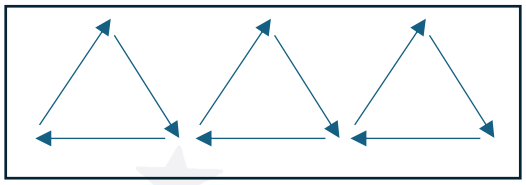
i. Real ii. Inverted



20. Molecular magnet is shown in the following figure.

Answer the following questions on the basis of the figure.





i. Which figure is magnet?

→ Figure A is a magnet.

ii. What is called as position of the molecules in the figure B?

→ The position of the molecules in the figure B is called closed chain in a non-magnet.

iii. Which principle is shown by the above diagram?

→ Magnetic field is strongest at the poles and weakest in middle is the principle shown by the above diagram.

1. Study the given table and answer the following questions.

Group	IA	IIA	IIIA	IVA	VA	VIA	VIIA	0
Period-2	Li	Be	X	C	N	O	F	Ne
Period-3	Na	Mg	Al	Si	P	S	Cl	Y

i) Write the name of element X and Y.

→ The name of element X and Y is Boron and Argon.

ii) Write the valency of X and Y.

→ The valency of X and Y is 3 and 0.

iii) Why are zero group elements inert gases and elements of group VIIA are the most reactive in the periodic table?

→ Zero group elements are inert gases because they do not take part in chemical reaction as its shells are already filled and elements of group VIIA are the most reactive because they have 7 valence electrons and they tend to easily gain one electron from others in their valence shell to become stable.

2 SET

Group B

Very short answer questions

2. What is dry preservation?

→ Dry preservation is one of the oldest methods of preserving food by drying them for later use.

3. Give any one example of species diversity.

→ Any one example of species diversity is [blank - answer not provided].

4. Write the principle of biodiversity conservation.

→ The principle of biodiversity conservation is controlling poaching and illegal trade of wild animals, etc.

5. What is average velocity?

→ The arithmetic mean of initial and final velocity of the body is called average velocity.

6. Write any one application of terrestrial magnetism.

→ Any one application of terrestrial magnetism is that it helps to locate the correct direction.

7. What is $2n^2$ rule used for?

→ $2n^2$ rule is used for knowing the number of electrons that can be accommodated by a shell.

8. What is base?

→ Metallic oxides and hydroxides are called bases.

9. What is the era in which dinosaurs were evolved?

→ Dinosaurs were evolved during Mesozoic era.

Group C

Short answer questions

10. Write two differences between observation and test.

Feature	Observation	Test (Experiment)
Control	Passive observation; no manipulation	Active manipulation of variables
Primary Purpose	Describe a phenomenon; gather data	Establish cause-and-effect; test a hypothesis

11. Where are the mitochondria located in a cell? Write their functions.

→ Mitochondria are located throughout the cytoplasm in a cell. Its functions are:

i) They work as the powerhouse of a cell.

ii) They help in production of hemoglobin, calcium and fatty acid.

12. **Tissue culture is considered as most advance method among other method of vegetative propagation, why?**

→ Tissue culture is considered the most advanced vegetative propagation method because it allows rapid production of disease-free, genetically identical plants in a controlled environment, regardless of season.

13. **If there is no pollination in plant, fertilization will be nearly impossible. Justify this statement with logic.**

→ Pollination is the transfer of pollen from the stamen (male part) to the pistil (female part) of a flower. Fertilization, the fusion of male and female gametes, *must* follow pollination. Without pollination, pollen never reaches the pistil, so the sperm cells within the pollen grain can't reach the ovule to fertilize the egg cell. Therefore, no pollination directly prevents fertilization.

14. **If a car starts to move from rest and its velocity becomes 30 m/s in 12 seconds then find its acceleration.**

Solution,
Given,
initial velocity (u) = 0 m/s
final velocity (v) = 30 m/s
time taken (t) = 12 sec.
acceleration (a) =?
We know, a = (v-u)/t
= (30-0)/12
= 30/12
= 2.5 m/s^2

1. **Mechanical advantage is always less than the velocity ratio. Why?**

→ MA is always less than the VR because MA is affected by friction but VR is not.

16. **How does the wind blow? Explain the process.**

→ Uneven solar heating creates pressure differences in the atmosphere. Warm air rises (low pressure), and cool air sinks (high pressure). Air flows from high to low pressure, creating wind. The Earth's rotation (Coriolis effect) also influences wind direction.

17. **Describe the Big Bang Theory.**

→ Big bang theory state that, the universe began as a tiny, hot, dense point (singularity) and rapidly expanded and cooled. This expansion led to the formation of atoms, stars, galaxies, and continues today.

Group D

Long answer questions

18. **What is artificial Intelligence? Write any three objectives of artificial intelligence.**

→ Artificial Intelligence (AI) is a broad field of computer science that focuses on creating machines capable of performing tasks that typically require human intelligence.

- Three key objectives of Artificial Intelligence are:

i. Automation of Cognitive Tasks.
ii. Understanding Human Intelligence.
iii. Development of Intelligent Agents.

19. Write down any two effects of sound pollution and two ways to minimize its effect.

→ Any two effects of sound pollution and two ways to minimize its effect are:

Effects:

i) Hearing problems

ii) Permanent deafness

Ways to minimize it are as follows:

i) The horns of vehicles should not be blown unnecessarily.

ii) Firecrackers should be avoided during festivals.

20. Part of a group of the periodic table is given alongside. Answer the following questions based on it.

Be
Mg
Ca

a) Which group of modern periodic table is shown in the given table?

→ Group IIA of modern periodic table is shown.

b) What is the name given for metals in this group? Give reasons.

→ The name given for metals in this group is alkaline earth metals because they are reactive as they tend to lose two electrons to form a +2 ion.

c) What is the valency of magnesium (Mg)? Write with reason.

- The valency of magnesium is 2 because it can donate two electrons to become stable.

d) What change occurs in the metallic character of element from the top to the bottom in the group?

- The metallic character increase while moving from top to bottom

21. How can the hardness of water be removed by the permutit method. Describe it with necessary diagram.

- The permutite method removes water hardness using sodium permutite (zeolite), which exchanges Na^+ ions with Ca^{2+} and Mg^{2+} ions, softening the water.

Process:

1. Hard water passes through a **permutite bed**.
2. **Ca^{2+} and Mg^{2+} are replaced by Na^+**, softening the water.
3. The exhausted permutite is **regenerated using NaCl solution**.

