Science

Chapter - 1

1. Tick (✓) the correct answer.

a. which of the following uses self working technology?
i. Ict ii) Steam engine iii) Artificial inielligence iv) Nuclear power plant

b. How is Sulphuric acid diluted?
i. water is added to concenterated acid
ii. Concenterated acid is added to water.
iii. Acid and water are pour together in a pot.
iv. Acid is poured into hot water. ✓

c. which of the following is related to chemistry?
i. Cloning ii. microscope iii. Surgical operation
iv. Battery ✓

d. What is Dr. Sanduk Ruit famous for?
i. Protein structure ii) Intra-ocular lens ✓
iii. organocatalysis iv) Discovery of radium

e. How is the number 0.00000738 expressed using Scientific notation?
i. 73.8×10^{-6} ii. 7.38×10^{-7} iii. 7.38×10^{-6} ✓
iv. 738×10^{-5}

2. Answer these questions in one sentence.

a. Give an example of interdisciplinary science.
→ Environmental science is an example of inter-disciplinary science

b. What is multiplier of the mega prefix?
→ 10^6 is multiplier of the mega prefix.

c. What is size of an atom in nanometer scale?
→ Size of an atom in nanometer scale is ~~10~~ 10^{-10} nm.

d. Who is meteorologist?
→ A meteorologist is a scientist who studies and works in the field of meteorology.

e. Define scientific notation
→ Scientific notation is the way of expressing very small and large numbers in terms of power of ten.

f. What is meant by precise measurement?
→ Precise measurement is the measurement if the repeated measurement gives very close or identical results.

g. What branch of science is in-vitro fertilization related to?
→ Biology is the branch of science in-vitro fertilization is related to.

2. Answer these questions in brief

a. What is science? make a list of main categories of science.

→ Science is a systematic examination of the physical and natural worlds, based on observations, experiments and sound reasoning.

the list of main categories of science are given below:-

i) Formal science
ii) Social science
iii) natural science

b. How do you conduct a scientific study? make flowsheet diagram.

→ The steps involved in scientific study is given below:-

i) observing and asking questions:
ii) Performing background study
iii) Forming hypothesis
iv) managing required materials
v) Testing with an experiment
vi) Getting the results
vii) Analyzing the results and drawing conclusion
viii) Communicating the results

* make diagram from book *

c How do you carry out an experiment in Science?

→ To carry out experiment in science we follow given steps:-

i) Ask a question on observation
ii) Form hypothesis
iii) Plan the experiment
iv) Conduct the experiment
v) Analyze the results
vi) Draw conclusion to find out if hypothesis was correct.
vii) Communicate the results.

d. Enlist the major safety precautions that are necessary in a science laboratory.

→ major safety precautions that are necessary in a science laboratory are given below:-

i) Students should perform experiments only in the guidance or presence of their science teacher.
ii) Students should never taste or smell a chemical.
iii) Students should learn about instrument or chemical before using it.
iv) Students should never mix chemicals carelessly.

e. Define Scientific notation and write down its importance.

→ Scientific notation is the way of expressing very small and large numbers in terms of power of ten. e.g:- 0.0009 can be written as 9×10^{-4}

The importance of writting scientific notation are as given below.-

i) Simplification of very small or large numbers.
eg:- 0.00000001 becomes 1×10^{-8}
ii) Easy calculation of big or small numbers.
iii) Reduces chances of errors.
iv) makes scientific calculation standardized.

f. What rules should be considered while writing scientific notation?

→ The rules that should be considered while writting scientific notation are given as:-

i) The base number is always 10.
ii) The exponent is never zero, alone, but it can be positive, negative value.
iii) The coefficient should not be more than 10 and less than 1.
iv) Coefficient can be positive or negative number, whole number or decimal number.
v) Shifting decimal point to the left will give power of 10 positively. 10^1
vi) Shifting decimal point to the right will give power of 10 negatively. 10^{-1}
vii) If give number is non-zero digits then last significant digit is rounded to nearest higher digit.

g How is Average value calculated? Explain its importance.

