



QUESTION PAPER

STD.: IXTH (CBSE)

MARKS: 80

SUBJECT: SCIENCE

SOLUTION 2019-20

TIME: 2 HOURS.

SECTION - A

1. Define the commercial unit of electrical energy. 1
- Ans.** Kilowatt - hour is the commercial unit of electrical energy which is defined as the amount of electrical energy consumed when an electrical appliance having a power rating of 1 kilowatt is used for 1 hour.
2. Name the characteristics of sound wave on which the following properties depend? 1
- (a) Loudness (b) Pitch
- Ans.** (a) Loudness depends on amplitude (b) Pitch depends on frequency.
3. Find the relative density of copper block of mass 216 g having volume of 80 cm³.
(Density of Water = 1 g/cm³). 1
- Ans.** Density of block = $\frac{\text{Mass}}{\text{Volume}} = \frac{216}{80} = 2.7 \text{ g/cm}^3$
- Relative density = $\frac{\text{Density of a substance}}{\text{Density of water}} = \frac{2.7}{1} = 2.7$
4. Seema visited a Natural Gas Compressing Unit and found that the gas can be liquefied under specific conditions of temperature and pressure. While sharing her experience with friends she got confused. Help her to identify the correct set of conditions 1
- (a) Low temperature, low pressure (b) High temperature, low pressure
(c) Low temperature, high pressure (d) High temperature, high pressure
- Ans.** (c) Low temperature, high pressure
5. Distribution of electrons, protons and neutrons in atoms of four elements A,B,C and D is given in the following table:

Element	Protons	Neutrons	Electrons
A	19	21	19
B	17	18	17
C	17	20	17
D	18	22	18

Observe the table and answer the following questions:

- (i) Describe the electronic distribution in atom of element B. 1
- (ii) Is elements B a metal or a non-metal? Why? 1
- (iii) Which two elements form a pair of ISOTOPES? 1
- (iv) Which two elements form a pair of ISOBARS? 1

- Ans.** (i) Number of electrons in element B = 17
Therefore, distribution of electrons is represented as: B (17) = 2 8 7
- (ii) Element B is a non-metal as it is short of one electron to complete the octet.
- (iii) As isotopes are the elements having same atomic numbers.
Therefore, here Brand C are the isotopes with atomic number 17.
- (iv) Isobars are the elements with same mass number, i.e., sum of protons and neutrons.
Thus, here A and D are the neutrons with same mass number, 40.
As, mass number of A = 19 + 21 = 40
And, mass number of B = 18 + 22 = 40

6. In which of the following conditions, the distance between the molecules of hydrogen gas would increase? **1**

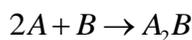
- (i) Increasing pressure on hydrogen contained in a closed container
- (ii) Some hydrogen gas leaking out of the container
- (iii) Increasing the volume of the container of hydrogen gas
- (iv) Adding more hydrogen gas to the container without increasing the volume of the container
- (a) (i) and (iii) (b) (i) and (iv) (c) (ii) and (iii) (d) (ii) and (iv)

Ans. (c) (ii) and (iii)

Reason :

In both the cases due to the availability of larger space molecules of hydrogen gas get scattered all around to create larger intermolecular spaces.

7. Two substances, A and B were made to react to form a third substance, A_2B according to the following reaction



Which of the following statements concerning this reaction are incorrect? **1**

- (i) The product A_2B shows the properties of substances A and B
- (ii) The product will always have a fixed composition
- (iii) The product so formed cannot be classified as a compound
- (iv) The product so formed is an elements
- (a) (i), (ii) and (iii) (b) (ii), (iii) and (iv) (c) (i), (iii) and (iv) (d) (ii), (iii) and (iv)

Ans. (c) (i), (iii) and (iv)

8. An atom with 3 protons and 4 neutrons will have a valency of **1**

- (a) 3 (b) 7 (c) 1 (d) 4

OR

The proteins and lipids, essential for building the cell membrane, are manufactured by

- (a) rough endoplasmic reticulum (b) golgi apparatus
- (c) plasma membrane (d) mitochondria9.

Ans. (a) rough endoplasmic reticulum

9. Rusting of an article made up of iron is called **1**

- (a) Corrosion and it is a physical as well as chemical change
- (b) Dissolution and it is a physical change
- (c) Corrosion and it is a chemical change

(d) Dissolution and it is a chemical change.