Reactions:

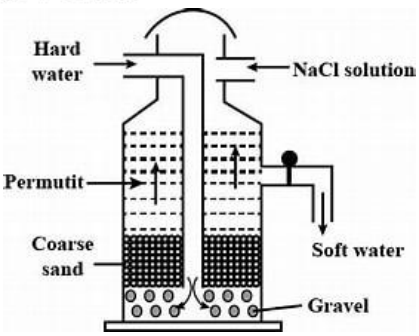
- Softening:

$$Na_2Z + Ca^{2+} \rightarrow CaZ + 2Na^+$$

- Regeneration:

$$CaZ + 2NaCl \rightarrow Na_2Z + CaCl_2$$

Diagram



3 SET

Group B

Very short answer questions

2. **Write the full form of URL.**
   - Uniform Resource Locator
3. **What is a cell?**
   - A cell is the structural and functional unit of life.
4. **How many species of gymnosperms are found in Nepal?**
   - Around 26 species of gymnosperms are found.
5. **What is meant by anemophily?**
   - Anemophily is a type of pollination in which pollen is distributed by wind.
6. **Which class lever is a scissor?**
   - A scissor is a first-class lever.
7. **What is meant by the conduction of heat?**
   - Conduction of heat is the process of transmission of heat from one point to another point in a body without actual movement of the molecules.
8. **What is magnetic declination?**
   - Magnetic declination is the angle between magnetic north (the direction a compass needle points) and true north[1] (geographic north).
9. **Write the modern periodic law.**
   - The modern periodic law states that the elements are arranged according to their increasing atomic number.

Group C

Short answer questions

1. **A report is prepared after the experiment and survey are done. Why?**
   - A report is prepared to communicate the findings and conclusions of the research, share the methodology used so others can replicate the study, contribute to the existing knowledge on the topic, and provide data-driven recommendations or inform decision-making.
2. **"Skilled human resource is the foundation as well as the destructor of sustainable development." Clarify this statement with examples.**
   - This statement highlights the dual role of human activity. Skilled individuals are essential for developing and implementing sustainable practices However, unsustainable human activities are major obstacles. The key is balancing human development with environmental protection through education, awareness, and ethical practices.

   Absolutely! Let's address these questions one by one.

12. What is gametogenesis? In which part of plants and animals does this process take place?

- Gametogenesis is the biological process of gamete (sperm or egg) formation.

1. In plants: It occurs in the reproductive organs, specifically in the anther and the ovule within the ovary.
2. In animals: It occurs in the gonads, specifically the testes and the ovaries.

13. Calculate the speed of the sound wave if the wavelength is 22 m and its frequency is 15 Hz.

Speed = Wavelength × Frequency

Speed = 22 m × 15 Hz

= 330 m/s

14. "Magnetization of magnetic materials in nature is the effect of terrestrial magnetism." Justify this statement with examples.

- Terrestrial magnetism, Earth's magnetic field, can induce magnetization in certain materials.

Example: Lodestone, a naturally magnetized rock, is an example. It aligns with Earth's magnetic field over long periods, becoming a magnet itself.

15. Living beings have evolved after a very long time on Earth's evolution. Why?

- The early Earth environment was extremely harsh and not conducive to life as we know it due to following reasons:

1. High Temperatures: The planet was very hot, with volcanic activity and frequent asteroid impacts.
2. Lack of Oxygen: The early atmosphere lacked free oxygen, which most living organisms require for respiration.
3. Toxic Gases: The atmosphere contained toxic gases like methane and ammonia.

   It took billions of years for the Earth to cool down, for liquid water to form, and for photosynthetic organisms to produce oxygen, creating an environment where life could evolve and thrive.

16. Write any two differences between metals and non-metals.

Metals	Non-metals
Good conductors of heat and electricity	Poor conductors (except graphite)
Lustrous (shiny)	Dull

17. What suggestion do you give to improve the declining agricultural production due to acid rain? Write any two points.

1. Reduce Emissions: The primary cause of acid rain is the release of sulfur dioxide and nitrogen oxides from burning fossil fuels. Reducing these emissions through cleaner energy sources and industrial processes is crucial.
2. Liming: Acid rain can make the soil acidic, hindering nutrient uptake by plants. Applying lime (calcium carbonate) to the soil can neutralize the acidity and make it more suitable for agriculture.

Group D

Long answer questions

18. Mention the two dangers of internet security and two ways to avoid them.

Dangers:

1. Malware: Malicious software can infect devices, steal data, or disrupt operations.
2. Phishing: Deceptive attempts to obtain sensitive information like passwords or credit card details.

Ways to avoid them:

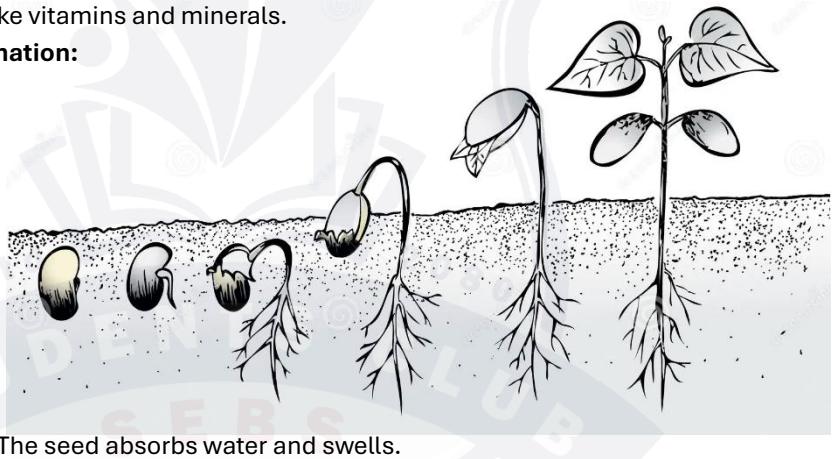
1. Use strong passwords and keep software updated: This makes it harder for malware to infect devices.
2. Be cautious of suspicious emails and links: Avoid clicking on links or opening attachments from unknown sources to prevent phishing attacks.

19. "Consuming germinated seeds is more beneficial than normal dry seeds". Clarify this statement with logic. Show the process of germination of dicotyledon seeds with diagram.

- Germinated seeds are more nutritious because:

1. Increased Enzyme Activity: Germination activates enzymes that break down complex starches into simpler sugars, making them easier to digest.
2. Enhanced Nutrient Availability: Germination increases the bioavailability of certain nutrients, like vitamins and minerals.

Diagram of Dicot Germination:

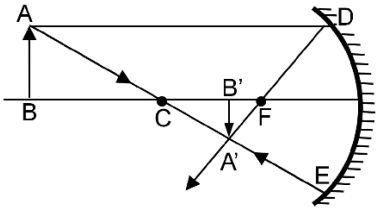


1. Imbibition: The seed absorbs water and swells.
2. Radicle Emergence: The embryonic root (radicle) emerges and grows downward.
3. Hypocotyl Elongation: The hypocotyl (embryonic stem) elongates, pushing the cotyledons (seed leaves) upward.
4. Cotyledon Expansion: The cotyledons expand and may become photosynthetic.
5. Plumule Development: The plumule (embryonic shoot) develops between the cotyledons and grows upward, forming the first true leaves.

20. Draw the ray diagram of image formation when the object is kept beyond the center of curvature of a concave mirror. Also write any two characteristics of the image.

- Characteristics of the image:

1. Real
2. Inverted



21. The electronic configuration of an element is 2, 8, 8, 1.

Answer the following questions.

(a) Write the name of the element.

- Potassium (K)

(b) What is the valency of this element? Write with reason.

- The valency is 1. The outermost shell has 1 electron, which it can lose to achieve a stable octet configuration.

(c) Write the molecular formula of the compound formed by this element and chlorine.

