



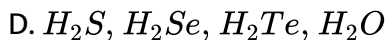
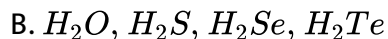
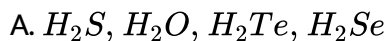
## CHEMISTRY

### BOOKS - MTG WBJEE CHEMISTRY (HINGLISH)

## HYDROGEN

#### Wb Workout Category 1 Single Option Correct Type

1. The correct order of increasing boiling point is



Answer: D



2. The anomalous boiling point of water is due to

- A. van derWaals'forces
- B. ionic bonding
- C. covalent bonding
- D. hydrogen bonding

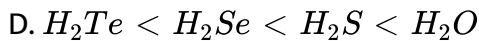
**Answer: D**



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3. The increasing order of volatility of hydrides of group 16 element is

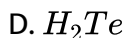
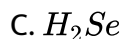
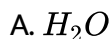
- A.  $H_2S < H_2O < H_2Se < H_2Te$
- B.  $H_2O < H_2Te < H_2Se < H_2S$
- C.  $H_2O, H_2S < H_2Se < H_2Te$



**Answer: B**

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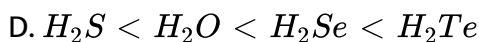
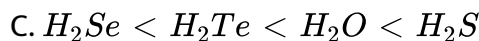
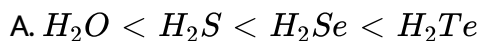
4. The hydride of group 16 elements showing maximum tendency for complex formation is



**Answer: A**

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5. The correct increasing order of dipole moments of the following is



**Answer: B**



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6. Water is said to be permancutly hard when it contains

A. chlorides and sulphates of Mg and Ca

B. bicarbonates of Na and K

C. carbonates of Na and K

D. phosphates of Na and K.

**Answer: A**



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7. Heavy water ( $D_2O$ ) freezes at

A.  $-3.8^\circ\text{C}$

B.  $3.9^\circ\text{C}$

C.  $0^\circ\text{C}$

D.  $38^\circ\text{C}$

**Answer: B**



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8. At its melting point ice is lighter than water because

A. on melting of ice the  $H_2O$  molecule shrink in size

- B. ice crystals have hollow hexagonal arrangement of  $H_2O$  molecules
- C.  $H_2O$  molecules are more closely packed in solid state
- D. ice forms mostly heavy water on first melting

**Answer: B**

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9. Which of the following statement is not correct?

- A.  $H_2O_2$  reduces Mn(VII) to Mn(II).
- B.  $H_2O_2$  can be obtained by electrolysis of dil.  $H_2SO_4$
- C.  $H_2O_2$  oxidises Fe(II) to Fe(III).
- D.  $H_2O_2$  is a weak base.

**Answer: D**

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10. Hydrogen is not obtained when zinc reacts with

A. dil  $H_2SO_4$

B. dil HCl

C. cold water

D. hot NaOH

**Answer: C**



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11. which of the following can adsorb large volume of hydrogen gas?

A. Colloidal ferric hydroxide

B. Finely divided nickel

C. Colloidal solution of palladium

D. Finely divided platinum

**Answer: C**

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12. Hydrogen from  $HCl$  can be prepared by

A. Mg

B. P

C. Cu

D. Hg

**Answer: A**

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13. Metals like platinum and palladium can adsorb large volumes of hydrogen under special conditions. Such adsorbed hydrogen by the metal is known as



- A. reactive hydrogen
- B. occluded hydrogen
- C. adsorbed hydrogen
- D. atomic hydrogen.

**Answer: B**

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**14.** Water can be tested by

- A. hydrated  $CuSO_4$
- B. taste
- C. smell
- D. anhydrous  $CoCl_3$  (blue) which changes to pink.

**Answer: D**

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15. One of the following is an incorrect statement , point it out,

A. Temporary hardness is due to bicarbonates of Ca and Mg.

B. Hardness of water affects soap consumption.

C. Hardness of water affects soap consumption.

D. Permanent hardness is due to the soluble,  $SO_4^{2-}$ ,  $Cl^-$ ,  $NO_3^-$  of Ca and Mg.

Answer: C



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16. Hydrogen peroxide cannot be concentrated easily because

A. it decomposes at its boiling point

B. it is not miscible with water

C. it is highly volatile in nature

D. it has a very high boiling point.

**Answer: A**



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17. The first ionization energy ( $\text{kJmol}^{-1}$  for  $H, Li, F, Na$  has one of the following values 1681, 520, 1312, 495, which of these values corresponds to that of hydrogen?

