# **Basic Exercise**

| Based | on Hydroge   | n  |   |                      |   |   |  |  |
|-------|--|--|---|----------------------|---|---|--|--|
| 1.    | Out of the following metals which will give $H_2$ on reaction with NaOH :    |  |   |                      |   |   |  |  |
|       | I : Zn,  | II : Mg,   | III : Al,   | IV : Be              |   |   |  |  |
|       | (1) I, II, III, IV   |  | (2) I, III, IV  |                      | (3) II, IV  | (4) I, III  |  |  |
| Ans.  | (2)  |  |   |                      |   |   |  |  |
| 2.    | The gas used in  | The gas used in the hydrogenation of oils in presence of nickel as a catalyst is :       |   |                      |   |   |  |  |
|       | (1) methane  |  | (2) ethane  |                      | (3) ozone   | (4) hydrogen  |  |  |
| Ans.  | (4)  |  |   |                      |   |   |  |  |
| 3.    | In which of the following reactions does dihydrogen act as oxidising agent ? |  |   |                      |   |   |  |  |
|       | (1) $Ca + H_2$   | <b>&gt;</b>  | $(2) \operatorname{H}_2 + \operatorname{O}_2 \longrightarrow$ |                      | $(3) \operatorname{H}_2 + \operatorname{F}_2 \longrightarrow$ | $(4) \operatorname{CuO} + \operatorname{H}_2 \longrightarrow$ |  |  |
| Ans.  | (1)  |  |   |                      |   |   |  |  |
| 4.    | Hydrogen has t   | the tendend  | ey to lose one e <sup>-</sup> a                               | nd forma             | tion of H <sup>+</sup> , In this respec                       | et it resembles with :  |  |  |
|       | (1) Alkali metal   |  | (2) Carbon  |                      | (3) Alkaline earth metal                                      | (4) Halogens  |  |  |
| Ans.  | (1)  |  |   |                      |   |   |  |  |
| 5.    | $H_2$ gas can not  | be prepare   | d by :  |                      |   |   |  |  |
|       | (1) Be + NaOH  |  | (2) Na + NaOH   |                      | (3) Mg + NaOH   | (4) By $(2 & 3)$ method                                       |  |  |
| Ans.  | (4)  |  |   |                      |   |   |  |  |
| 6.    | Deuterium an isotope of hydrogen is :  |  |   |                      |   |   |  |  |
|       | (1) Radioactive  | ;  | (2) Non radioact  | ive                  | (3) Heaviest  | (4) Lightest  |  |  |
| Ans.  | (2)  |  |   |                      |   |   |  |  |
| Based | on Water   |  |   |                      |   |   |  |  |
| 7.    | Which is true statement about D <sub>2</sub> O and H <sub>2</sub> O :        |  |   |                      |   |   |  |  |
|       | (1) $D_{2}O$ has lower dielectric constant than $H_{2}O$                     |  |   |                      |   |   |  |  |
|       | (2) NaCl is more soluble in $D_2O$ than in $H_2O$                            |  |   |                      |   |   |  |  |
|       | (3) both are correct   |  |   |                      |   |   |  |  |
|       | (4) none is correct  |  |   |                      |   |   |  |  |
| Ans.  | (1)  |  |   |                      |   |   |  |  |
| 8.    | Deuteromethar  | ne can be pi   | repared if $D_2O$ rea   | cts with             |   |   |  |  |
|       | $(1)Al_4C_3$   |  | (2) CaC <sub>2</sub>  |                      | (3) Both the above  | (4) None of the above   |  |  |
| Ans.  | (1)  |  |   |                      |   |   |  |  |
| 9.    | The reactions of heavy water are slow. The reason is                         |  |   |                      |   |   |  |  |
|       | (1) Heavy wate   | (1) Heavy water is associated  |   |                      | (2) Heavy water is dissociated                                |   |  |  |
|       | (3) Heavy water is of higher mass (4) Heavy water is of lower mass           |  |   |                      |   |   |  |  |
| Ans.  | (3)  |  |   |                      |   |   |  |  |
| 10.   | $4D_2O + 3Fe$ —  | $\xrightarrow{\text{Re d hot}}$ ]  | $Fe_3 O_4 + gas.$ The g                                       | gas produ            | ced in the above reaction                                     | n is :  |  |  |
|       | (1) O <sub>2</sub>   |  | $(2) H_{2}$   |                      | $(3) D_{2}$   | (4) None  |  |  |
| Ans.  | (3)  |  |   |                      |   |   |  |  |
| 11.   | Heavy water re   | acts respec  | tively with $CO_2$ , S  | $SO_{3}, P_{2}O_{5}$ | and $N_2O_5$ to give the cor                                  | npounds :   |  |  |
|       | $(1) D_2 CO_3, D_2 SO_3$   | $O_4, D_3PO_2, D_3PO_2$  | DNO <sub>2</sub>  |                      | $(2) D_2 CO_3, D_2 SO_4, D_3 PO_4, DNO_2$                     |   |  |  |
|       | $(3) D_2 CO_3, D_2, S$   | $(3) D_2 CO_3, D_2 SO_3, D_3 PO_4, DNO_2 \qquad (4) D_2 CO_3, D_2 SO_4, D_3 PO_4, DNO_3$ |   |                      |   |   |  |  |