- KCl (Potassium Chloride)

4 SET

Group B

Very short answer questions

2. **What is the importance of observation in scientific work?**
   → The importance of observation in scientific work is that it helps us to understand the properties and behaviors of the things we are studying.
3. **Which device is used to convert hard copy to soft copy?**
   → A scanner is used to convert hard copy to soft copy.
4. **Write the function of pseudopodia.**
   → The function of pseudopodia is Locomotion.
5. **What is layering?**
   → Layering is a method of plant propagation in which a stem of an attached plant is induced to root while still connected to the parent plant.
6. **What are the other advantages of a lever besides making our work easier?**
   → Other advantages of a lever include reducing effort, increasing force, and changing the direction of force.
7. **What is the transmission of heat?**
   → Transfer of heat from a hot body to a cold body is called the transmission of heat.
8. **What change in the metallic properties of the elements occurs while moving from top to bottom in any group of the modern periodic table?**[1]
   → Metallic properties increase from top to bottom in a group of the modern periodic table.
9. **What are the causes of hardness of water?**
   → Causes of hardness of water are:
   i. Presence of minerals.
   ii. Use of chemical during purification of water.

Group C

Short answer questions

10. Precautions should be taken while conducting experimental work. Why?

→ Precautions should be taken while conducting experimental work to ensure safety, avoid accidents, prevent damage to equipment, and obtain accurate and reliable results.

11. Write any two differences between virtual reality (VR) and artificial intelligence.

Virtual reality (VR)	Artificial intelligence (AI)
i) VR is an environment created by computer technology, which is not actually real but feels like real.	AI is the representation of human abilities and behavior found in machines or computers.
ii) It is mainly used in health, medical education, tourism, education, finance, transportation, etc.	It is mainly used in healthcare, education, finance, transportation, social media, robotics, etc.

12. What kind of technology is an ATM? Write its important functions.

→ ATM is a machine found at banks or at a self-service banking outlet used to withdraw money, check balance, print mini statements as well as deposit funds. Its functions are to provide users to withdraw cash, check balance, change the pin and get account updates.

13. Five kingdom system has provided an appropriate position to almost all organisms. Why?

→ In five kingdom classification, the organisms of each group have a proper place from the structure and evolution point of view. The prokaryotes are placed in kingdom Monera as they are made up of prokaryotic cells. All the unicellular eukaryotes are placed in kingdom Protista which has solved many problems like the position of organisms like Euglena.

14. What is the role of species richness in biodiversity? Write.

→ Two key points about species richness in biodiversity:

1. Higher species richness generally leads to greater ecosystem stability.
2. Species richness is a fundamental component of biodiversity and is often used as a direct measure of it.

15. Prove that the pressure exerted by the liquid is P = hdg. Where the symbols have their usual meanings.

Proving that P = hdg,

we know,

P = F/A

= mg/A [∵ f = mg]

= (d × v × g) / A [∵ m = d × v]

= (d × A × h × g) / A [∵ v = A × h]

= dhg

Therefore, P = hdg

16. Which era was inappropriate for the evolution of life and why? Explain with an example.

- Precambrian Era is inappropriate for complex life evolution. Early atmosphere lacked free oxygen, limiting the development of complex, aerobic organisms. Example: Early life was anaerobic; complex life needs oxygen for energy production.

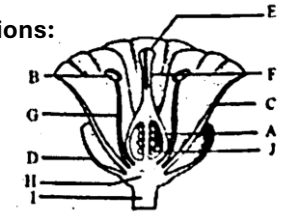
17. Steel is used more than iron in making household kitchen utensils. Why?

- Steel is stronger, more durable, corrosion-resistant, hygienic, and aesthetically pleasing. Iron rusts easily and requires more maintenance.

Group D

Long answer questions

18. Study the given diagram of a flower and answer the following questions:



- (i) Label A, B, C, and D parts of a flower.

A - Ovary
B - Anther
C - Petal
D - Sepal

(ii) What effect may occur in the fertilization process if part B (anther) is removed?

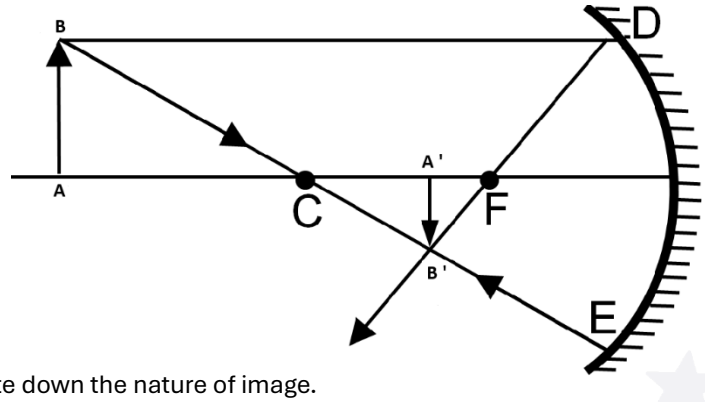
- If the anther (B) is removed, fertilization will not occur because pollen grains contain the male gametes (sperm cells) necessary for fertilization.

(iii) Write the function of B (anther).

The function of the anther is to produce and store pollen grains.

19. Study the given diagram and answer the following questions.

i. Complete the ray diagram.



Ii. Write down the nature of image.

a. Real

b. Inverted

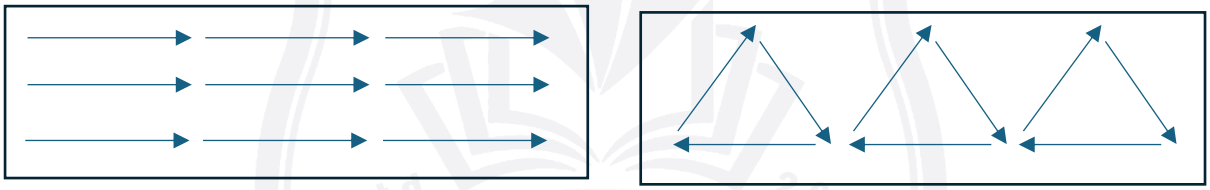
iii. Write any two uses of mirror.

a. Use in headlight of vehicles.

b. Use as shaving mirrors.

20. Explain, with a diagram, the molecular theory of magnetism.

- The molecular theory of magnetism states that “all magnetic substances are made up of tiny molecular magnets. These molecules have both a north and a south pole.”



1. **Magnetized State:** When a magnetic field is applied, these molecular magnets align themselves in the same direction, causing the substance to become magnetized. Now, the tiny north and south poles add up, creating a larger, overall magnetic field.
2. **Unmagnetized State:** In an unmagnetized substance, these molecular magnets are randomly oriented, canceling out each other's magnetic fields. Think of it like a jumble of tiny magnets pointing in all directions.

21. Express the given chemical reaction into a balanced chemical equation:

(a) Magnesium oxide + Hydrogen -> Magnesium + Water

- $MgO + H_2 \rightarrow Mg + H_2O$

(b) Calcium Carbonate + Hydrochloric acid → Calcium Chloride + Water + Carbon dioxide

- $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$

5 SET

Group B

Very short answer questions

2. What is the name of software program that makes copy from one computer to another.

- Scanner is a software program that makes copy from one computer to another.