A. 520

B. 1312

C. 1681

D. 495

**Answer: B**



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18. Deuteroammonia ( $ND_3$ ) can be prepared

- A. by fractionation of ordinary ammonia
- B. by action of heavy water on magnesium nitride
- C. by heating a solution of  $NH_4Cl$  in NaOD
- D. none of the above

Answer: B



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19. Which of the following pairs of molecule have partially the same mass?

- A.  $D_2O$  and HTO
- B.  $H_2O$  and HTO
- C.  $H_2O$  and  $D_2O$

D. DTO and HDO

**Answer: A**

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20. Hydrogen molecule differs from chlorine molecule in the following respect

- A. hydrogen molecule can form intermolecular hydrogen bonds but chlorine molecule does not
- B. hydrogen molecule is polar while chlorine molecule is non-polar
- C. hydrogen molecule is non-polar but chlorine molecule is polar
- D. hydrogen molecule cannot participate in coordinate bond formation but chlorine molecule can

**Answer: D**

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21. Decomposition of  $H_2O_2$  is favoured by

- A. acetanilide
- B. MnO
- C. traces of acids
- D. alcohol

**Answer: B**



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22. Hardness of water is due to which pair of ions

- A.  $Ca^{2+}$  and  $Mg^{2+}$
- B.  $Mg^{2+}$  and  $K^+$
- C.  $Ca^{2+}$  and  $K^+$
- D.  $Ba^{2-}$  and  $Zn^{2+}$

**Answer: A**



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**23.** Hydrogen will not reduce

- A. heated stannic oxide
- B. heated ferric oxide
- C. heated cupric oxide
- D. heated aluminium oxide

**Answer: D**



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**24.** Which one of the following statements, regarding hydrogen peroxide is false?

- A. It is more stable in a basic solution.
- B. It is decomposed by  $MnO_2$
- C. It is a strong oxidizing as well as reducing agent in acidic as well as basic medium.
- D. It behaves as a reducing agent towards acidified  $KMnO_4$

**Answer: A**



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25. which of the following stament is not correct?

- A. Pure para hydrogen can be obtained by cooling ordinaiy hydrogen to about 20 K.
- B. The ratio of ortho and para hydrogen at 300 K and above is 3 : 1.
- C. The ratio of ortho to para hydrogen varies with temperature.



D. Pure ortho hydrogen can be obtained by heating ordinary hydrogen above 300 K.

**Answer: D**

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26. The reaction  $2H_2O_2 \rightarrow 2H_2O + O_2$  shows that

- A. it acts as reducing agent
- B. it acts as oxidising agent
- C.  $H_2O_2$  is decomposed
- D. none of these

**Answer: C**

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27. For preparing  $H_2O_2$  in the laboratory

- A.  $PbO_2$  is added to acidified solution of  $KMnO_4$
- B.  $BaO_2$  is added to  $CO_2$  bubbling through cold water
- C.  $MnO_2$  is added to dilute cold  $H_2SO_4$
- D.  $Na_2O_2$  is added to boiling water

**Answer: B**



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28. A hydride of nitrogen which is acidic is

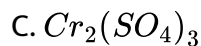
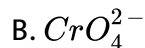
- A.  $N_2H_2$
- B.  $N_2H_4$
- C.  $NH_3$
- D.  $N_3H$

**Answer: D**



**View Text Solution**

29. When  $H_2O_2$  is shaken with an acidified solution of  $K_2Cr_2O_7$  in presence of ether, the ethereal layer turns blue due to the formation of



**Answer: D**



**View Text Solution**

30. The normality of '30 volume  $H_2O_2$  is

A. 2.678 N

B. 5.336 N

C. 8.0334 N

D. 6.685 N

**Answer: B**

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## Wb Workout Category 2 Single Option Correct Type

1. A sample of water contains 0.012 g of  $MgSO_4$  per litre. The hardness of the water sample in ppm is

A. 20 ppm

B. 10 ppm

C. 25 ppm

D. 15 ppm

Answer: B

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2. Statues and paintings coated with white lead turn black on long exposure to atmosphere. The original colour can be restored by treating them with  $H_2O_2$ . The reason behind this is