Ans. (4)

| 12.   | Hard water when passed through ion exchange resin containing RCOOH group, becomes free from          |  |   |                                       |  |  |  |
|-------|--|--|---|---------------------------------------|--|--|--|
|       | (1)Cl-   | $(2) SO_4^{-2}$  | $(3) H_{3}O^{+}$  | $(4) \operatorname{Ca}^{+2}$          |  |  |  |
| Ans.  | (4)  |  |   |                                       |  |  |  |
| 13.   | Permutit is a technical n  | ame given to :   |   |                                       |  |  |  |
|       | (1) Aluminates of Ca and   | l Na   | (2) Hydrated silicates of   | Al and Na                             |  |  |  |
|       | (3) Silicates of Ca and N  | a  | (4) Silicates of Ca and M   | lg                                    |  |  |  |
| Ans.  | (2)  |  |   |                                       |  |  |  |
| 14.   | The formula of sodium z  | zeolite which is used in per                                     | mutit process for softening   | utit process for softening water is   |  |  |  |
|       | (1)Na <sub>2</sub> O.Al <sub>2</sub> O <sub>3</sub> .Si <sub>2</sub> O <sub>4</sub> .xH <sub>2</sub> | 0  | (2) Na <sub>2</sub> .Al <sub>2</sub> .Si <sub>2</sub> O <sub>4</sub> .xH <sub>2</sub> O |                                       |  |  |  |
|       | (3) Na <sub>2</sub> O.AlO <sub>3</sub> .SiO <sub>4</sub> .xH <sub>2</sub> O                          | )  | (4) K,Al,SiO <sub>8</sub> ,xH,O   |                                       |  |  |  |
| Ans.  | (1)  |  |   |                                       |  |  |  |
| 15.   | The compound sodium polymeta phosphate $Na_{A}(PO_{A})_{A}$ is called calgon because                 |  |   |                                       |  |  |  |
|       | (1) It was developed by  | the scientist  | (2) It was developed first  | t in California                       |  |  |  |
|       | (3) It refers to calcium g   | one  | (4) It is based on the nan  | ne of the company which developed it. |  |  |  |
| Ans.  | (3)  |  |   |                                       |  |  |  |
| 16.   | Which of the following   | pairs produce deutronitric a                                     | acid  |                                       |  |  |  |
|       | (1) NO., H.O   | (2) NO, D,O  | (3) N <sub>2</sub> O <sub>2</sub> , D <sub>2</sub> O                                    | $(4) N_{a}, D_{a}O$                   |  |  |  |
| Ans.  | (3)  |  |   |                                       |  |  |  |
|       | ()   |  |   |                                       |  |  |  |
| 17.   | Permanent hardness in  | water due to pressence of :                                      |   |                                       |  |  |  |
|       | (1) Ca <sup>+</sup> Mg <sup>+</sup>  | (2) CaCl MgCl  | (3) CaCO MgCO   | (4) All                               |  |  |  |
| Ans.  | (2)  | (-)  | (*) ***********************************   |                                       |  |  |  |
| 18.   | Temporary unstable har   | dness of water due to prese                                      | ence of ·   |                                       |  |  |  |
| 10.   | (1) CoCl MaSO  | (2) $Ca^{+2}$ Ma^{+2}  | $(2) V^{\oplus}$ CoCO   | $(A) C_{2}(HCO) = M_{2}(HCO)$         |  |  |  |
| •     | (1) $\operatorname{CaCl}_2$ , $\operatorname{WigSO}_4$   | (2) Ca <sup>-</sup> , Mg <sup>-</sup>                            | (5) K , CaCO <sub>3</sub>   | $(4) Ca(HCO_3)_2, Mg(HCO_3)_2$        |  |  |  |
| Ans.  | (4)  |  |   |                                       |  |  |  |
| р     |  | • •  |   |                                       |  |  |  |
| Based | 1 on Hydrogen Perox  | lae  |   |                                       |  |  |  |
| 19.   | $H_2O_2$ is used but not as  | •  |   |                                       |  |  |  |
|       | (1) oxidant, reductant   | (2) bleaching agent  | (3) antiseptic  | (4) catalyst                          |  |  |  |
| Ans.  | (4)  |  |   |                                       |  |  |  |
| 20.   | Which of the following is a true structure of $H_2O_2$ ?   |  |   |                                       |  |  |  |
|       | 180°   |  | 94°   |                                       |  |  |  |
|       | (1)  |  | (2) H $(2)$   |                                       |  |  |  |
|       | Н <del>`</del> О-О <del>`</del> Н  |  | 0 O(H   |                                       |  |  |  |
|       | ң  |  | ң   |                                       |  |  |  |
|       | $(3) \rightarrow O \rightarrow O$  |  | $(4)$ $\rightarrow O=O$   |                                       |  |  |  |
| Ang   | (1)  |  | 11  |                                       |  |  |  |
| Alls. | (2)  |  | <b>a 1</b>  |                                       |  |  |  |
| 21.   | In the reaction $2H_2O_2 \rightarrow C_2$  | $\rightarrow$ 2H <sub>2</sub> O + O <sub>2</sub> oxidation state | e ot oxygen changes as :  |                                       |  |  |  |
|       | (1) Only $-1$ to $-2$  | (2) Only $-1$ to zero  | (3) Both of the above   | (4) - 1 to $-3$                       |  |  |  |
| Ans.  | (3)  |  |   |                                       |  |  |  |
| 22.   | The dipole moment of H   | $I_2O_2$ is 2.1D. This indicates                                 | that the structure of $H_2O_2$ is   | :                                     |  |  |  |
|       | (1) Linear   | (2) Non-linear   | (3) Symmetrical   | (4) None                              |  |  |  |
| Ans.  | (2)  |  |   |                                       |  |  |  |
|       |  |  |   | 2                                     |  |  |  |