Ans. (c) Corrosion and it is a chemical change

Explanation: Rusting of an article made up of iron is called corrosion. Corrosion is a chemical change because rust is a chemical compound (Hydrated iron oxide), which is totally different from element iron (Fe).

10. Fats are stored in human body as

1

(a) cuboidal epithelium (b) adipose tissue (c) bones (d) cartilage

Ans. (b) adipose tissue

11. Given below is a diagram showing the structure of a neuron tissue?

1

Choose the correct labelling for the parts A, B, C, D and E.

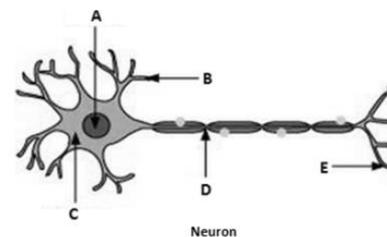
(a) A – Nucleus; B – Cell body; C – Dendrite; D – Axon; E – Nerve ending.

(b) A – Nucleus; B – Dendrite; C – Cell body; D – Nerve ending; E – Axon.

(c) A – Nucleus; B – Axon; C – Cell body; D – Dendrite; E – Nerve ending.

(d) A – Nucleus; B – Dendrite; C – Cell body; D – Axon; E – Nerve ending

Ans. (d) A – Nucleus; B – Dendrite; C – Cell body; D – Axon; E – Nerve ending



12. Earthquake produces which kind of sound before the main shock wave begins

1

(a) ultrasound (b) infrasound (c) audible sound (d) none of the above

Ans. (b) infrasound

OR

Find out the false statement

(a) Golgi apparatus is involved with the formation of lysosomes

(b) Nucleus, mitochondria and plastid have DNA, hence they are able to make their own structural proteins

(c) Mitochondria is said to be the power house of the cell as ATP is generated in them

(d) Cytoplasm is called as protoplasm.

Ans. (d) Cytoplasm is called as protoplasm

Reason:

Cytoplasm is the jelly like substance that occupies the space between the cell membrane and the nucleus. Whereas, the cytoplasm surrounded by the cell membrane and enclosing the nucleus together constitute the protoplasm.

13. In case of negative work the angle between the force and displacement is

1

(a) 0° (b) 45° (c) 90° (d) 180°

Ans. (d) 180°

14. In which layer of the atmosphere ozone layer is located?

1

Ans. Ozone layer is located in Stratosphere.

15. What is the absolute mass and charge of an electron?

1

Ans. Absolute mass of an electron = 9.1×10^{-31} kg

Absolute Charge on electron = -1.6×10^{-19} Coulomb.

16. Give two reasons why crystallization is better than simple evaporation.

1

Ans: Crystallization is better than evaporation because during Evaporation: 1) Some solids decompose or some, like sugar may get charred on heating to dryness. 2) Some impurities may remain dissolved in the solution even after filtration, which on evaporation contaminates the solid.

17. Name the unbalanced force which slows, down a moving bicycle when we stop pedalling it. **1**

Ans: Force of friction

SECTION - B

18. A flask contains 4.4g of CO₂ gas. Calculate **3**

- (a) How many moles of CO₂ gas does it contain?
- (b) How many molecules of CO₂ gas are present in the sample.
- (c) How many atoms of oxygen are present in the given sample.

[Atomic mass of C is 12u and that of O is 16u]

Ans. 1 mole of CO₂ = 12 + 16 × 2 = 44g

- (a) Number of moles of CO₂ = $\frac{4.4}{44\text{g mol}^{-1}} = 0.1 \text{ mol}$
- (b) Number of molecules of CO₂ = $0.1 \times 6.022 \times 10^{23} = 6.022 \times 10^{22}$ molecules
- (c) Number of atoms of oxygen = $2 \times 0.1 \times 6.022 \times 10^{23}$
 $= 2 \times 6.022 \times 10^{22}$
 $= 1.204 \times 10^{23}$ atoms

OR

- (a) Define Power of a body.
- (b) Two children A and B both weighing 32 kg start climbing up a rope separately reach a height of 8m, 'A' takes 15s and 'B' takes 20s to reach that level. Calculate the amount of work done by A and B. Which of the two has more power. Show by calculation. [g = 10 m/s²].

