CHEMISTRY

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

HYDROGEN

Exercise 1

1. Hydrogen resembles halogens in many respects for which several factors are responsible. Of the following factors which one is most important in this respect ?

A. Its tendency to lose an electron to form a cation

B. Its tendency to gain a single electron in its valence shell to attain stable electronic in its configuration

C. Its low negative electron gain enthalpy value

D. Its small size

Answer: B

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2. The most reactive isotope of H is

A. protium

B. deuterium

C. tritium

D. All the above have same reactivity

Answer: A

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3. Tritium is obtained by

A. nuclear reactions

B. passing steam over heated C

C. action of $NaOH$ on Al

D. action of H_2SO_4 on Zn

Answer: A

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4. Ortho and para-hydrogen differ in the

A. number of protons

B. molecular mass

C. nature of spin of protons

D. nature of spin of electrons

Answer: C

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5. When different metals like Zn, Sn and Fe are added to diluted sulphuric acid, same gas, which burns explosively

in air, when evolved is

A. O_2

B. N_2

C. Cl_2

D. H_2

Answer: D

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6. Pure H_2 is obtanied by the action of

A. aluminium with potassium hydroxide

B. sodium hydride with water

C. electrolysis of warm solution of $Ba(OH_2)$ using Ni electrodes

D. All of the above

Answer: D

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7. Hydrogen adsorabed on palladium is known as

A. atomic H

B. ortho H

C. occluded H

D. heavy H

Answer: C

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8. The adsorption of hydrogen by metals is called :

A. adsorption

B. occlusion

C. hydrogenation

D. dehydrogenation

Answer: B

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9. When silicon is boiled with caustic soda solution, the gas evolved is

A. O_2

B. SiH_4

C. H_2

D. None of these

Answer: C

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10. Atomic hydrogen is obtained by

A. electrolysis of water

B. reaction of water heavy metals

C. thermal decomposition of water

D. passing silent electric discharge through hydrogen at low pressure

Answer: D

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11. Ionic hydrides are formed by :

A. transition metals

B. s-block elements

C. p-block elements

D. metalloids

Answer: B

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12. Consider the following statements about intermolecular and intramolecular hydrogen bonds .ltbr gt I. Both types of H-bonds are temperature dependent.

II. Intramolecular H- bonds disapperears on increaassing the concentration

III. Intrmolecular H-bonds disppears on decreasing the concentration

IV. The boiling point of compounds having intramolecular H-bond are lower than that of those campounds which

have intermolecular H- bonds

Which of the statement given above are correct ?

A. I, II and IV

B. III and IV

C. I, III and IV

D. I and II

Answer: A

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13. The boiling points of water is high because

A. water molecule is linear

B. water molecule is not linear

C. water molecule possess covalent between H and O

D. water molecules associates due to H-bonding

Answer: D

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14. Ice floats on water because

A. its density is less than that of water

B. crystal structure of ice has empty space

C. Both (a) and (b)

D. None of the above

Answer: C

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15. Temporaty hardness of water is caused due to the presence of

A. $CaSO_4$

B. $CaCl_2$

C. $CaCO_3$

D. $Ca(HCO_3)_2$

Answer: D

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16. Both temporary and permanent hardness is removed on boiling with

A. $CaSO_4$

B. Na_2CO_3

C. $CaCO_3$

D. CaO

Answer: B

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17. Hard water becomes free from . . . . ions when passed through ion exchange resin containing RCOOH groups.

A. Cl^-

B. SO_4^{2-}

C. H_3O^+

D. Mg^{2+}

Answer: D

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18. The moderator used in nuclear ractor is

A. TEL

B. D_2O

C. H_2O_2

D. $R - O - R$

Answer: B

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19. Which of the following statements are correct regarding D_2O and H_2O?

I. D_2O reacts with Al_4C_3 at a faster rate than does H_2O.

II. The freezing point of $D_2O$is higher than that of H_2O.

III. NaCl is more solution in D_2O than in H_2O.

IV. Ionic product of D_2O is smaller than that if H_2O.

Select the correct answer using the codes givem below.