| 23.  | The dihedral angle in gaseous $H_2O_2$ is                                     |                             |                                 |                         |  |  |  |
|------|---|-----------------------------|---------------------------------|-------------------------|--|--|--|
|      | (1) 180°  | $(2) 90^{\circ}$            | (3) 111.5°                      | (4) 109°–28"            |  |  |  |
| Ans. | (3)   |                             |                                 |                         |  |  |  |
| 24.  | Hydrogen peroxides cann   | ot be concentrated easily b | because                         |                         |  |  |  |
|      | (1) It is highly volatile in r  | ature                       | (2) It is not dissolve in $H_2$ | )                       |  |  |  |
|      | (3) It decompose at its boi   | ling point                  | (4) It has a very high b.p.     |                         |  |  |  |
| Ans. | (3)   |                             |                                 |                         |  |  |  |
| 25.  | Bleaching action of $H_2O_2$ is due to its :                                  |                             |                                 |                         |  |  |  |
|      | (1) Oxidising nature  | (2) Reducing nature         | (3) Acidic nature               | (4) Thermal instability |  |  |  |
| Ans. | (1)   |                             |                                 |                         |  |  |  |
| 26.  | Correct order of BP is :-   |                             |                                 |                         |  |  |  |
|      | (1) $H_2 > H_2O_2 > D_2O > H_2O > D_2$ (2) $H_2O_2 > H_2 > D_2O > H_2O > D_2$ |                             |                                 |                         |  |  |  |
|      | (3) $H_2O_2 > D_2O > H_2O > D_2 > H_2$ (4) $H_2O_2 > D_2O > H_2O > H_2 > D_2$ |                             |                                 |                         |  |  |  |
| Ans. | (3)   |                             |                                 |                         |  |  |  |

