JEE Advanced Archive	**DTS-1**

1. Water forms stronger intermolecular H-bonds, therefore it is liquid at room temperature while H_2S cannot form such strong intermolecular bonds, gas at room temperature.

2.(D) Presence of solvated electrons makes solution of alkali metal in liquid ammonia makes them strongly reducing agent.

3. Anhydrous $MgCl_2$ is obtained by heating hydrated salt in stream of $SOCl_2$.

4. I_2 disproportionate in alkali giving NaI and $NaIO_3$.

5.(A) Electrolysis of molten $CaCl_2$ gives calcium at cathode

$Ca^{2+} + 2e^- \longrightarrow Ca$ (at cathode)

In case of electrolysis in aqueous medium, less electropositive H^+ is reduced at cathode rather than Ca^{2+}.

6. In solvay process, $NaHCO_3$ is extracted from the solution by fractional crystallization, which is then converted to Na_2CO_3. $KHCO_3$ being more soluble than $NaHCO_3$ cannot be extracted by fractional crystallization. Hence, solvay process fails in production of K_2CO_3.

7.(C) D_2O is commonly known as heavy water.

8.(F) Heating $MgCl_2 . 6H_2O$ brings about partial dehydration as

$MgCl_2 \cdot 6H_2O \xrightarrow{\Delta} MgO + HCl + 5H_2O$

9. Occlusion is a phenomena in which particles are physically trapped.

10.(D) Glauber's salt is $Na_2SO_4 \cdot 10H_2O$

11.(A) KNO_3 and other nitrates of alkali metals (except $LiNO_3$) are thermally stable.

12. Na in liquid ammonia contain $NH_3(e^-)$ which possesses charge and conduct electricity.

13.(B) Sodium peroxide on treatment with dilute acid gives H_2O_2.

$Na_2O_2 + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O_2$

14. In H_2O_2 the peroxide ion (O_2^{2-}) is unstable, has tendency to pass into stable oxide sate (O^{2-}). Hence, H_2O_2 is a good oxidising agent while H_2O is stable.

15. $Al + \text{conc. } NaOH \longrightarrow NaAlO_2 + H_2\uparrow$