3. Write the function of root hair.

→ The function of root hair is to absorb water and minerals.

4. What is ecosystem?

→ It is a community of living organisms interacting with their physical environment.

5. What is formed from coleoptile during seed germination?

→ The shoot or plumule emerges from the coleoptile during seed germination.

6. Give any one example of a longitudinal wave.

→ Sound wave is an example of a longitudinal wave.

7. What is magnetic saturation?

→ When a magnetic material reaches its maximum magnetization capacity, it is known as magnetic saturation.

8. Write any one use of sulfuric acid.

→ It is used in cars and batteries.

9. Give any one example of a sulfuric energy mineral.

→ Any one example of energy minerals is coal.

Group C

Short answer questions

10. What precautions should be taken while carrying out a scientific experiment?

→ The following precautions should be taken while carrying out a scientific experiment:

i) Handle chemicals and equipment with care.

ii) Wear safety gloves, goggles.

iii) Ensure proper ventilation.

11. Mention the opportunities and benefits of social media.

→ The opportunities and benefits of social media are:

Opportunities:

i) Helps in communication, networking.

Benefits:

ii) Helps us to update with worldwide news, raising awareness, etc.

12. What is a printer? Mention its function in brief.

→ Printer is an output device that produces hard copy of digital documents.

Functions:

- It converts digital data into printed data.

13. Mention the two functions of plastids in a plant cell.

→ Functions of plastids:

i) It helps in photosynthesis (chloroplast)

ii) It helps to balance the oxygen and carbon dioxide in nature.

iii) It helps in storage of starch, oils, and proteins.

14. What is meant by seed dormancy? How does it help seeds?

→ It is a period during which a seed remains inactive.

It helps seeds to survive unfavorable conditions and ensures germination at the right time.

15. Ventilation is kept at the upper part of the wall or door. Why?

→ As we know, hot air rises up. So, to allow warm and lighter air to escape and to ensure better air circulation, ventilation is kept at the upper part of the wall or door.

16. Which mirror is suitable to use while shaving a beard and doing make-up, and why?

→ A concave mirror is suitable because it provides a magnified image.

17. Write any two differences between group and period.

Group	Period
i) Groups are vertical columns in the periodic table.	Periods are horizontal rows in the periodic table.
ii) Atomic size increases from top to bottom of the element.	Atomic size decreases from left to right of the element.

Group D

Long answer questions

18. What are the principles of sustainable development? Describe any one of them in brief.

→ Principles:

1. Conservation of ecosystem
2. Conservation of bio-diversity
3. Sustainable development of society
4. Population control

Population control: It is an important principle of sustainable development as it balances resource use and population growth. Overpopulation strains resource and harms the environment. Managing growth through family planning and education ensures better resource access, reduces poverty, and supports environmental conservation.

19. Write down the formula to calculate the relative velocity of a body moving in the same and opposite directions with examples.

→ If they move in the same direction, then the formula is: $V_{BA} = V_B - V_A$

If they move in different directions, the formula is: $V_{AB} = V_A + V_B$

20. What is earthing? Why is earthing necessary in domestic wiring?

→ The process of connecting the metallic body of an electric appliance to the earth by a wire to send excess current to the earth to protect the user from getting an electric shock is called earthing.

It is necessary because it prevents electrical hazards, prevents electrical shocks, etc.

Sharmila's sub-meter records 8.5 units (kilowatt-hours, kWh) of electricity consumption in a month. If she only uses a 65-watt electric bulb in her room, how many hours a day does she study?

Solution,

Here, Total electric consumption in a month = 8.5 units

We know,

1000 W = 1 Unit

So, 8.5 units = 8.5 x 1000

= 8500 W

Now,

Total electric consumption in a day = $\frac{8500}{30}$

= 283.33

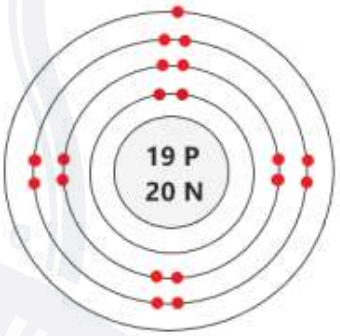
Given, Power of electric bulb = 65 W

So, total hrs she studies = $\frac{283.33}{65}$

= 4.35 hrs

21. What is the element to which the given nucleus of an atom belongs? Draw the atomic structure of an atom of the element given alongside. What are the information required to calculate the atomic weight of the element? Write with reasons.

- The element is Potassium.
- Electronic Configuration of Potassium
- To calculate atomic weight of elements, proton and neutron are needed because atomic weight is equivalent to the sum of proton and neutron of an element.



6 SET

Group B

Very short answer questions

2. **What is computer code of conduct?**
   → A set of ethical guidelines and riles to govern the use of computers, ensuring responsible and fair use of technology.
3. **Write the name of any one bird found only in Nepal.**
   → Spiny Babbler is the only bird found in Nepal.
4. **What is double fertilization?**
   → It is a process in flowering plant where one sperm cell fertilizes the egg cell to form a zygote, zygote, and the other sperm cell fuses with the polar nuclei to form the endosperm.
5. **Write any one application of atmospheric pressure.**
   → Any one application of atmospheric pressure is drinking with straw.
6. **What is meant by magnetic inclination?**
   → The angle made by the earth's magnetic field with the non-zonal surface at a specific location.
7. **Give an example of comet.**
   → Halley's comet is an example of comet.
8. **Write the molecular formula of magnesium chloride.**
   → The molecular formula of magnesium chloride is $MgCl_2$.
9. **Which metals are mixed to make brass?**
   → Copper and zinc are mixed to make brass.

Group C

Short answer questions

10. **What do you mean by survey tools? Give some examples.**
    → It refers to instruments or platforms used to collect, organize, and analyze data. Examples: Interview, Questionaries, Google Forms, etc.
11. **Write any two main features of ISP.**
    → ISP stands for Internet Service Provider. Its two main features are: i) It provides reliable service at a reasonable price. ii) It uses high quality virus protection system that protects user's data.
12. **Why is the five-kingdom system more advanced than the two-kingdom system? Explain.**
    → Five kingdom system is more advanced because it classifies organisms into monera, protista, fungi, plantae, and animalia based on cellular structure, mode of nutrition, and complexity. And it also distinguishes between prokaryotic and eukaryotic cells. It also places producers, consumers, and decomposers into separate kingdoms: plantae, animalia, and fungi, which the two-kingdom system fails to do.
13. **Transparent plastic is used to cover the roof and walls of an artificial greenhouse. Why?**
    → Transparent plastic is used to cover the roof and walls of an artificial greenhouse because transparent plastics allow sunlight to enter the greenhouse, providing the required light for

photosynthesis while trapping heat to maintain a warm environment and increase production even in the off-season.

14. **The electric meter in Bhawana's house records 75 units of consumption of electricity in 15 days. Calculate the average monthly electricity bill of Bhawana's house if the cost of electricity is Rs. 9.5 per unit.**

Solution:

In 15 days, total used energy = 75 units

Cost of 1 unit = Rs. 9.5

Her monthly bill = ?