## Analytical Exercise

| 1.   | Calgon is an industrial name given to :                               |                                    |                           |                           |  |  |  |
|------|---|------------------------------------|---------------------------|---------------------------|--|--|--|
|      | (1) normal sodium pho   | sphate                             | (2) sodium meta-alumina   | (2) sodium meta-aluminate |  |  |  |
|      | (3) sodium hexametaph   | osphate                            | (4) hydrated sodium alur  | ninium silicate           |  |  |  |
| Ans. | (3)   |                                    |                           |                           |  |  |  |
| 2.   | Hydrogen may be prepared by heating a solution of caustic soda with : |                                    |                           |                           |  |  |  |
|      | (1) Mg  | (2) Zn                             | (3) Fe                    | (4) Ag                    |  |  |  |
| Ans. | (2)   |                                    |                           |                           |  |  |  |
| 3.   | Hydrogen peroxide has a :   |                                    |                           |                           |  |  |  |
|      | (1) linear structure  |                                    | (2) closed chain structur | e                         |  |  |  |
|      | (3) closed book type st   | ructure                            | (4) half open book type   | structure                 |  |  |  |
| Ans. | (4)   |                                    |                           |                           |  |  |  |
| 4.   | Hydrogen peroxide is a  | :                                  |                           |                           |  |  |  |
|      | (1) liquid  | (2) gas                            | (3) solid                 | (4) semi-solid            |  |  |  |
| Ans. | (1)   |                                    |                           |                           |  |  |  |
| 5.   | One of the following is   | an incorrect statement, poin       | nt it out.                |                           |  |  |  |
|      | (1) Permanent hardnes   | s can be removd by boiling         | water                     |                           |  |  |  |
|      | (2) hardness of water effects soap consumption                        |                                    |                           |                           |  |  |  |
|      | (3) Temporary hardness is due to bicarbonates of Ca and Mg            |                                    |                           |                           |  |  |  |
|      | (4) Permanent hardnes   | s is due to the soluble $SO_4^2$ , | Cl− of Ca and Mg          |                           |  |  |  |
| Ans. | (1)   |                                    |                           |                           |  |  |  |
| 6.   | Water is said to be permanently hard when it contains                 |                                    |                           |                           |  |  |  |
|      | (1) Chlorides and sulphates of Mg and Ca:                             |                                    |                           |                           |  |  |  |
|      | (2) Bicarbonates of Na and K  |                                    |                           |                           |  |  |  |
|      | (3) Carbonates of Na and K  |                                    |                           |                           |  |  |  |
|      | (4) Phosphates of Na and K  |                                    |                           |                           |  |  |  |
| Ans. | (1)   |                                    |                           |                           |  |  |  |
| 7.   | Which is the lightest g   | as ?                               |                           |                           |  |  |  |
|      | (1) Nitrogen  | (2) Helium                         | (3) Oxygen                | (4) Hydrogen              |  |  |  |
| Ans. | (4)   |                                    |                           |                           |  |  |  |
| 8.   | The absorption of hydrogen by platinum is known as :                  |                                    |                           |                           |  |  |  |
|      | (1) Hydrogenation   | (2) reduction                      | (3) Dehydrogenation       | (4) Occlusion             |  |  |  |
| Ans. | (4)   |                                    |                           |                           |  |  |  |
| 9.   | False statement for H atom –  |                                    |                           |                           |  |  |  |
|      | (1) It resembles halogens in some properties                          |                                    |                           |                           |  |  |  |
|      | (2) It resembles alkali metals in some property                       |                                    |                           |                           |  |  |  |
|      | (3) It can not be placed I <sup>st</sup> group in table               |                                    |                           |                           |  |  |  |
|      | (4) It can be placed in 17 <sup>th</sup> group of periodic table      |                                    |                           |                           |  |  |  |
| Ans. | (3)   |                                    |                           |                           |  |  |  |
| 10.  | Boiling point of water  | is high due to presence of         |                           |                           |  |  |  |
|      | (1) H-bonding   |                                    | (2) its bend structure    |                           |  |  |  |
|      | (3) It high dielectric co   | nstant                             | (4) None                  |                           |  |  |  |
| Ans. | (1)   |                                    |                           |                           |  |  |  |

| 11.  | D <sub>2</sub> O is  | $D_2O$ is used more in :   |                      |                       |                                     |                           |  |  |  |
|------|--|--|----------------------|-----------------------|-------------------------------------|---------------------------|--|--|--|
|      | (1) Chemical industry  |  |                      |                       | (2) Nuclear moderator               | (2) Nuclear moderator     |  |  |  |