Ans. (a) Power: Power is defined as the rate of doing work or work done per unit time.

$$\text{i.e., } P = \frac{W}{t}$$

- (b) For A: $W = m \times g \times h$
 $= 32\text{kg} \times 10 \text{ m/s}^2 \times 8\text{m}$
 $= 2560 \text{ J}$

Both have same mass and climb the same height.

∴ Work done by B = 2560 J

$$\text{Now power of A, } P_A = \frac{2560\text{J}}{15\text{s}} = 170.7\text{W}$$

$$\text{And, power of B, } P_B = \frac{2560\text{J}}{20\text{s}} = 128\text{W}$$

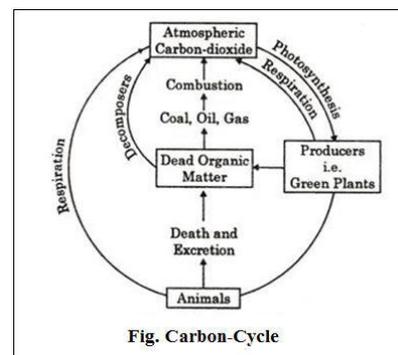
- 19.** (a) List four main processes involved in the water cycle. **3**
- (b) Give a diagrammatic representation of Carbon Cycle in nature.

Ans. (a) Four main processes involved in water cycle are:

- i. Evaporation:** Water from oceans, lakes, rivers and other water bodies get warmed up due to sun's heat and converted into water vapour (gas). Water vapour droplets join together to make clouds.
- ii. Condensation:** In this step vapour gets cooled down and turns back into liquid water.
- iii. Precipitation:** Here water (in the form of rain, snow, hail or sleet) falls from clouds in the sky.

iv. **Runoff:** The water from clouds falls down the hills, mountains, or other inclines to join oceans, rivers, lakes, streams, etc. Most will infiltrate (soak into) the ground and will collect as underground water.

(b) Diagrammatic representation of Carbon Cycle in nature:



20. 10 bulbs of 50 W each, are being used for 6 hours a day along with 5 bulbs of 100 W each, for 2 hours a day. How many 'units' (kWh) of electrical energy are consumed in one day by all bulbs together? **3**

Ans. We know that,

Energy consumed by electric bulb = Power of the bulb \times Time

For 50 W bulbs:

Energy consumed by 1 electric bulb in a day = $50 \text{ W} \times 6 \text{ h} = 300 \text{ watt-hours}$

Energy consumed by 10 electric bulbs in a day = $300 \times 10 = 3000 \text{ watt-hour}$

For 100 W bulbs:

Energy consumed by 1 electric bulb in a day = $100 \text{ W} \times 2 \text{ h} = 200 \text{ watt-hour}$

Energy consumed by 5 electric bulb in a day = $200 \times 5 = 1000 \text{ watt-hour}$

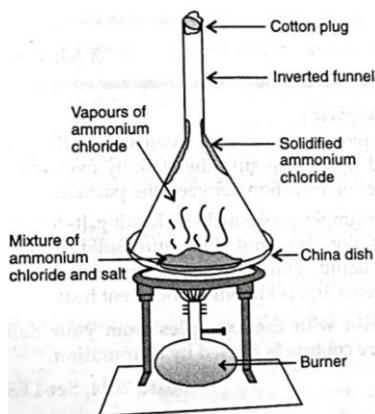
Thus, total energy consumed by all 50 W bulbs and 100 W bulbs, in a day

$$= 3000 + 1000 = 4000 \text{ watt-hour} = 4 \text{ kWh}$$

21. With the help of a well – labelled diagram (with two labelling) explain how solid ammonium chloride converts directly to gaseous state on heating? **3**

Ans. a) Take some camphor or ammonium chloride. Crush it and put in a China dish.

b) Put an inverted funnel over the China dish. Put a cotton plug on the stem of the funnel. Now heat slowly. It is observed that NH_4Cl sublimes and gets deposited on the inner core of funnel.



OR

List three differences between properties of metals and non - metals.

Ans. **Metals:**

- (i) Metals are sonorous i.e., they produce sound.
- (ii) Metals can be beaten into thin sheets i.e., malleable.
- (iii) Metals can be drawn into wires i.e., ductile.