→ Average value is calculated using given formula :-

$$\text{Average} = \frac{\text{Sum of all values}}{\text{number of values}}$$

The importance of Average value is given as:-

i) Summary of data → Summarizes data in single value.

ii) Comparison tool → helps to compare different data

h. How is least count of device determined? Write down importance of least count.

→ The smallest value that a particular instrument can measure accurately is called least count. which is determined by formula:-

$$\text{least count} = \frac{\text{value of one divisio}}{\text{Total number of divis}}$$

The importance of least count are given as:-

i) Necessary for precise measurement

ii) Determines accuracy of measurement.

iii)

i What are challenges asociated with a nuclear power plant?

→ The challenges asociated with nuclear power plant are given as:-

i) Radio-active waste disposal → Radio-active waste are dangerous for thousand of years.

ii) high initial cost → Constructing nuclear power plant is costly.

iii) Radiation risk → Radiation caused by nuclear plant are harmful to health of living beings.

iv) Long construction time.

J. How is artificial intelligence affecting the learning and working of people?

→ Artificial intelligence is affecting learning and working of people in following ways:-

In learning

i) Personalized education based on user's learning style

ii) Instant feedback and correction.

In working

i) Automation of Repetitive tasks

ii) Smart decision making.

4. Explain following numbers in terms of scientific notation.

i) $10000 = 1 \times 10^4$

ii) $12300000 = 1.23 \times 10^7$

iii) $0.00000037 = 3.7 \times 10^{-7}$

iv) 4000×10000

$= 4 \times 10^3 \times 1 \times 10^4$

$= 4 \times 1 \times 10^3 \times 10^4$

$= 4 \times 10^7$

v) $5 \times 10^3 \times 7 \times 10^4$

$= 5 \times 7 \times 10^3 \times 10^4$

$= 35 \times 10^7$

$= 3.5 \times 10^8$

vi) $2 \times 5000 + 3 \times 4000$

$= 10000 + 12000$

$= 22000$

$= 2.2 \times 10^4$

vii) $2 \times 10^5 + 3 \times 10^5$

$= 10^5(2+3)$

$= 10^5 \times 5$

$= 5 \times 10^5$

5. Answer these questions in detail

a. How is Scientific Study carried out? Explain the steps involved in Scientific study.

→ Scientific study is the an approach that uses a series of procedures applied methodically to describe natural events in a repeatable way.

The steps involved in Scientific study are given below:-

a) observing and asking questions → Asking question on what you have observed is the first step. For example:- falling down of leaves on earth surface is the observation where question is why does leaves fall downward?

b) Performing background study → After question is asked on respective topic we need to study further which is called background study.

c) Forming hypothesis → Hypothesis is the act of guessing best possible answer ~~about the~~ of the question.

d) managing the required materials → After formation of hypothesis we plan to do experiment, To conduct experiment we need materials, in this step we gather materials.

e) Testing with an experiment → With the suitable method hypothesis are tested to find wether hypothesis is true or false.

f) Gatling the results → The experiment changes are noted down. Changes could be numerical or any kind of change.

g) Analyzing the results and drawing conclusion → After results being noted down the results should be analyzed and conclusion should be formed wether hypothesis was correct or not.

h) Communicating the results → After all the steps performed ~~results~~ finding of experiments are written and telling other people should be done.

b. Explain the interrelationship among different fields of science.

→ Science has different fields such as physics, Chemistry, Biology, Earth science, etc. They are interconnect to one another which are explained below:-

a) Physics and chemistry → Physics explains fundamental forces and energy in nature where Chemistry deals with composition and behavior of matter.

b) chemistry and Biology → chemistry helps life to explain life process at molecular level. Combination called Bio-chemistry.

c) Biology and physics → Physics helps to understand biological processes such as movement, blood flow and vision. Their combination known as biophysics.