A. blackened statues get coated with PbS which on reaction with

$H_2O_2$  is oxidised to white  $PbSO_4$

B.  $H_2O_2$  dissolves the coating of white lead and exposes the inner surface.

C. white lead reacts with  $H_2O_2$  to form white  $PbSO_4$

D. blackened statues get coated with lead sulphate which reacts with  $H_2O_2$  to give PbS.

Answer: A

 [View Text Solution](#)

3. A sample of hard water with hardness 150 ppm is found to contain  $Ca(HCO_3)_2$  and  $CaCl_2$ . If one litre of the sample on boiling produce  $0.108gCaCO_3$ , then its permanent hardness is

A. 42 ppm

B. 32 ppm

C. 15 ppm

D. 10.8 ppm

**Answer: A**

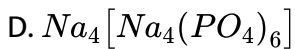
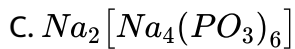


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4. Calgon used as a water softener is

A.  $Na_2[Na_4(PO_4)_5]$

B.  $Na_4[Na_2(PO_3)_6]$



**Answer: C**



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5. Hydrogen peroxide molecules are

A. diatomic and form  $HO_2^-$  ions

B. diatomic and form  $HO^-$  ions

C. monoatomic and form  $H_2^{2-}$  ions

D. monoatomic and form  $H^-$  ions.

**Answer: A**



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6. The volume strength of 1.5 N  $H_2O_2$  solution is

- A. 3
- B. 8.4
- C. 4.8
- D. 8

Answer: B



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7. which of the following reactions depicts the reducing action of  $H_2O_2$ ?

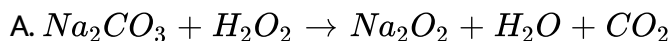
- A.  $2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 5O_2 + 8H_2O$
- B.  $2I^- + 2H^+ + H_2O_2 \rightarrow I_2 + H_2O$
- C.  $C_6H_6 + H_2O_2 \rightarrow C_6H_5OH + H_2O$
- D.  $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$



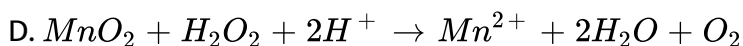
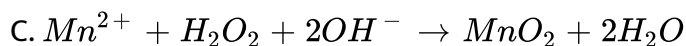
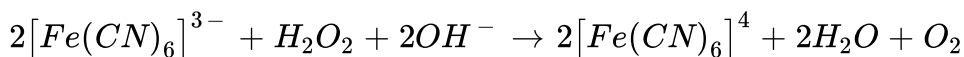
**Answer: A**

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8. Which one of the following reactions demonstrates that  $H_2O_2$  acts as an oxidising agent in the basic medium?



B.



**Answer: C**

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9.  $100 \text{ cm}^3$  of a given sample of  $\text{H}_2\text{O}_2$  gives  $1000 \text{ cm}^3$  of  $\text{O}_2$  at S.T.P. The given sample is

A. 10 volume  $\text{H}_2\text{O}_2$

B. 90% of  $\text{H}_2\text{O}_2$

C. 10% of  $\text{H}_2\text{O}_2$

D. 100 volume  $\text{H}_2\text{O}_2$

**Answer: A**



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10. In the following reactions,

A. liquid water

B. steam

C. oxygen

D. carbon monoxide.

**Answer: B**

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11. A metal (M) produces a gas (N) on reactions with alkalies like NaOH and KOH. Same gas is produced when the metal reacts with dilute sulphuric acid. Gas (N) reacts with another toxic gas (P) to form methanol at high temperature and pressure. (N) also reacts with metals like (Q) to form electrovalent hydrides, M,N,P and Q respectively are

A.  $Zn, H_2, CO, Na$

B.  $Na, H_2, Cl_2, Ca$

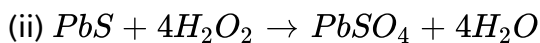
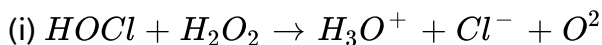
C.  $Al, H_2, H_2S, B$

D.  $Mg, H_2, NO_2, Al$

**Answer: A**

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12. Study the reactions carefully.



Mark the correct option.