Non - metals:

- (i) Non - metals are non - sonorous as they do not produce any sound.
- (ii) Non - metals are fragile.
- (iii) Non - metals are non - ductile.

22. Give an example for each of the following. **3**

- (i) Solid - Liquid homogeneous mixture.
- (ii) Gas - Gas homogeneous mixture.
- (iii) Liquid - Liquid heterogeneous mixture.

Ans. (i) Sugar in water (ii) Air (iii) Oil in water.

23. (i) Which cell organelle would you associate with ATP production? How is this organelle able to make its own proteins? **3**

(ii) A student performed an experiment by placing the deshelled egg in a concentrated salt solution for five minutes. What changes did he observe in the egg? Give reason for the same.

Ans. (i) Mitochondria is associated with ATP production. It has own DNA and ribosomes to make proteins.
 (ii) The egg shrinks because water passes out of the egg solution, into the salt solution due to osmosis.

24. Name the following: **3**

- (i) Tissue that forms the inner lining of our mouth.
- (ii) Tissue that connects muscle to bone in humans.
- (iii) Tissue that transports food in plants.
- (iv) Tissue that stores fat in our body.

Ans. (i) Epithelial tissue (ii) Tendon (iii) Phloem
 (iv) Adipose tissue (v) Cardiac muscles (vi) Ciliated cuboidal epithelium.

25. List the three distinguishing features between Gymnosperms and Angiosperms. **3**

Ans. Difference between Gymnosperms and Angiosperms:

Gymnosperms	Angiosperms
(i) Plants bear naked	(i) Plants contain seeds that develop inside an organs which are further modified to becomes a fruit.
(ii) They are perennial, evergreen woody.	(ii) They are annual, biennial perennial, woody or non-woody.
(iii) Non-flowering plants	(iii) Flowering plants

26. Name the phylum to which the following organisms belong to: **3**

- (i) Organisms having peculiar water driven tube system that they use for moving around.
- (ii) Organisms having a foot that is used for moving around and have an open circulatory system.
- (iii) These organisms have holes or pores all over the body that lead to a canal system that helps in circulating water throughout the body.

Ans. (i) Echinodermata (ii) Mollusca (iii) Porifera.

27. (a) Identify two features possessed by all Chordates.
(b) In which class would you place any organism which has?
(i) A scaly exoskeleton and a bony endoskeleton
(ii) A scaly exoskeleton and lay eggs outside water.

3

- Ans. (a) Features exhibited by Chordates are:
(i) All chordates have a dorsal supportive notochord.
(ii) The Hollow nerve chord runs dorsal to the notochord.
(b) (i) Scaly exoskeleton and bony endoskeleton - Class Pisces
(ii) Scaly exoskeleton and lay eggs outside - Class Reptilia

OR

Explain the following terms:

- (a) Bilateral symmetry
(b) Triploblastic animals
(c) Open circulatory system.

Ans. Explain the following terms:

- (i) Bilateral symmetry : It means that the left and right halves of the body have the same design. It is found in Platyhelminthes.
(ii) Triploblastic animals : In triploblastic animals, there are three layers of cells from which differentiated tissues can be made.
(iii) Open circulatory system : In open circulatory system, blood does not flow in well defined blood vessels. Blood is pumped by a heart into the body cavities, where tissues are surrounded by the blood.

SECTION - C

28. (a) Write any four characteristics exhibited by a pure substance?
(b) What happens to sugar when it is dissolved in water? Where does the sugar go? What information do you get about the nature of matter from this solution of sugar in water.

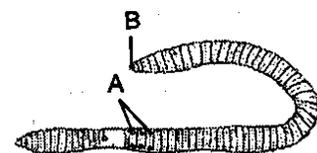
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- Ans. (a) Four characteristics exhibited by a pure substance are:
(i) A pure substance contains only one kind of atoms or molecules.
(ii) It is perfectly homogenous
(iii) It has definite composition which does not vary with time.
(iv) It has definite melting point, boiling point, density etc.
(b) When sugar is dissolved in water, the particles of sugar get settled in between the spaces of the particles of water and fill that space. From this process we conclude that the particles of water have space between them and that is why the sugar particles get into those spaces resulting in no change in the water level.