Now, Cost of 75 units = 75 x 9.5

= Rs. 712.5

So, Cost of total used energy in a month = 712.5 x 2

= Rs. 1425

15. **Write any two differences between Group 1 and Group 17 elements.**

Group 1 (Alkali Metals)	Group 17 (Halogens)
They are highly reactive metals.	They are highly reactive non-metals.
They have 1 valence electron in its outermost shell.	They have 7 valence electrons in their outermost shell.

16. **The use of alloys is increasing day by day than pure metals. Why?**

→ Alloy is the homogeneous mixed mixture of two or more metals or non-metals. The use of alloy is increasing day by day because:

i) They are stronger. ii) They are more resistant to corrosion. iii) They have low melting point. (Note: This should likely be *high* melting point for many common alloys)

17. **Mention the characteristics of asteroids with examples.**

→ Asteroids are rocky objects which revolve around the sun like planets.

Characteristics:

i) They are irregular in size. ii) They are made of rocks and minerals.

Group D

Long answer questions

18. **What is cloud computing? Write down any three services provided by cloud computing.**

→ Cloud Computing is a method of computing in which a customer gets a set of services like storage, networking, etc. hosted by a service provider over the internet.

Three services of cloud computing are:

Three services provided by cloud computing are:

i) Infrastructure as a service (IaaS) ⇒ It provides server and storage on payment basis.

ii) Software as a service (SaaS) ⇒ It provides software services to the users with or without payment.

iii) Platform as a service (PaaS) ⇒ It allows clients to use the platform to develop software through the internet.

19. **Suryanarayan dug his field well with a tractor to sow wheat and put compost manure. The next day he sowed wheat and dug the field once again which helped to bury all seeds in the soil. After a few days, he went to the field to observe the condition. At the moistened part, the seedling was good but at the dry part, germination and seedling were not uniform.**

- i) Why did Suryanarayan again dig the field after sowing wheat?

→ To bury all the seeds properly in the soil for better germination.

ii) What may be the reasons for seeds not germinating in the dry part of the field? Give any two reasons.

→ Lacking moisture and water because of which seed could not initiate the germination process.

iii) What should be done for proper seedlings at every corner of the field?

→ By ensuring the fact that every corner should get water to initiate germination and the seed properly gets buried and distributed in every part.

20. If 300 N effort is applied to lift a load of 900 N by using 2 meters long lever. Calculate the mechanical advantage, velocity ratio and efficiency of the lever if the load lies at a distance of 50 cm from the fulcrum.

Sol^{n}:

Here,

Effort (E) = 300 N

Load (L) = 900 N

Total length = 2 m
= 2 x 100
= 200 cm

Load distance (Ld) = 50 cm

Effort distance (Ed) = Total length – Ld
= 200 – 50
= 150 cm

Mechanical Advantage (MA) = Load (L) / Effort (E)
= 900 / 300
= 3

Velocity Ratio (VR) = Effort Distance (Ed) / Load Distance (Ld)
= 150 / 50
= 3

Efficiency (η): = (MA / VR) * 100%
= (3 / 3) * 100%
= 100%

21. A compound gives hydrogen ion and chlorine ion in the solution state.

a. Write down the name and molecular formula of the compound.

→ Name = Hydrochloric acid

→ Formula = HCl

b. In what color is methyl orange changed when it is treated with the above compound? Why?

→ Methyl orange changes into red when treated with HCl because HCl is an acidic solution.

c. Write down the name of the salt formed by the chemical reaction of the above compound and zinc with a chemical reaction.

→ The Salt thus formed is zinc chloride.

Chemical equation:

$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

7 SET

Group B

Very short answer questions

2. **In what conditions is the survey conducted?**
   → To ensure accuracy and reliability and to eradicate/remove any kind of dilemma by collecting data in any specific topic or issues.
3. **What is a collective form of online communication channel dedicated to community-based interaction, content sharing and collaboration?**
   → Social media platforms
4. **What is the legal framework to combat cybercrime and harassment?**
   → Cybercrime laws
5. **Write the name of any one organism in which vegetative reproduction occurs through root.**
   → Sweet potato.
6. **What is meant by relative velocity?**
   → The velocity of a body described relative to reference point or reference frame is called relative velocity.
7. **Which mirror is called a spherical mirror?**
   → Concave and convex mirrors are spherical mirrors.
8. **Write any one application of magnetic inclination.**
   → It is used in navigation to determine latitude of a place.
9. **What is called the hardness of the water?**
   → The concentration of calcium and magnesium ions in water is known as hardness of water.

Group C

Short answer questions

10. **Write any two reasons for writing a report after research work.**
    → Two reasons of writing report are:
    To make research accessible for future studies.
    To ensure clarity.
    To give information to the public.
11. **What is robotics? Mention any two important tasks performed by robots.**
    → The branch of science that can design, operate and use robots is called robotics.
    The two tasks are:
    Cooking
    Assisting in medical surgeries.
12. **What is meant by Virtual Reality? Write the various sectors in which it is used.**
    → Virtual reality means providing stimulus to our sense organs with a complex computer-generated virtual three-dimensional environment which can be explored.

The sectors it is used in are:

Gaming

Education

Movies, etc.

13. **There should be proper coordination among cells, tissues and organs to conduct the life process. Why?**

→ Cell is the basic unit of life. A group of similar cells working together for a particular function is called tissue. A group of tissues specialized for a particular function is called organ. Different organs performing a related function make a system. One system has a specific function. The group of systems such as respiratory system, digestive system, reproductive system, etc. work together to make a living body. So, there should be proper coordination among cells, tissues and organs.

14. **The depth of liquid kept in a drum is 2m and the pressure of liquid at its bottom is 500 N/m^2. Then what is the density of the liquid?**

Sol^n:

Here,

depth of liquid (h) = 2m

gravity (g) = 9.8 m/s^2

liquid pressure (P) = 500 N/m^2

density (d) = ?

We know,

P = h d g

500 = 2 x d x 9.8

500 = 19.6 x d

d = 500 / 19.6

d = 25.5 kg/m^3

15. **Convex mirrors are used as looking glass in vehicles, why?**

→ Convex mirrors are used as looking glass in vehicles because they form virtual, erect and diminished images of objects because of which clear view of vehicles coming from behind can be seen.

16. **The fuse is always connected in phase or live wire in domestic wiring. Why?**

→ The fuse is always connected in phase or live wire in domestic wiring because it protects the appliance from high currents and prevents electric shock.

17. **Write any two differences between valence shell and valence electrons.**

Valence shell	Valence electrons
i) It is the outermost shell of an atom.	i) It is the electrons in the outermost shell of an atom.
ii) It determines the level or shell.	ii) It determines the chemical reactivity and bonding.

Group D

Long answer questions

18. **What are stock and scion in grafting? Describe the process of grafting with its advantages.**

→ Stock → The rooted part of the plant used in grafting.

Scion → The plant whose shoot system is used in grafting is called scion.

Process → Grafting involves attaching a scion (a stem or branch) from one plant to the stock of another. The two parts are bound together, and as they grow, they join to form a single plant.

