

Class: 11
Subject: Chemistry
Topic: Hydrogen
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

1. Heavy water is represented as
 - A. H_2^{18}O
 - B. D_2O
 - C. D_2^{18}O
 - D. H_2O at 4°C

Sol: The formula of heavy water (deuterium oxide) is D_2O
2. Hydrogen molecules differs from chlorine molecule in the following respect
 - A. Hydrogen molecule is non-polar but chlorine molecule is polar
 - B. Hydrogen molecule is polar while chlorine molecule is non-polar
 - C. 1-hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not
 - D. Hydrogen molecule cannot participate in coordination bond formation but chlorine molecule can

Sol: D
Chlorine has lone pair which it can donate to form coordinate bond while hydrogen cannot.
3. The alum used for purifying water is
 - A. Ferric alum
 - B. Chrome alum
 - C. Potash alum
 - D. Ammonium alum

Sol: C
Potash alum is used for purifying water
4. Which of the following terms is not correct for hydrogen?
 - A. Its molecule is diatomic
 - B. It exists both as H^+ and H^- in different chemical compounds
 - C. it is the only species which has no neutrons in the nucleus
 - D. Heavy water is unstable because hydrogen is substituted by its isotope deuterium

Sol: D
Heavy water is not stable

5. Water is

- A. more polar than H₂S
- B. more or less identical in polarity with H₂S
- C. less polar than H₂S
- D. none of these

Sol: A

Polarity of bond depends on difference in electro negativity of the two concerned atoms. H₂O is more polar than H₂S because oxygen (in O-H) is more electronegative than sulphur (in S-H)

6. **Assertion (A)** When blood is added to a solution of H₂O₂, the solution bubbles furiously.

Reason (R) Catalase (an enzyme) present in blood decomposes H₂O₂ and produces bubbles of O₂

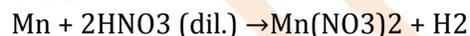
- A. Both (A) and (R) are true and (R) is the correct explanation of (A).
- B. Both (A) and (R) are true but (R) is not the correct explanation of (A).
- C. (A) is true but (R) is false.
- D. (A) is false but (R) is true.

Sol: A

7. Hydrogen is evolved by the action of cold dil. HNO₃ on

- A. Fe
- B. Mn
- C. Cu
- D. Al

Sol: B

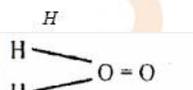


8. Which of the following is the true structure of H₂O₂?

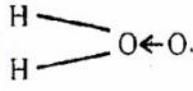
A. H-O-O-H



B.

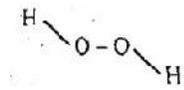


C.



D.

Sol: B



is the true structure of H₂O₂.

9. **Assertion (A)** K_2O_2 is used as life supports in space crafts.

Reason (R) K_2O_2 absorbs CO_2 and releases O_2

- A. Both (A) and (R) are true and (R) is the correct explanation of (A).
- B. Both (A) and (R) are true but (R) is not the correct explanation of (A).
- C. (A) is true but (R) is false.
- D. (A) is false but (R) is true.

Sol: A

10. Statement-1: Decomposition of H_2O_2 is a disproportionate reaction.

Statement-2: H_2O_2 molecule simultaneously undergoes oxidation and reduction

- A. Statement-1 is True, Statement-2 is True, and Statement-2 is a correct explanation for Statement-1
- B. Statement-1 is True, Statement -2 is True; Statement-2 is NOT a correct explanation for Statement -1
- C. Statement-1 is True, Statement- 2 is False
- D. Statement-1 is False, Statement -2 is True

Sol: A

Both statement-1 and statement-2 are true and statement-2 is the correct explanation of statement-1

Correct Reason H_2O_2 is a strong reducing agent.

11. HCl is added to following oxides. Which one would give H_2O_2

- A. MnO_2
- B. PbO_2
- C. BaO
- D. None

Sol:D

MnO_2 , PbO_2 and BaO will not give with H_2O_2 with HCl. MnO_2 and PbO_2 will give Cl_2 and BaO will react with HCl to give BaCl_2 and water

12. Hydrogen can behave as a metal

- A. At very high temperature
- B. At very low temperature
- C. At very high pressure
- D. At very low pressure

Sol: C

Hydrogen behaves as a metal at very high pressure

13. Calgon used as a water softener is

- A. $\text{Na}_4[\text{Na}_4(\text{PO}_3)_6]$
- B. $\text{Na}_4[\text{Na}_2(\text{PO}_3)_6]$
- C. $\text{Na}_4[\text{Na}_4(\text{PO}_4)_5]$
- D. $\text{Na}_4[\text{Na}_2(\text{PO}_4)_6]$

Sol: A

The complex salt of metaphosphoric acid sodium hexametaphosphate $(\text{NaPO}_3)_6$, is known as calgon. It is represented as $\text{Na}_2[\text{Na}_4(\text{PO}_3)_6]$

14. Hydrogen bond energy is equal to

- A. 3-7cals
- B. 30-70cals
- C. 3-10kcal
- D. 30-70kcal

Sol: C

Hydrogen bond is weak force of attraction existing between molecules. Its energy is equal to 3-10 k cal

15. Which of the following metal evolves hydrogen on reacting with cold dilute HNO₃?

- A. Mg
- B. Al
- C. Fe
- D. Cu

Sol: A

Mg+dil. HNO₃ →Mg(NO₃)₂ +H₂ (Mg and Mn give H₂ with dil HNO₃)

16. Commercial 10 volume H₂O₂ is a solution with a strength of approximately

- A. 15%
- B. 3%
- C. 1%
- D. 10%

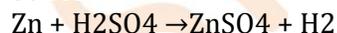
Sol: B

$$\text{Strength of 10V H}_2\text{O}_2 = \frac{68 \times 10}{22.4} \text{ g/l} = 3.035\%$$

17. When same amount of zinc is treated separately with excess of sulphuric acid and excess of sodium hydroxide solution the ratio of volumes of hydrogen evolved is

- A. 1:1
- B. 1:2
- C. 2:1
- D. 9:4

Sol: A



Ratio of volumes of H₂ evolved is 1:1

18. Which of the following pair will not produce dihydrogen gas

- A. Cu+HCl(dil.)
- B. Fe+H₂SO₄
- C. Mg + steam
- D. Na + alcohol

Sol: A

Cu and dil. HCl will not produce H₂

19. Statement-1: H_2O_2 is not stored in glass bottles.
Statement-2: Alkali oxides present in glass catalyse the decomposition of H_2O_2
- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1
 - B. Statement-1 is True, Statement -2 is True; Statement-2 is NOT a correct explanation for Statement -1
 - C. Statement-1 is True, Statement- 2 is False
 - D. Statement-1 is False, Statement -2 is True
- Sol: A
Statement-1 is True, Statement-2 is True,
Statement-2 is a correct explanation for
20. D_2O is used in
- A. Industry
 - B. Nuclear reactor
 - C. Medicine
 - D. Insecticide
- Sol: B
 D_2O is used in nuclear reactors as moderators