OR

Study the figure and answer the following questions.

- (i) Identify the organism and name the phylum to which it belongs.
(ii) Label A and B
(iii) Name the type of symmetry.



1

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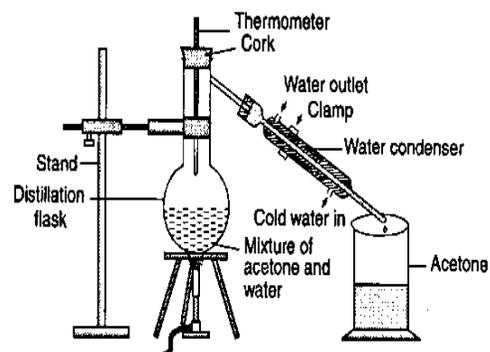
(iv) Name two other organisms belonging to the above phylum.

- Ans.** (i) Earthworm, Phylum – Annelidan
 (ii) A – Genital papillae B – Anus
 (iii) Bilaterally Symmetrical
 (iv) Nereis, Hirudinaria

29. With a neat labelled diagram explain the process used for separating acetone (or alcohol) and water from their mixture. List two criteria that must be fulfilled for using this process. 5

Ans. Activity:

- (i) Take the mixture in a distillation flask. Fit it with a thermometer.
- (ii) Arrange the apparatus as shown in figure.
- (iii) Heat the mixture slowly keeping a close watch at the thermometer.
- (iv) The acetone (or alcohol) vapourises, condenses in the condenser and can be collected from the condenser outlet.
- (v) Water is left behind in the distillation flask.



Criteria: Two miscible liquids that boil without decomposition and have sufficient difference in their boiling points can be separated by this method.

30. (a) Why are angiosperms so called ? In which structures do the seeds develop ? How are angiosperms different from gymnosperms ? 5

(b) Give an appropriate term for each of the following:

- (i) Complex sugar that makes the fungal cell wall.
- (ii) Plants which bear naked seeds.
- (iii) Basic unit of classification.
- (iv) Group of unicellular eukaryotic organism.

Ans. (a) Angiosperms are so called because these plants have covered seeds. Seeds develop within ovary which later modify into fruit.

Angiosperms can be differentiated from gymnosperms as follows:

S. No.	Angiosperms	Gymnosperms
1.	They are flowering plants.	They are non-flowering plants.
2.	The plants of this group contains seeds which develop inside an organ which is further modified to become a fruit .	The plants of this group bear naked seeds.
3.	The plants of this group may be annual, evergreen and woody.	The plants of this group are usually

- (b) (i) Complex sugar that makes the fungal cell wall - Chitin
- (ii) Plants which bear naked seeds - Gymnosperms
- (iii) Basic unit of classification - Cell structure
- (iv) Group of unicellular eukaryotic organism - Protista.

31. Give reasons for the following statements:

- (a) Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole.
- (b) Intercellular spaces are absent in sclerenchymatous tissues.
- (c) We get a crunchy and granular feeling, when we chew pear fruit.
- (d) Branches of a tree move and bend freely in high wind velocity.
- (e) It Is difficult to pull out the husk of a coconut tree. 20.

- Ans.**
- (a) Vacuoles have a function of storing food and other nutrients that a cell might need to survive. But, as Meristematic cells have an ability to divide and form new cell so there is no point in storing food and other nutrients when the cell has to divide. So they lack vacuole.
 - (b) There are no intercellular spaces in the sclerenchyma cells as these cells are lignified to provide strength to the plants.
 - (c) This is due to the presence of cells known as sclereids or stone cells. The sclereids give a crunchy feeling to the pear fruit because it provides support and hardens the tissue.
 - (d) Branches of a tree move and bend freely because of the presence of a simple permanent tissue called collenchyma
 - (e) The husk of a coconut tree is made up of sclerenchyma tissues which gives rigidity and stiffness to the plant cells due to which we find it tough to pull the husk out.

OR

(a) Draw the velocity time graph to show:

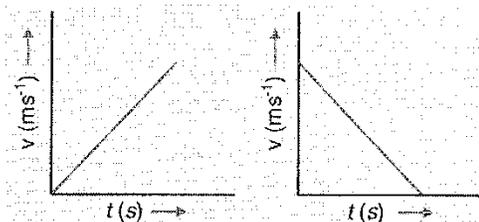
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- (i) the change in velocity of a freely falling body.
- (ii) the change in velocity of a body thrown vertically upwards.