A. In (i), HOCl is reduced and in (ii) PbS is oxidised.

B. In (i), HOCl is oxidised and in (ii) PbS is reduced.

C. In both (i) and (ii), HOCl and PbS are reduced.

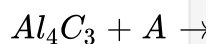
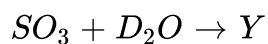
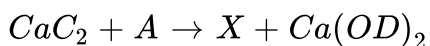
D. In both (i) and (ii), HOCl and PbS are oxidised.

Answer: A



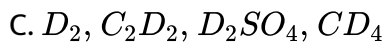
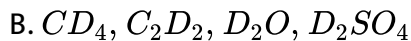
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13. In the following chemical equations :



Identify A, X, Y and Z respectively.

A.  $D_2O$ ,  $D_2SO_4$ ,  $CD_4$ ,  $C_2D_2$



**Answer: C**



**View Text Solution**

**14.** Dihydrogen forms three types of hydrides. (i) hydrides are formed by alkali metals and alkaline earth metals. (ii) hydrides are formed by non-metals and (iii) hydrides are formed by d-and f-block elements at elevated temperature. Complex metal hydrides such as (iv) and (v) are powerful reducing agents.

A. (i)= Covalent (ii)= Molecular (iii) = Saline (iv)  $NaH$  , (v)  $LiH$

B. (i)= Molecular (ii)= Covalent (iii) Ionic (iv)=  $LiAlH_4$ , (v) =  $NaBH_4$

C. (i)= Ionic (ii) = Covalent (iii)= Interstitial (iv)=  $LiAlH_4$  (v)=  $NaBH_4$

D. (i) = Ionic (ii) = Saline Interstitial (iii)=  $LiAlH_4$  (iv)=  $NaBH_4$

Answer: C



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15. Hydrogen peroxide has a non-planar structure. In gas phase of  $H_2O_2$ , dihedral angle is  $x^\circ$  and in solid phase at 110 K, its dihedral angle is  $y^\circ$ .

What are x and y ?

A.  $90^\circ$ ,  $90^\circ$

B.  $90.2^\circ$ ,  $101.5^\circ$

C.  $111.5^\circ$ ,  $90.2^\circ$

D.  $90.2^\circ$ ,  $119.5^\circ$

Answer: C



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1. What of the following is not correct for  $D_2O$ ?

- A. Boiling point is higher than  $H_2O$
- B. Solubility of NaCl in it is more than  $H_2O$
- C.  $D_2O$  reacts faster than  $H_2O$
- D. Viscosity is higher than  $H_2O$  at  $25^\circ C$

**Answer: B::C**



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2. Hydrogen as a fuel has many advantages like

- A. high efficiency
- B. pollution free
- C. easy to store
- D. non-inflammable

**Answer: A::B**



**View Text Solution**

**3. Which of the following pairs will evolve  $H_2$  gas ?**

- A. Iron and dil.  $H_2SO_4$
- B. Copper and dil.  $HCl$
- C. Sodium and ethyl alcohol
- D. Iron and steam

**Answer: A::C::D**



**View Text Solution**

**4. Consider the following statements :**

- (i) Atomic hydrogen is obtained by passing hydrogen through an electric  
are



(ii) Hydrogen gas will not reduce heated aluminium oxide

(iii) Finely divided palladium adsorbs large volume of hydrogen gas

(iv) Nascent hydrogen is best obtained by reacting Na and  $C_2H_5OH$

Which of the above statements are correct ?

A. I,II

B. II,IV

C. I,II,III

D. I,IV

**Answer: A::C**



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5. The oxidation states of the most electronegative element in the products of the reaction between  $BaO_2$  with dil  $H_2SO_4$  are

A. - 1

B. + 1

C.  $-2$

D.  $0$

**Answer: A::C**

 [View Text Solution](#)

## Wb Jee Previous Years Questions

1. Commercial sample of  $H_2O_2$  is labeled as 10 V. Its % strength is nearly

A. 3

B. 6

C. 9

D. 12

**Answer: A**

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2. At room temperature, the reaction between water and fluorine produces

- A. HF and  $H_2O_2$
- B. HF,  $O_2$  and  $F_2O_3$
- C.  $F^-$ ,  $O_2$  and  $H^+$
- D. HOF and HF

**Answer: C**



**View Text Solution**