|      | (3) Pha  | armaceutical prepa   | aration              |                       | (4) Insecticide preparat            | ions                      |  |  |  |
| Ans. | (2)  | (2)  |                      |                       |                                     |                           |  |  |  |
| 12.  | Which one of the following removes temporary hardness of water ? |  |                      |                       |                                     |                           |  |  |  |
|      | (1)Sla   | ked lime   | (2) Plas             | ster of parris        | (3) CaCO <sub>3</sub>               | (4) Hydrolith             |  |  |  |
| Ans. | (1)  |  |                      |                       |                                     |                           |  |  |  |
| 13.  | Heavy  | Heavy water is used in nuclear reactors as :   |                      |                       |                                     |                           |  |  |  |
|      | (1) So   | (1) Source of $\alpha$ - particles   |                      |                       |                                     |                           |  |  |  |
|      | (2) Slo  | owing down the sp  | peed of hig          | gh energy neutror     | 18                                  |                           |  |  |  |
|      | (3) Tra  | ansporting heat of   | f the reacto         | or                    |                                     |                           |  |  |  |
|      | (4) He   | ating purposes   |                      |                       |                                     |                           |  |  |  |
| Ans. | (2)  |  |                      |                       |                                     |                           |  |  |  |
| 14.  | Nasce  | nt hydrogen cons   | ists of :            |                       |                                     |                           |  |  |  |
|      | (1) Hy   | drogen atoms wit   | h excess o           | fenergy               |                                     |                           |  |  |  |
|      | (2) Hy   | drogen molecules   | s with exce          | ess energy            |                                     |                           |  |  |  |
|      | (3) Hy   | drogen ions in ex  | cited state          |                       |                                     |                           |  |  |  |
|      | (4) So   | lvated protons   |                      |                       |                                     |                           |  |  |  |
| Ans. | (1)  |  |                      |                       |                                     |                           |  |  |  |
| 15.  | Match  | Match list I with list II and select the correct answer  |                      |                       | er using the codes given be         | low the lists :           |  |  |  |
|      | List I   |  | List II              |                       |                                     |                           |  |  |  |
|      | <b>1.</b> Heavy water  |  | А.                   | A. Bicarbonates of Mg |                                     |                           |  |  |  |
|      |  |  |                      | and Ca in water       |                                     |                           |  |  |  |
|      | 2.   | Temporary  | В.                   | No foreign ion        | S                                   |                           |  |  |  |
|      |  | hard water   |                      | in water              |                                     |                           |  |  |  |
|      | 3.   | Soft water   | С.                   | $D_2O$                |                                     |                           |  |  |  |
|      | 4.   | Permanent  | D.                   | Sulphates and         |                                     |                           |  |  |  |
|      |  | hard water   |                      | chlorides of M        | g                                   |                           |  |  |  |
|      |  |  |                      | and Ca in water       | r                                   |                           |  |  |  |
|      | (1)1-0   | C, 2-D, 3-B, 4-A   | (2) 1-B,             | , 2-A, 3-C, 4-D       | (3) 1-B, 2-D, 3-C, 4-A              | (4) 1-C, 2-A, 3-B, 4-D    |  |  |  |
| Ans. | (4)  |  |                      |                       |                                     |                           |  |  |  |
| 16.  | What is formed when calcium carbide reacts with heavy water ?    |  |                      |                       |                                     |                           |  |  |  |
|      | $(1)C_{2}I$  | $D_2$  | (2) CaE              | $\mathbf{D}_2$        | (3)Ca <sub>2</sub> D <sub>2</sub> O | $(4) \operatorname{CD}_2$ |  |  |  |
| Ans. | (1)  |  |                      |                       |                                     |                           |  |  |  |
| 17   | Shape  | of $O_2F_2$ is similar   | to that of:          |                       |                                     |                           |  |  |  |
|      | $(1)C_{2}I$  | 2  | (2) H <sub>2</sub> C | $D_2$                 | $(3) H_2 F_2$                       | $(4) C_2 H_2$             |  |  |  |
| Ans. | (2)  |  |                      |                       |                                     |                           |  |  |  |
| 18.  | In whi<br>(a) H <sub>2</sub>                                     | In which of the following reactions $H_2O_2$ acts as a reducing agent?<br>(a) $H_2O_2 + 2H^+ + 2e^- \longrightarrow 2H_2O$ |                      |                       |                                     |                           |  |  |  |
|      | (b) $H_2O_2 - 2e^- \longrightarrow O_2 + 2H^+$                   |  |                      |                       |                                     |                           |  |  |  |
|      | (c) $H_2$  | $O_2 + 2e^- \longrightarrow 2C$  | )H-                  |                       |                                     |                           |  |  |  |
|      | (d) H,   | (d) $H_2O_2 + 2OH^ 2e^- \longrightarrow O_2 + 2H_2O$   |                      |                       |                                     |                           |  |  |  |
|      | <b>(1)</b> (a), (c)  |  | <b>(2)</b> (b),      | (d)                   | <b>(3)</b> (a), (b)                 | (4)(c), (d)               |  |  |  |
| Ans. | (2)  |  |                      |                       |                                     |                           |  |  |  |