Advantages

Combines the qualities of two plants.

Improves resistance to disease and pests.

19. Write the range of frequency of sound that can be heard by human beings. If the speed of sound in air is 332 m/s then calculate the wavelength of the shortest and longest wave that can be heard by human beings.

→ The shortest range of frequency of sound extends from shortest, 20 Hz and longest 20,000 Hz (20 KHz).

Solⁿ:

Wavelength of shortest wave

Given,

speed of sound (v) = 332 m/s

frequency (f) = 20 Hz

wavelength (δ) = ?

We know, v = f x δ 332

= 20 x δ δ

= 332 / 20 δ

= 16.6 m

Wavelength of longest wave

Given,

speed of sound (v) = 332 m/s

frequency (f) = 20,000 Hz

wavelength (δ) = ?

We know, v = f x δ

332 = 20,000 x δ

δ = 332 / 20,000

δ = 0.0166 m

20. Write any two chemical properties of acid with balanced chemical equations.

→ i) Acid reacts with base to give salt and water.

$HCl + NaOH \rightarrow NaCl + H_2O$

$NaOH + H_2CO_3 \rightarrow Na_2CO_3 + H_2O$

ii) Acid reacts with metal to form salt and hydrogen gas.

$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2\uparrow$

$Zn + HCl \rightarrow ZnCl_2 + H_2\uparrow$

21. What are the hypotheses about the origin of the earth? Explain any one of them.

→ Nebular hypothesis

→ Big Bang theory

Nebular → Nebular hypothesis states that the earth and other planets are formed from a cloud of gas and dust called nebula, which contracted and condensed under gravity.

8 SET

Group B

Very short answer questions

2. **What is the act of shutting down or abusing a website or computer networking by unethical means?**
   → Hacking is the act of shutting down or abusing a website or computer networking by unethical means.
3. **Write any one application of viruses.**
   → Viruses are used as vectors to treat various diseases.
4. Name the method of reproduction in yeast.
   → Budding
5. **What do you understand by retardation?**
   → Negative value of acceleration where the velocity of a body decreases over time.
6. **What is meant by the reflection of light?**
   → It is the phenomenon where the light bounces back from a surface into the same medium.
7. **Show the relationship between the wavelength, frequency and speed of the sound wave.**
   → Speed of sound wave (v) = frequency (f) x wavelength (δ)
8. **When did mammoths with long tusks and fish with lungs evolve?**
   → This is adaptation for defense in mammoths and in case of fish this is to survive even in low oxygen.
9. **What is a chemical equation?**
   → A chemical equation represents chemical reaction using symbols and formulas of the reactants and products.

Group C

Short Answer questions

10. **What is done in scientific work when there is not enough information from observation? Give answer in two points.**
    Conduct additional experiments.
    Re-evaluate the hypothesis.
    Analyze the existing data, etc.
11. **Write any two differences between robotic human and humans.**

Robotic human	Human
i) They require programming and can't think and act independently.	i) They can think and act independently.
ii) They don't feel emotions.	ii) They do feel emotions.

12. **Environment must be considered while implementing developmental works - why?**

→ • To ensure sustainable development.
• To prevent environmental degradation.
• To maintain eco-system.

13. **What is household electrification? Write down the characteristics of neutral and phase wires used in household electrification.**

→ It is a process of wiring a home to provide electricity for appliances.
Here,
i) Phase wire supplies a current to devices which is indicated by red or brown color.
ii) Neutral wire completes the circuit and carries current back to the power source which is indicated by blue or black color.

14. **If 8 bulbs each of power 25W are installed in a house used for 4 hours 40 minutes daily, calculate the total electricity consumption, in units, in a day.**

- Given,
Power of each bulb = 25W = 0.025 kW
Number of bulbs = 8
Daily usage time = 4 hours 40 minutes = $4 + \frac{40}{60} = 4.67\ hours$
Here,
Total power consumption per hour
Total Power = $= 8 \times 0.025 = 0.2kW$
Total energy consumption per day
Energy Consumption = $Total\ Power\ \times\ Time$
$= 0.2\ \times 4.67$
$= 0.934\ kWh$

15. **Comets gradually lose their material when revolving around the sun many times. Why?**

→ The broom-shaped shining ice heavenly body with a bright head is called a comet. So, comets gradually lose their material when revolving around the sun many times due to the heat of the sun which converts ice into vapors.

16. **"All alkalis are bases but all bases are not alkalis." Justify this statement.**

→ All alkalis are bases but all bases are not alkalis because water-soluble bases are called alkalis, and metallic oxide or hydroxide are called bases. And, all bases do not dissolve in water. For example, ZnO, SiO_2 do not dissolve in water so they are bases, but NaOH or Na_2O are water soluble.

17. **Rain water produces more lather with soap while washing clothes. Why?**

→ Rain water is soft water and does not contain calcium or magnesium ions which produce more lather when reacting with soap.

Group D

Long Answer questions

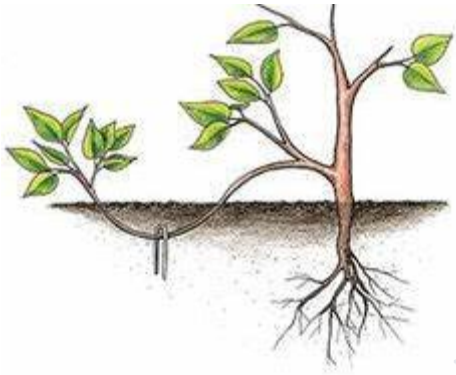
18. **What is cybercrime? What are the forms of cybercrime? Write any three forms.**

→ Cybercrime involves illegal activities done to harm others by using different ICT tools.
The forms of cybercrime are:

i) Hacking	ii) Online fraud	iii) Phishing
iv) Cyber stalking	v) Data theft	vi) Cyber bullying

19. What is layering? Draw a figure of layering with an example.

- Layering is a method of vegetative propagation in which a stem or branch of a plant is bent towards the soil and covered with moist soil while still attached to the parent plant.



20. Observe the given table and answer the following questions asked below.

Sound	Frequency
A	200Hz
B	10Hz
C	50KHz

i) Which sound can be heard by human ear?

→ A (200 Hz)

ii) What is the type of sound "B" called? Why?

→ It is infrasound because it is below the range of audible sound.

iii) Write an application of sound 'C'.

→ Studying animal communication.

iv) From which source the sound 'B' is produced?

→ Earthquakes

21. Study the table given alongside Element and answer the following questions.

Element	Electronic configuration
A	2, 8, 8, 2
B	2, 6
C	2, 8

a) Name the inert gas from given table.

→ Neon

b) Out of A and B, which is metal? Why?

→ Calcium (A)

c) What is formed, when A and B are reacted with each other? Write with balanced chemical equation.

→ $2Ca + O_2 \rightarrow 2CaO$

Calcium oxide is formed.