A. I and II

B. I and III

C. II and III

D. II and IV

Answer: D

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20. Mass precentage of deuterium in heavy water is

A. same as that of protium in water

B. 11.1

C. 20.0

D. cannot be predicted

Answer: C

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21. The critical temperature of water is higher than that of O_2 because the H_2O molecule has

A. fewer electrons than oxygen

B. two covalent bonds

C. V-shape

D. dipole moment

Answer: D

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22. When two ice cubes are pressed over each other, they unite to form one cube. Which of the following forces is responsible to hold them together ?

A. Ionic interaction

B. van der Waals' forces

C. Covalent interaction

D. Hydrogen and formation

Answer: D

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23. Semi water gas is

A. $CI + H_2$

B. $CO + N_2$

C. $CO + H_2 + N_2$

D. $H_2 + CH_4$

Answer: C

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24. H_2O_2 is stored in

A. iron container after the addition of stabiliser

B. glass container after the addition of stabiliser

C. plastic container after the addition of stabiliser

D. Both (b) and (c)

Answer: C

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25. Acidified solution of $K_2Cr_2O_7$ on treatment with H_2O_2 yields :

A. $CrO_3 + H_2O + CO_2$

B. $Cr_2O_2 + H_2O + O_2$

C. $CrO_5 + H_2O + K_2SO_4$

D. $H_2Cr_2O_7 + H_2O + O_2$

Answer: C

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26. Blackened old painting can be restored into original form by the action of

A. chlorine

B. BaO_2

C. H_2O_2

D. MnO_2

Answer: C

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27. Dielectric constant of H_2O_2

A. increases with dilution

B. decreases with dilution

C. is unaffected on dilution

D. None of the above

Answer: A

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28. The basic principle of hydrogen economy is

A. the transporatation and storage of energy in the form of liquid or gaseous dihydrogen

B. the transportation and storage of energy in the form of liquid or gaseous deuterium

C. the transportation and storage of energy in the form of liquid or gaseous tritium

D. None of the above

Answer: A

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29. In fuel cell, the percentage of bond energy is converted into electricity is

A. 71

B. 75

C. 68

D. 78

Answer: B

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30. The species that do not contain peroxide ions, is

A. PbO_2

B. H_2O_2

C. SrO_2

D. BaO_2

Answer: A

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31. The volume strength of $1 \cdot 5$ N H_2O_2 solution is

A. 4.8

B. 8.4

C. 3.0

D. 8.0

Answer: B

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32. How does H_2O_2 differ from O_2 in its chemical action?

A. In oxidising PbS to $PbSO_4$

B. In decolourising I_2 from KI

C. In decolourising acidified $KMnO_4$

D. In oxidising $K_4[Fe(CN)_6]$ to $K_3[Fe(CN)_6]$

Answer: C

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33. A given solution of H_2O_2 is of 30 volume. Its concentration in terms of molarity is

A. 9.1 M

B. 2.68 M

C. 2.1 M

D. 26.8 M

Answer: B

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34. Match the following columns and choose the correct option given below.

A.

A	B	C	D
4	3	2	1

B.

A	B	C	D
1	2	3	4

C.
A	B	C	D
1	3	2	4

D.
A	B	C	D
4	2	3	1

Answer: A

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35. The laboratory method for the preparation of H_2O_2 is by

A. H_2SO_4

B. NH_4HSO_4

C. $Na_2O_2 + H_2SO_4$

D. All of these

Answer: C

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Exercise 2

1. Nascent hydrogen is prepared by

A. Na and C_2H_5OH

B. Al and NaOH

C. Zn and dil. H_2SO_4

D. All of these

Answer: D

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2. The metal, which gives hydrogen on treatment with acid as well as sodium hydroxide is

A. Fe

B. Zn

C. Cu

D. none of these

Answer: B

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3. Why does H^+ ion always get associated with atoms or molecules ?