- 19. From the following statements regarding H<sub>2</sub>O<sub>2</sub>, choose the incorrect statement?(1) It has to be stored in plastic or wax lined glass bottles in dark
  - (2) It has to be kept away form dust
  - (3) It can act only as an oxidizing agent
  - (4) It decomposes on exposure to light

#### Ans. (3)

- 20. Which one of the following statements about water is FALSE?
  - (1) Water can act both as an acid and as a base.
  - (2) There is extensive intramolecular hydrogen bonding in the condensed phase.
  - (3) Ice formed by heavy water sinks in normal water.
  - (4) Water is oxidized to oxygen during photosynthesis.
- Ans. (2)

### Prev. Yr. Questions

|       | Prev. Yr. Questions   |  |                                      |  |  |  |
|-------|---|--|--------------------------------------|--|--|--|
| 1.    | Which of the following statements about hydrogen is incorrect ?         |  |                                      | [NEET - 2016]  |  |  |
|       | (1) Dihydrogen does not act as a reducing agent                         |  |                                      |  |  |  |
|       | (2) Hydrogen has  | three isotopes of which trit                         | ium is the most commor               | 1  |  |  |
|       | (3) Hydrogen neve   | er acts as cation in ionic sa                        | alts                                 |  |  |  |
|       | (4) Hydrogen ion,   | H <sub>3</sub> O <sup>+</sup> exists freely in solut | ion                                  |  |  |  |
| Ans.  | (1,2)   |  |                                      |  |  |  |
| 2.    | In acidic medium, H   | $H_2O_2$ changes $Cr_2O_7^{2-}$ to $Cr_2O_7^{2-}$    | $O_5$ which has two (–O–O            | -) bonds. Oxidation state of Cr in CrO <sub>5</sub> is<br>[AIPMT - 2014] |  |  |
|       | (1)+5   | (2)+3  | (3)+6                                | (4)–10   |  |  |
| Ans.  | (3)   |  |                                      |  |  |  |
| 3.    | The ease of adsorpt   | tion of the hydrates alkali                          | metal ions on an ion-exc             | hange resins follows the order   |  |  |
|       | (1) $K^+ < Na^+ < Rb^+$   | < Li <sup>+</sup>                                    | (2) $Na^+ < Li^+ < K$                | + < Rb <sup>+</sup>  |  |  |
|       | $(3) Li^+ < K^+ < Na^+ < $  | $< Rb^+$   | (4) $Rb^+ < K^+ < Na$                | $a_{+} < \Gamma a_{+}$   |  |  |
| Ans.  | (3)   |  |                                      |  |  |  |
| 4.    | Some statements al  | bout heavy water are given                           | below                                | [AIPMT(Mains)-2010]  |  |  |
|       | (a) Heavy water is  | used as a moderator in nu                            | clear reactors                       |  |  |  |
|       | (b) Heavy water is  | more associated than ordi                            | nary water                           |  |  |  |
|       | (c) Heavy water is  | more effective solvent that                          | n ordinary water                     |  |  |  |
|       | Which of the above  | e statements are correct?                            |                                      |  |  |  |
|       | (1) a and b   | (2) a,b and c  | (3) b and c                          | (4) a and c  |  |  |
| Ans.  | (1)   |  |                                      |  |  |  |
| Quest | tion asked Prior t  | o Medical Ent. Exams                                 | . 2005                               |  |  |  |
| 5.    | Hydrogen is prepar  | ed from H <sub>2</sub> O by adding                   |                                      |  |  |  |
|       | (1) Ca, which acts  | as reducing agent                                    |                                      |  |  |  |
|       | (2) Al, which acts  | as oxidising agent                                   |                                      |  |  |  |
|       | (3) Ag, which acts  | s as reducing agent                                  |                                      |  |  |  |
|       | (4) Au, which acts  | as oxidising agent                                   |                                      |  |  |  |
| Ans.  | (1)   |  |                                      |  |  |  |
| 6.    | The hydride ion H <sup>-</sup>  | is stronger base than its hyd                        | roxide ion OH <sup>-</sup> . Which o | f the following reaction will occur if sodium                            |  |  |
|       | hydride (NaH) is di   | issolved in water ?                                  |                                      |  |  |  |
|       | $(1) \mathrm{H}^{-} + \mathrm{H}_{2}\mathrm{O} \rightarrow \mathrm{Ne}$ | reaction   |                                      |  |  |  |
|       | (2) $H^{-}(aq) + H_{2}O -$  | $\rightarrow$ H <sub>2</sub> O                       |                                      |  |  |  |
|       | (3) $H^{-}(aq) + H_2O(l$  | $) \rightarrow OH^- + H_2$                           |                                      |  |  |  |
|       | (4) None of these   |  |                                      |  |  |  |
| Ans.  | (3)   |  |                                      |  |  |  |
|       |   |  |                                      |  |  |  |

- 7. Which of the following statements about the interstitial compounds is incorrect ?
  - (1) They are chemically reactive
  - (2) They are much harder than the pure metal
  - (3) They have higher melting points than the pure metal
  - (4) They retain metallic conductivity

Ans. (1)