(b) Comment on the kind of motion of the body while:

- (i) it comes down
- (ii) it goes up.

Ans. (a)



- (b) (i) Motion is uniformly accelerated when it goes vertically downwards.
- (ii) Motion is uniform with negative acceleration when it goes up.

(a) How can we liquefy a gas?

2

(b) Why do clothes take more time in drying on a rainy day?

Ans. (a) We can liquefy gases by applying pressure and reducing temperature.

(b) On a rainy day, the amount of water vapours present in air (humidity) is already high, the rate of evaporation decreases.

32. (i) Explain the terms: (a) Endocytosis, (b) Plasmolysis.

5

(ii) What will happen if the organization of a cell is damaged due to certain physical or chemical reasons?

(iii) How do substances like CO_2 and water move in and out of the cell?

Ans. (i) **(a) Endocytosis:** The flexibility of the cell membrane enables the cell to engulf food and other materials from its external environment. Such process is known as endocytosis.

(b) Plasmolysis: When a living plant cell loses water through osmosis, there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as plasmolysis.

(ii) When the organization of a cell gets damaged, lysosomes will burst and their enzymes will eat up their own cell organelles. Therefore, lysosomes are also known as the suicidal bags of the cell.

(iii) Gases like CO₂ and O₂ move in and out of the cell by diffusion from their higher concentration to lower concentration. Water enters the cell by endosmosis through semi-permeable plasma membrane from its higher concentration to lower concentration.

Similarly, water moves out of the cell by exoosmosis when a cell is placed in a hypertonic solution.

33. In the given figure of an animal cell as observed under an electron microscope.

5



(i) Name the parts labelled as 1 to 10.

(ii) Which parts are concerned with the following functions?

(a) Release of energy,

(b) Protein synthesis,

(c) Transmission of hereditary characters from parents to their offspring's.

(iii) Mention any two structures, found only in plant cell not in animal cell.

- Ans.** (i) 1. Mitochondria, 2. Cytoplasm, 3. Ribosome.
4. Smooth Endoplasmic reticulum, 5. Rough Endoplasmic reticulum,
6. Nucleolus, 7. Nucleoplasm, 8. Nuclear membrane,
9. Centrosome, 10. Golgi apparatus.
- (ii) (a) Mitochondria, (b) Ribosome, (c) Nucleus
- (iii) (a) Cell wall and (b) Plastids.

OR

(a) Write the rules followed for filling the electrons in various energy shells of any atom, as proposed by Bohr and Bury.

(b) Write the electronic configuration of an atom of sulphur. Also draw a schematic diagram of its atom showing the distribution of electrons in its shells.

(c) State the law of constant Proportion with the help of an example.

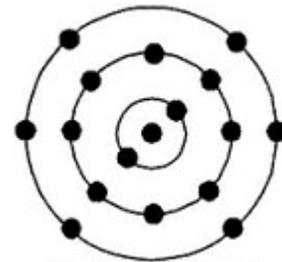
- Ans.** (a) The rules followed for filling the various electrons in various energy shells of any atom, as proposed by Bohr and Bury are :
- (i) The maximum number of electrons present in a shell is given by the formula $2n^2$, where 'n' is the orbit number or energy level index.
- (ii) The maximum number of electrons that can be accommodated in the outermost orbit is 8.

(iii) Electrons are not accommodated in a given shell, unless the inner shells are filled. That is, the shells are filled in a stepwise manner.

(b) Atomic number of sulphur(S) is = 16

Therefore, electronic configuration of sulphur = 2,8,6

Following diagram shows the distribution of electrons in various shells of sulphur:



(c) According to the law of constant proportion , a chemical substance always contains the same elements in a fixed proportion by mass, irrespective of its source.

For example: Pure water obtained from any source will always contain two hydrogen

atoms and one oxygen atom. Hydrogen and oxygen respectively combine together in the ratio of 1:8 by mass to form water. The ratio by the number of atoms for water will always be H : O = 2 : 1.

Thus, 18 g of water contains 2 g of hydrogen and 16 g of oxygen.
