

Answers to this Paper must be written on the paper provided separately. You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper. The time given at the head of this Paper is the time allowed for writing the answers.

Section A is compulsory. Attempt any four questions from Section B. The intended marks for questions or parts of questions are given in brackets.

SECTION A (40 Marks)

(Attempt all questions from this section)

I. Choose the correct answers from the given options:

[15]

- Excessive release of carbon dioxide in the atmosphere is the cause of:
(a) depletion of ozone
(b) formation of polar vortex
(c) global warming
(d) formation of smog
- The S.I. unit of pressure is :
(a) Kelvin
(c) Pascal
(b) Atmosphere
(d) Celcius
- Which of the following metals does not give hydrogen with acids?
(a) Iron
(c) Magnesium
(b) Copper
(d) Zinc
- Helium is preferred to hydrogen for filling balloons because it is :
(a) lighter than air
(c) non-combustible
(b) almost as light as hydrogen
(d) inflammable
- Typical elements are the elements of :
(a) third group
(c) second period
(b) third period
(d) fourth period
- Inhalation of air polluted with carbon monoxide is dangerous because :
(a) CO combines with O_2 dissolved in blood.
(b) CO combines with haemoglobin of blood
(c) CO removes water from the body and causes dehydration
(d) CO causes coagulation of proteins in the body
- Which of the following temperatures is known as the steam point?
(a) 273 K
(c) 290 K
(b) 373 K
(d) $273^\circ C$
- Typical elements are the elements of :
(a) third group
(c) second period
(b) third period
(d) fourth period
- All members of group 14 have _____ valence electrons
(a) 1
(c) 3
(b) 2
(d) 4
- The branch of chemistry that aims to design products/process which minimize the use and/ or generation of pollution is :
(a) Industrial industry
(c) Analytical chemistry
(b) Green chemistry
(d) Biochemistry
- Volume-temperature relationship is given by :
(a) Boyle
(c) Dalton
(b) Gay Lussac
(d) Charles

12. Upon reacting with water, an active metal produces:
- (a) oxygen (b) nitric acid
(c) a base (d) none of these
13. The strongest reducing agents are the elements of group :
- (a) six (b) seven
(c) one (d) two
14. Law of octaves was given by :
- (a) Mendeleev (b) Dobereiner
(c) Newland (d) none of these
15. Shortest period in the periodic table is
- (a) 1 (b) 2
(c) 3 (d) 4

II. Fill in the blanks:

[5]

- Moving left to right in the second period, number of valance electrons _____.
- _____ is a good reducing agent.
- The average kinetic energy of the molecules of a gas is proportional to the _____.
- Decrease in the concentration of ozone in the stratosphere is the cause of formation of _____ holes
- Hydrogen is collected by the _____ displacement of water.

III. Name or state the following: -

[5]

- Natural sources of atmospheric pollution
- Volume of a gas at 0 K
- A substance that oxidises concentrated HCl
- An electrovalent compound formed by an alkaline earth metals and a halogen.
- Group whose elements have zero valency

IV. Match the following: -

[5]

- | | |
|--------------------------|-----------------------|
| 1. Non reactive elements | a) temperature |
| 2. Kelvin | b) oxygen |
| 3. CFCs | c) carboxyhaemoglobin |
| 4. A gas of valency 2 | d) Noble gases |
| 5. Hb + CO | e) global warming |

V. Balance the following equations:

[5]

- $\text{Ca(OH)}_2 + \text{HNO}_3 \rightarrow \text{Ca(NO}_3)_2 + \text{H}_2\text{O}$
- $\text{Mg} + \text{CO}_2 \rightarrow \text{MgO} + \text{C}$
- $\text{KBr} + \text{Cl}_2 \rightarrow \text{KCl} + \text{Br}_2$
- $\text{NaHCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O} + \text{CO}_2$
- $\text{KHCO}_3 \rightarrow \text{K}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$

VI. Give a reason for each of the following:

[5]

- Our atmosphere acts as a greenhouse.
- Inflating a balloons seems to violate boyle's law.
- Apparatus for laboratory preparation of hydrogen should be air tight and away from a naked flame.
- Dobereiner's triads were discarded.
- A candle brought near the mouth of a jar containing hydrogen gas starts burning but is extinguished when pushed inside the jar.

SECTION B (40 Marks)(Attempt any **four** questions from this section)

- VII.** 1. What was the basis of the earliest attempts made for classification and grouping of elements. [2]
2. How are the positions of cobalt and nickel resolved in the modern periodic table. [2]
3. Take any one alkali metal and write its reaction with oxygen [4]
(i) oxygen (ii) water (iii) acid
4. How are the positions of cobalt and nickel resolved in the modern periodic table. [3]
- VIII.** 1. Why was hydrogen called 'inflammable air'. [2]
2. Which test should be made before collecting hydrogen in a gas jar? [2]
3. How is hydrogen manufactured? Describe with equations involved? [3]
4. Is it essential that oxidation and reduction must occur side by side in a chemical reaction? [3]
Explain.
- IX.** 1. What is diffusion? Give an example to illustrate it. [2]
2. Why is it necessary to compare gases at S.T.P. [2]
3. State Charles's law. Give its mathematical expression and significance. [3]
4. At what centigrade temperature will the volume of a gas 0 °C triple itself if the pressure remains constant? [3]
- X.** 1. How can we reduce global warming? [2]
2. Give the mechanism of the action of carbon monoxide. [2]
3. What is the cause of acid rain? Give any two consequences of acid rain. [3]
4. State how CFCs break ozone layer. [3]
- XI.** 1. Cl^{35} and Cl^{37} are two different atoms. Where would they be placed in the periodic table? [2]
2. Name alkali metals. Write the electronic configuration of first four alkali metals. [2]
3. Why are zinc and aluminium considered to have a unique nature? Give balanced equations to support your answer. [3]
4. Explain Boyle's law on the basis of the kinetic theory of matter. [3]
- XII.** 1. Convert (i) 273 °C to Kelvin (ii) 293 K to °C [2]
2. A given mass of a gas occupies a volume 143 cm³ at 27 °C and 700 mm Hg pressure. [3]
What will be its volume at 300 K and 280 mm Hg pressure. [2]
3. Why are zinc and aluminium considered to have a unique nature? Give balanced equations to support your answer. [3]
4. For laboratory preparation of hydrogen, give the following: [3]
material used, method of collection, chemical equation and fully labelled diagram.