| 8.                 | The volume strength of $1.5 \text{ NH}_2\text{O}_2$ solution is  |   |                               |                      |  |  |  |
|--------------------|--|---|-------------------------------|----------------------|--|--|--|
|                    | (1)8.8   | (2)8.4  | (3)4.8                        | (4) 5.2              |  |  |  |
| Ans.               | (2)  |   |                               |                      |  |  |  |
| 9.                 | Which one of the following pairs of substances on reaction will not evolve H <sub>2</sub> gas ?  |   |                               |                      |  |  |  |
|                    | (1) Copper and HCl (ac   | queous)   |                               |                      |  |  |  |
|                    | (2) Iron and steam   |   |                               |                      |  |  |  |
|                    | (3) Iron and $H_2SO_4$ (aq   | ueous)  |                               |                      |  |  |  |
|                    | (4) Sodium and ethyl al  | lcohol  |                               |                      |  |  |  |
| Ans.               | (1)  |   |                               |                      |  |  |  |
| 10.                | Zn gives H <sub>2</sub> gas with H <sub>2</sub> SO <sub>4</sub> and HCl but not with HNO <sub>3</sub> because  |   |                               |                      |  |  |  |
|                    | (1) Zn act as oxidizing  | agent when react with HNC   | 3                             |                      |  |  |  |
|                    | (2) $HNO_3$ is weaker aci  | d than $H_2SO_4$ and HCl  |                               |                      |  |  |  |
|                    | (3) In electrochemical   | series Zn is above hydroge  | n                             |                      |  |  |  |
|                    | (4) $NO_3^-$ is reduced in   | preference to hydronium id  | on                            |                      |  |  |  |
| Ans.               | (4)  |   |                               |                      |  |  |  |
| 11.                | Which pair of substance  | es gives same gaseous pro   | duct, when these react with   | water?               |  |  |  |
|                    | (1) K and $KO_2$   | (2) Ba and $BaO_2$  | (3) Ca and $CaH_2$            | (4) Na and $Na_2O_2$ |  |  |  |
| Ans.               | (3)  |   |                               |                      |  |  |  |
| 12.                | Ortho and para hydroge   | n differ in   |                               |                      |  |  |  |
|                    | (1) Proton spin  | (2) Electron spin   | (3) Nuclear charge            | (4) Nuclear reaction |  |  |  |
| Ans.               | (1)  |   |                               |                      |  |  |  |
| 13.                | Action of water or dilute  | e mineral acids on metals o   | an give                       |                      |  |  |  |
|                    | (1) Monohydrogen   | (2) Tritium   | (3) Dihydrogen                | (4) Trihydrogen      |  |  |  |
| Ans.               | (3)  |   |                               |                      |  |  |  |
| 14.                | (1) More vigorously the  | drogen in chemical proper   | ties but reacts               |                      |  |  |  |
|                    | (1) Note vigorously in<br>(2) Easter than hydroge  | an nyurogen   |                               |                      |  |  |  |
|                    | <ul><li>(2) Fusice than hydrog.</li><li>(3) Slower than hydrog.</li></ul>  | ren   |                               |                      |  |  |  |
|                    | <ul><li>(4) Just as hydrogen</li></ul>   |   |                               |                      |  |  |  |
| Ans.               | (3)  |   |                               |                      |  |  |  |
| 15.                | Spin isomerism is shown  | n by  |                               |                      |  |  |  |
|                    | (1) Dichloro benzene   | (2) Hydrogen  | (3) Dibasic acid              | (4) n-butane         |  |  |  |
| Ans.               | (1) 21011010 001120110   |   |                               |                      |  |  |  |
|                    | (2)  |   |                               |                      |  |  |  |
| 16.                | <ul><li>(2)</li><li>Hydrogen can be fused to</li></ul>   | to form helium at   |                               |                      |  |  |  |
| 16.                | <ul><li>(2)</li><li>(2)</li><li>(1) High temperature a</li></ul>   | to form helium at<br>nd high pressure   |                               |                      |  |  |  |
| 16.                | <ul> <li>(2)</li> <li>Hydrogen can be fused t</li> <li>(1) High temperature a</li> <li>(2) High temperature at</li> </ul>  | to form helium at<br>nd high pressure<br>nd low pressure  |                               |                      |  |  |  |
| 16.                | <ul> <li>(2)</li> <li>Hydrogen can be fused to</li> <li>(1) High temperature at</li> <li>(2) High temperature at</li> <li>(3) Low temperature at</li> </ul>  | to form helium at<br>nd high pressure<br>nd low pressure<br>nd high pressure  |                               |                      |  |  |  |
| 16.                | <ul> <li>(1) Diameter can be fused if</li> <li>(2)</li> <li>Hydrogen can be fused if</li> <li>(1) High temperature at</li> <li>(2) High temperature at</li> <li>(3) Low temperature at</li> <li>(4) Low temperature at</li> </ul>  | to form helium at<br>nd high pressure<br>nd low pressure<br>nd high pressure<br>nd low pressure   |                               |                      |  |  |  |
| 16.<br>Ans.        | <ul> <li>(1) Diameter can be fused if</li> <li>(2)</li> <li>Hydrogen can be fused if</li> <li>(1) High temperature at</li> <li>(2) High temperature at</li> <li>(3) Low temperature at</li> <li>(4) Low temperature at</li> <li>(1)</li> </ul>   | to form helium at<br>nd high pressure<br>nd low pressure<br>nd high pressure<br>nd low pressure   |                               |                      |  |  |  |
| 16.<br>Ans.<br>17. | <ul> <li>(2)</li> <li>Hydrogen can be fused to</li> <li>(1) High temperature at</li> <li>(2) High temperature at</li> <li>(3) Low temperature at</li> <li>(4) Low temperature at</li> <li>(1)</li> <li>What is formed when cat</li> </ul>  | to form helium at<br>nd high pressure<br>nd low pressure<br>nd high pressure<br>nd low pressure<br>nd low pressure  | heavy water                   |                      |  |  |  |
| 16.<br>Ans.<br>17. | <ul> <li>(1) Difference of the function of the</li></ul> | to form helium at<br>nd high pressure<br>nd low pressure<br>id high pressure<br>id low pressure<br>id low pressure<br>id low carbide reacts with<br>(2) $CaD_2$ | heavy water<br>(3) $Ca_2D_2O$ | (4) CD <sub>2</sub>  |  |  |  |