A. Ionisation enthalpy of hydrogen resembles that of alkali metals

B. Its reactivity is similar to halogens

C. It resembles both alkali metals and halogens

D. Loss of an electron from hydrogen atom results in a nucleus of very small size as compared to other atoms or ions. Due to small size, it cannot exist free

Answer: D

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4. The maximum possible number of hydrogen bonds in a water molecule can form in ice is

A. 1

B. 2

C. 3

D. 4

Answer: D

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5. NH_3 and H_2O form NH_4OH by

A. electrovalent bond

B. covalent bond

C. coordination bond

D. none of these

Answer: A

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6. $100mL$ of tap water containing $Ca(HCO_3\_(2)$ was titrated with $\frac{N}{50}HCL$ with methyl orange as indicaor. If $30mL$ of HCL was required, the temporary hardness of water as parts of $CaCO_3$ per 10^6 parts of water was

A. 150 ppm

B. 600 ppm

C. 275 ppm

D. 300 ppm

Answer: D

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7. When zeolite, which is hydrated sodium aluminium silicate, is treated with hard water, the sodium ions are exchanged with

A. H^+ ion

B. Ca^{2+} ion

C. SO_4^{2-} ion

D. OH^- ion

Answer: B

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8. The molarity of a 100 mL solution containing 5.1 g of hydrogen peroxide is

A. 0.15 M

B. 1.5 M

C. 3.0 M

D. 50.0 M

Answer: B

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9. $1000g$ aqueous solutioin of $CaCO_3$ contains $10g$ of calcium carbonate, hardness of the solution is

A. 10 ppm

B. 100 ppm

C. 1000 ppm

D. 10000 ppm

Answer: D

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10. The oxidising property of H_2O_2 is best explained by assuming that two oxygen atoms in its molecule are

bonded

A. differently

B. similarly

C. covalently

D. by hydrogen bonds

Answer: A

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11. Hydrogen peroxide is used as

A. an oxidant only

B. a reductant only

C. an acid only

D. All of the above

Answer: D

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12. Decomposition of H_2O_2 is favoured by

A. traces of acids

B. alcohol

C. acetanilide

D. MnO

Answer: D

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13. Match the following columns and choose the correct option.

A.

A	B	C	D
1	3	2	4

B.

A	B	C	D
4	3	1	2

C.

A	B	C	D
4	1	3	2

D.

A	B	C	D
2	3	1	3

Answer: B

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14. Last molecule of H_2O is evolved from H_2O_2 by

A. crystallisation

B. evaporation

C. distillation under reduced pressure

D. electrolysis

Answer: A

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15. The volume of 10 volume H_2O_2 solution that decolourises $200mL$ of $2NKMnO_4$ solution in acidic medium is

A. 112 mL

B. 336 mL

C. 220 mL

D. 224 mL

Answer: D

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16. Hydrolysis of one mole of peroxodisulphuric acid produces

A. two moles of sulphuric acid

B. two moles of peroxomonosulphuric acid

C. one mole of sulphuric acid and one mole of peroxomonosulphuric acid

D. one mole of sulphuric acid, one mole of peroxomonosulphuric acid and one mole of hydrogen peroxide

Answer: C

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17. 100 volume hydrogen peroxide solution means

A. 17.86 N

B. $30.36\ \%\ H_2O_2$

C. 8.93 M

D. all are correct

Answer: D

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18. Which of the following equations depict theoxidising nature of H_2O_2 ?

A.

$$2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 8H_2O + 5O_2$$

B. $2Fe^{3+} + 2H^+ + H_2O_2 \rightarrow 2Fe^{2+} + 2H_2O + O_2$

C. $2l^- + 2H^+ + H_2O_2 \rightarrow l_2 + 2H_2O$

D. $KlO_4 + H_2O_2 \rightarrow KlO_3 + H_2O + O_2$

Answer: C

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19. What is the volume of O_2 liberated at NTP by complete decomposition of 100 mL of 2M solution of H_2O_2 ?

A. 2.24 L

B. 22.4 L

C. 44.8 L

D. 11.2 L

Answer: A

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20. Excess of Kl and dill. H_2SO_4 were mixed in 50 mL H_2O_2. Thus, l_2 liberated requires 20 mL of 0.1 N $Na_2S_2O_3$. What will be the strenght of H_2O_2 in g L^{-1} ?

A. 0.034

B. 0.68

C. 6.8

D. 5.8

Answer: B

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