9 SET

Group B

Very short answer questions

2. **What is observation?**
   → The act of noticing tiny details by using our sense organs is called observation.
3. **What is sustainable development?**
   → It refers to meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.[1]
4. **Define the reference point.**
   → It is a fixed point used to determine the position or motion of an object.
5. **What can be done to lift heavy loads by using a lever?**
   → A lever can be used to lift heavy loads by applying smaller force at a longer distance from the fulcrum.
6. **What is the relationship between the density of liquid and pressure?**
   → Density of liquid and pressure are directly proportional to each other.
7. **What are the factors on which the valency of an element depends?**
   → Valency depends upon the number of electrons in its outermost shell.
8. **What change in metallic properties of elements occurs while moving from left to right in any period of the periodic table?**
   → Metallic properties decrease as we move from left to right in a period of the periodic table.
9. **Well water is hard - why?**
   → Because it has high concentrations of dissolved minerals, such as calcium and magnesium, and it does not produce lather with soap easily.

Group C

Short answer questions

10. **What is a search engine? Illustrate the need for search engines with examples.**
    → The software that can search a database of information according to our query is called a search engine. (Archie) was the first search engine created in 1990 by Alan Emtage.
    Search engines help us to facilitate us in our work with the required information and data as we human can't remember everything so we can gain required knowledge at required time from search engines like google, etc.

11. Write any two differences between computer code of conduct and cyber law.

Computer Code of Conduct	Cyber Law
Voluntary ethical guidelines for individuals or organizations	Legally binding rules enforced by the government
Internal disciplinary actions, reputation loss	Legal penalties such as fines or imprisonment

12. Write any two things that can be done while working in the laboratory.

→ The two things are:

i) Following safety measures.

ii) Keep the area clean.

13. If the brake is applied in a car moving with uniform velocity, then the retardation of 2 m/s^2 is produced and the car stops after 4 seconds. Calculate the initial velocity of the car.

Sol^n:

Here,

retardation (-a) = 2 m/s^2

final velocity (v) = 0 m/s

time taken (t) = 4 sec

initial velocity (u) = ?

We know, -a = u - v / t

2 = u - 0 / 4

2 x 4 = u - 0

8 = u

u = 8 m/s

14. It is easier to push the load in a wheelbarrow while sitting the load towards its wheel. Why?

→ As we know, effort will be magnified when effort distance is large. So, when we shift the load towards the wheel, load distance is decreased and effort distance is increased making it easier to push.

15. What is the greenhouse effect? Write down the applications of greenhouse effects.

→ It is a natural process which traps the heat from the sun in earth's atmosphere making a temperature stable.

The applications are:

i) To stabilize earth's temperature.

ii) Growing plants, etc.

16. Convex mirrors and plane mirrors cannot produce the real image. Why?

→ Because in both mirrors the rays of light gets diverged which end up forming a virtual image beyond the screen.

17. What will be the valency of an element if the electronic configuration of an element is 2,8,8,1? Write with reasons.

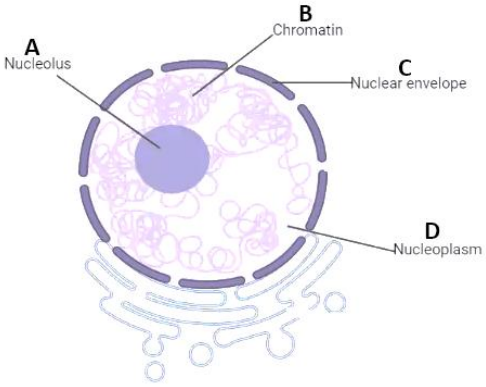
→ The name of the element is potassium which is denoted by (K) and its valency is one because it donates one electron to complete its octet rule.

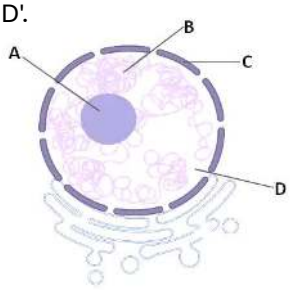
Group D

Long Answer questions

18. Study the given figure of nucleus carefully and answer the following questions:

i. Copy this figure in your exercise book and label the parts 'A', 'B', 'C', and 'D'.





ii. What is the function of 'B'?

→ To store genetic information and help in cell division. It also controls the activities of the cell by carrying instructions for making proteins.

iii. What happens if there is no nucleus in a cell? Explain?

→ If there is no nucleus in a cell then the cell will die.

19. What is meant by double fertilization? Describe the process in brief.

→ It is a process that occurs in flowering plants, where one cell sperm cell fertilizes the egg cell to form zygote and the other sperm cells fuses with the polar nuclei to form the endosperm.

20. a) What is the condition in which the average velocity of a body is calculated? Write down the formula to calculate average velocity.

→ Average velocity is calculated when we divide the total displacement by the total time taken.

b) Two motorcycles are moving at the speed of 50 km/hr and 60 km/hr in the same direction. Calculate the relative velocity between these motorcycles. If they were moving in opposite directions what would be the relative velocity between them?

Solⁿ: Given,

velocity of motorcycle A (V_a) = 60 km/hr

velocity of motorcycle B (V_B) = 50 km/hr

Relative velocity of motorcycle A, if moving in the same direction (VAB) = ?

Relative velocity of motorcycle B, if moving in the opposite direction (VAB) = ?

When both motorcycles are moving in the same direction

VAB = VA - VB

= 60 - 50

= 10 km/hr

When the motorcycles are moving in opposite direction

VAB = VA + VB

= 60 + 50

= 110 km/hr

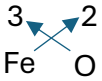
21. Write down the molecular formula of given compounds by crisscross method.

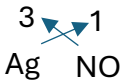
a) Ferric oxide

b) Silver nitrate

Ferric oxide: Fe_2O_3

Silver nitrate: ($Ag\ NO_3$)





10 SET

Group B

Very short answer questions

2. What to pay attention to during research?
   - **Pay attention to** reliable sources, objective data, unbiased research, and proper analysis.
3. What is a microorganism? Example?
   - **A microorganism** is a tiny organism invisible to the naked eye. Example: **Bacteria**.
4. Why use convex mirrors in street lamps?
   - **Convex mirrors** spread light widely, improve visibility, and enhance road safety.
5. **Write any one application of convection in daily life.**
   - Convection is responsible for the circulation of air in a room when a heater is used. Warm air rises, while cooler air falls, creating a continuous flow.
6. **What is an atom?**
   - An atom is the basic building block of matter. It is the smallest unit of an element that retains the chemical properties of that element.
7. **Classification of elements is necessary. Why?**
   - Classifying elements makes it easier to study their properties and understand their relationships. It organizes the vast amount of chemical information in a logical and systematic way.
8. **List out the two reasons for acid rain.**
   - i. Release of sulfur dioxide and nitrogen oxides from industrial processes and burning fossil fuels.
     ii. These gases react with moisture in the atmosphere to form sulfuric acid and nitric acid.
9. **What is an alloy?**
   - An alloy is a mixture of two or more metals, or a metal and a nonmetal. They are often created to have more desirable properties than the individual components.