| 18.  | <b>18.</b> Maximum number of hydrogen bonding in $H_2O$ is   |                                      |   |            |  |  |  |
|------|--|--------------------------------------|---|------------|--|--|--|
|      | (1)1   | (2) 2                                | (3) 3   | (4) 4      |  |  |  |
| Ans. | (4)  |                                      |   |            |  |  |  |
| 19.  | In which of the following reaction hydrogen peroxide is a reducing agent ?<br>(1) $2FeCl_2 + 2HCl + H_2O_2 \rightarrow 2FeCl_3 + 2H_2O$<br>(2) $Cl_2 + H_2O_2 \rightarrow 2HCl + O_2$<br>(3) $2HI + H_2O_2 \rightarrow 2H_2O + I_2$<br>(4) $H_2SO_4 + H_2O_2 \rightarrow H_2SO_4 + H_2O$ |                                      |   |            |  |  |  |
| Ans. | (2)<br>There is a second soft to show a schedule concerning to show its state state with   |                                      |   |            |  |  |  |
| 20.  | I nere is a sample of 10 volume of hydrogen peroxide solution. Calculate its strength.   |                                      |   |            |  |  |  |
|      | (1) 3.00%  | (2) 4.045%                           | (3) 2.509%  | (4) 3.035% |  |  |  |
| Ans. | (4)  |                                      |   |            |  |  |  |
| 21.  | In lab $H_2O_2$ is prepared by   | 7                                    |   |            |  |  |  |
|      | (1) Cold $H_2SO_4 + BaO_2$   |                                      | (2) HCl + BaO <sub>2</sub>  |            |  |  |  |
|      | (3) Conc. $H_2SO_4 + Na_2O_2$  |                                      | (4) $H_2 + O_2$   |            |  |  |  |
| Ans. | (1)  |                                      |   |            |  |  |  |
| 22.  | <ul><li>H<sub>2</sub>O<sub>2</sub> acts as an oxidising</li><li>(1) Acidic medium only</li><li>(3) Neutral medium only</li></ul>   | g agent in                           | <ul><li>(2) Alkaline medium only</li><li>(4) Acidic and alkaline medium</li></ul> |            |  |  |  |
| Ans. | (4)  |                                      |   |            |  |  |  |
| 23.  | Hydrogen peroxide is red   | uced by                              |   |            |  |  |  |
|      | (1) Ozone  |                                      | (2) Barium peroxide   |            |  |  |  |
|      | (3) Acidic solution of KM  | InO <sub>4</sub>                     | (4) Lead sulphide suspen  | sion       |  |  |  |
| Ans. | (4)  |                                      |   |            |  |  |  |
| 24.  | The volume of oxygen libe  | erated from 15 ml of 20 volu         | $1 \text{me} H_2 O_2 \text{ is}$  |            |  |  |  |
|      | (1)250 ml  | (2) 300 ml                           | (3) 150 ml  | (4) 200 ml |  |  |  |
| Ans. | (2)  |                                      |   |            |  |  |  |
| 25.  | The volume of oxygen libe  | erated from 0.68 g of $H_2O_2$ is    | 8   |            |  |  |  |
|      | (1)112 ml  | (2) 224 ml                           | (3) 56 ml   | (4) 336 ml |  |  |  |
| Ans. | (2)  |                                      |   |            |  |  |  |
| 26.  | 20 volume $H_2O_2$ solution  | has a strength of about              |   |            |  |  |  |
|      | (1) 30%  | (2)6%                                | (3)3%   | (4) 10%    |  |  |  |
| Ans. | (2)  |                                      |   |            |  |  |  |
| 27.  | The $H - O - O$ bond angle   | $e \text{ in } H_2O_2(g) \text{ is}$ |   |            |  |  |  |
|      | (1) 107.28°  | (2) 109.28°                          | (3) 104.5°  | (4) 94.8°  |  |  |  |
| Ans. | (4)  |                                      |   |            |  |  |  |

### ASSERTION & REASON QUESTIONS

These questions consist of two statements each, printed as *Assertion* and *Reason*. While answering these Questions you are required to choose any one of the following four responses.

- A. If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
- B. If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
- C. If Assertion is True but the Reason is False.
- D. If both Assertion & Reason are False.

1. Assertion : Decomposition of H<sub>2</sub>O<sub>2</sub> is a disproportionation reaction. Reason : H<sub>2</sub>O<sub>2</sub> molecule simultaneously undergoes both oxidation and reduction. Ans. (A) 2. Assertion: The colour of old lead paintings can be restored by washing with dilute solution of H<sub>2</sub>O<sub>2</sub>. Reason : Black lead sulphide is oxidised by H2O, to white lead sulphate Ans. **(A)** 3. Assertion : The O–O bond length in  $H_2O_2$  is shorter than that in  $F_2O_2$ . **Reason :** H<sub>2</sub>O<sub>2</sub> is ionic compound [AIIMS 2003] **(D)** Ans. 4. Assertion : Hard Water is not fit for washing clothes. **Reason**: It contains Ca<sup>+2</sup> & Mg<sup>+2</sup> ion which can forms ppt with soap & detergents. Ans. **(A)** 5. Assertion : Rate of reaction  $CD_4 + Cl_2 \rightarrow Slow \qquad CH_4 + Cl_2 \rightarrow Fast$ Reason : Due to isotopic effect. Ans. **(A)** 6. Assertion :- Saline hydrides are non volatile, non conducting & crystalline solids. Reason : Saline hydrides are compounds of hydrogen with most of the p-block elements. Ans. **(C)** 7. Assertion : Temporory hardness can be removed by boiling. **Reason**: On boiling the soluble bicarbonates change to carbonates which being insoluble, get precipitated. Ans. (A)