Group C

Short answer questions

10. **Write any two differences between search engines and websites.**

Search Engines	Websites
Search engines help users find information on the internet by indexing websites.	Websites are specific locations on the internet containing information or services.
Google, Bing, Yahoo	www.example.com, www.amazon.com, www.wikipedia.org

11. **Write any two uses of artificial intelligence.**
- AI is used in medical diagnosis to analyze images and patient data.
AI is used in self-driving cars to process sensory information and make driving decisions.

12. **Write any two things that cannot be done while working in the laboratory.**
- Eating or drinking in the lab.
Performing unauthorized experiments.

13. **If a bus covers 4.2 km of distance in 7 minutes, then calculate its average velocity.**
- Given,
Time: 7 minutes x 60 seconds/minute = 420 seconds
Distance: 4.2 km x 1000 m/km = 4200 meters
Velocity = Distance / Time
= 4200 meters / 420 seconds
= 10 m/s

14. **Write any two differences between input work and output work.**

Input Work	Output Work
The work done on a machine to set it in motion.	The work done by the machine to perform a task.
Input work involves transferring energy to the machine.	Output work involves the machine transferring energy to the object.

15. **Write down the factors on which the image formed by the concave mirror depends.)**
- The distance of the object from the mirror.
The focal length of the mirror.

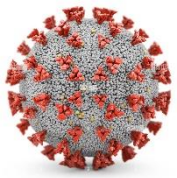
16. **Sodium and chlorine belong to different groups but they have valency 1. Why?**
- Sodium (Na) is in Group 1, meaning it has 1 valence electron that it tends to lose. Chlorine (Cl) is in Group 17, meaning it has 7 valence electrons and tends to gain 1 electron. Both achieve a stable octet (8 electrons in their outermost shell) by either losing or gaining 1 electron, hence having a valency of 1.

17. **Write any two differences between temporary hardness of water and permanent hardness of the water.**

Temporary Hardness	Permanent Hardness
Presence of dissolved bicarbonates of calcium and magnesium	Presence of dissolved sulfates or chlorides of calcium and magnesium
Can be removed by boiling the water	Cannot be removed by boiling; requires chemical treatment (e.g., washing soda)

Group D

Long answer questions




18. **Study the figure and answer the questions.**

(i) What are shown in the figure.

- Corona Virus and Retro Virus are shown in figure.

(ii) Name a disease caused by it and two preventive measures.

- **Disease caused by Coronavirus**: COVID-19

Preventive Measures:

1. Wear masks and practice social distancing.
2. Wash hands frequently with soap and water or use hand sanitizer.

- **Disease caused by Retrovirus**: HIV/AIDS

Preventive Measures:

2. Use condoms during sexual activity.
3. Avoid sharing needles or any other equipment for drug use.

19. **Explain the germination process of seeds with a suitable diagram.**

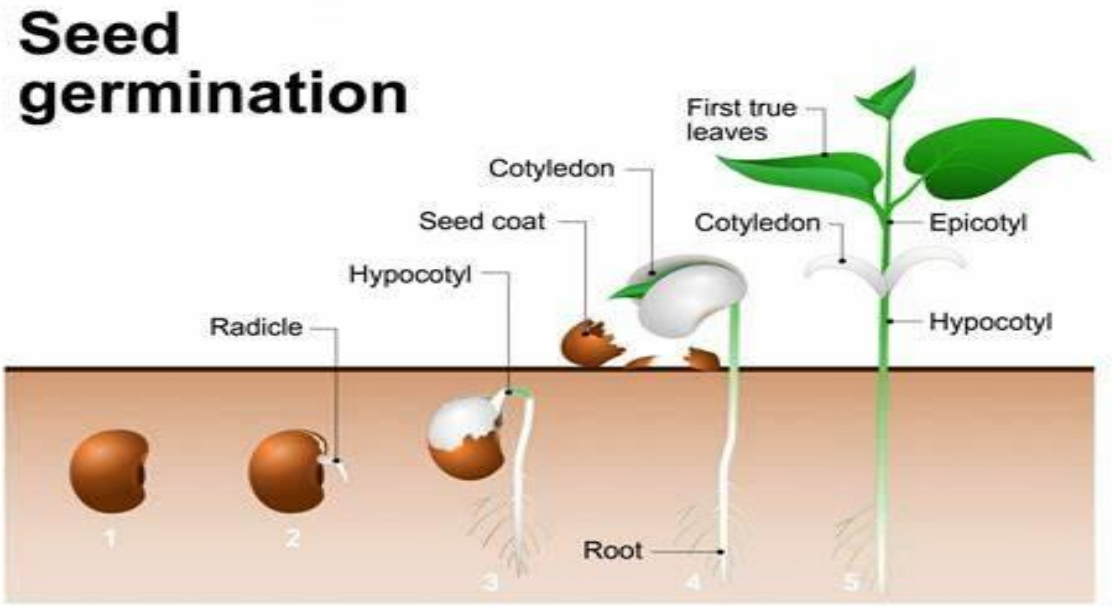
- Seed germination takes place in the following three stages:

i. **Inhibition**: the seed imbibes (takes up) a lot of water, causing the seed coat to expand and soften.

ii. **Interim or lag phase**: the seed's internal physiology is activated, so its cells respire and the seed begins to produce proteins and use up its food reserves.

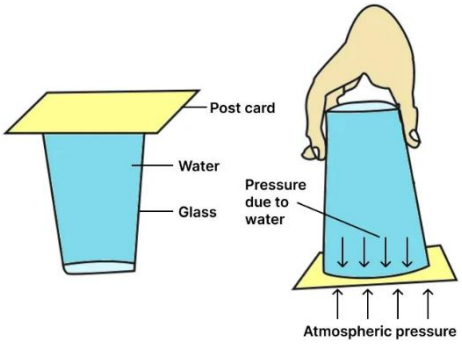
iii. **Radicle and root emergence**: the cells begin to lengthen and divide, allowing the root and radicle to emerge from the seed.

A seed is considered to have completed germination as soon as the radicle breaks open the coleorhiza (root sheath) and emerge. A seed becomes a "seedling" as soon as the first true leaf emerges.



20. Describe an experiment to prove that the atmosphere exerts pressure.

- The following experiment demonstrates that atmosphere exerts pressure:



1. Take a glass filled with water up to its brim and place a post card on top of it.
2. Press the palm of your one hand on top of post card and then invert the filled glass upside down.
3. Now gently remove your hand from the post card to release it.

Conclusion — It is observed that post card does not fall from the glass because the atmospheric pressure is acting upwards on the post card from outside the glass which overcomes the pressure on post card due to water in the glass.

21. Study the figure and answer the questions.

(i) In which era did these animals evolve and extinct.

- Dinosaurs evolved during the Mesozoic Era and extinct at the end of the Cretaceous period which spanned from about 252 to 66 million years ago.

(ii) What are the reasons for their extinction. Write in any two points.

- a. Asteroid Impact b. Volcanic Activity

(iii) If these animals were still roaming on the earth, what impact, in your opinion would be occurred in biological balance.

- If dinosaurs were still roaming the Earth, they would likely disrupt current ecosystems by becoming apex predators and competing with existing species for sfood and territory.
- Their presence could potentially alter the evolution of modern species, as mammals and birds would need to adapt or face increased competition, which could drastically shift biodiversity and the biological balance.