CHEMISTRY

1. How much volume of HBr (0.02M) needed to completely neutralize $Ba(OH)_2$ (0.01M, 10 ml)

Ans. (2.5 ml)

Sol. $N_1 V_1 = N_2 V_2$

$0.02 \times 2 \times V_1 = 0.01 \times 10$

$V_1 = 2.5$ ml

2. If the radius of first Bohr orbit is a_o then De-Broglie wavelength of electron in 3rd orbit is

(1) $3\pi a_o$ (2) $6\pi a_o$ (3) $\frac{\pi a_o}{3}$ (4) $\frac{\pi a_o}{6}$

Ans. (2)

Sol. $2\pi r_3 = 3\lambda$

$2\pi (9\ a_0) = 3\lambda$

$\left\{\begin{matrix} r_3 = (3)^2 a_0 \\ r_3 = 9a_0 \end{matrix}\right\}$

$\lambda = 6\pi \alpha_0$

3. An Ideal gas increased its Temperature from 200 K to 800 K if velocity of gas molecule is v at 200k then at 800 K it becomes

(1) 2v (2) 4v (3) 0.5v (4) v

Ans. (1)

Sol. $V \propto \sqrt{T}$

$\frac{V}{V'} = \sqrt{\frac{200}{800}}$

$V' = 2V$

4. Which element is not found in Nessler's reagent

(1) Nitrogen (2) Mercury (3) Iodine (4) Potassium

Ans. (1)

Sol. Nesslar's reagent

K_2HgI_4

5. What is the IUPAC Name of $K_3\ [Co(C_2O_4)_3]$

Ans. Potassium trioxalato cobaltate (III)

Sol.

6. In solid, liquid and at high temperature respectively, the $BeCl_2$ compound exists in following form

(1) Diameric, Monomeric, Polymeric (2) Diameric, Polymeric, Monomeric

(3) Monomeric, Polymeric, Diameric (4) Polymeric, Diameric, Monomeric

Ans. (4)

7. Potential energy of an electron is defined as $U = \frac{1}{2}m\omega^2x^2$ and follows Bohr's law. Radius orbit function of n depends on (ω is some constant)

(1) n^2 (2) $\frac{1}{\sqrt{n}}$ (3) $\sqrt{n}$ (4) $n^{2/3}$

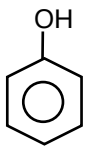
Ans. (3)

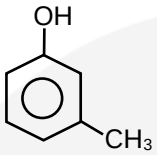
Sol. $mvr = \frac{nh}{2\pi}$

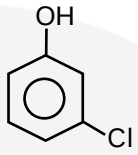
$mwr^2 = \frac{nh}{2\pi}$

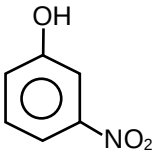
$r \propto \sqrt{n}$

8. Which one of the following is most acidic

(1) 

(2) 

(3) 

(4) 

Ans. (4)

9. $NO_3^- + 4H^+ + 3e \rightarrow NO + 2H_2O$ $E^o = 0.97v$

$V^{2+} + 2e^- \rightarrow V$ – 1.19 V

$Fe^{3+} + 3e^- \rightarrow Fe$ – 0.04 V

$Ag^+ + e^- \rightarrow Ag$ + 0.80 V

$Au^{3+} + 3e^- \rightarrow Au$ + 1.40 V

Number of metal which can be oxidized by NO_3^- ion

Ans. (3)

Sol. (V, Fe, Ag)

10. Which of the following is most basic

(1) Tl_2O_3 (2) Tl_2O (3) Cr_2O_3 (4) B_2O_3

Ans. (2)

Sol.

11. Which of the following has highest hydration energy ?

(1) Be^{+2} (2) Mg^{+2} (3) Ca^{+2} (4) Ba^{+2}

Ans. (1)

Sol. hydration energy

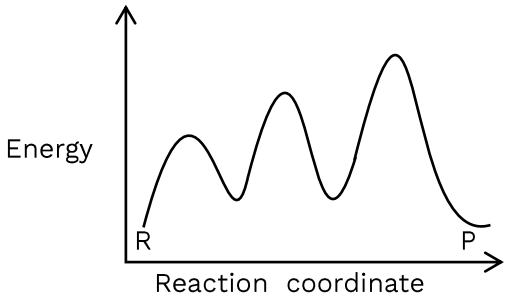
$Be^{2+} > Mg^{2+} > Ca^{2+} > Sr^{2+} > Ba^{2+}$

12. Oxidation state of Mn in $KMnO_4$ changes by 3 units in which medium ?

(1) Strongly acidic (2) Strongly basic (3) Aqueous neutral (4) Weakly acidic

Ans. (3)

Sol.

13. 

Total number of Intermediate and number of transition states

Ans. (5)

Sol. (Intermediate = 2

Transition states = 3)

14. How many of the following will have same RLVP

A. 1M NaCl, B. 1.5 $AlCl_3$, C. 1M urea, D. 2M Na_2SO_4

(1) A and B (2) B and D (3) C and D (4) A and D

Ans. (2)

Sol. 1M Nacl $\Rightarrow$ i = 1 + (2 – 1) = 2 $\Rightarrow$ ci = 2

1.5 M $AlCl_3$ $\Rightarrow$ i = 1 + (4 – 1) = 4 $\Rightarrow$ ci = 6

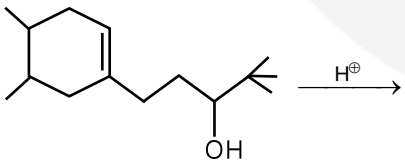
1M urea $\Rightarrow$ i = l $\Rightarrow$ ci = 1

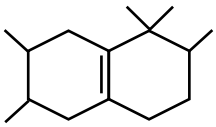
2M Na_2SO_4 $\Rightarrow$ i = 1 + (3 – 1) = 3 $\Rightarrow$ ci = 6

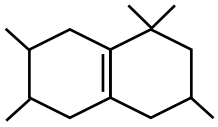
15. How many of them can have BCC unit cells-Cubic, tetragonal, Orthorhombic, Rhombohedral, hexagonal, Monoclinic, Triclinic

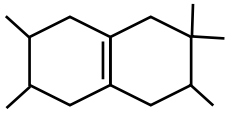
Ans. (03.00)

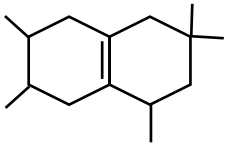
Sol.

16. 

(1) 

(2) 

(3) 

(4) 

Ans. (1)

17. Which of are following are square planar in shape

SF_4, XeF_4, BrF_4^-, $NiCl_4^{2-}$, $[Cu(NH_3)]^{2+}$, $PtCl_4^{2-}$,

Ans. (4)

18. During the detection of lead, formation of which of the following compound is not used as confirmatory test.

(1) $PbSO_4$ (2) $Pb(NO_3)$ (3) $PbCrO_4$ (4) PbI_2

Ans. (1)

19. In ice, each H_2O molecule is surrounded by how many molecules ?

Ans. (4)

20. A metal oxide formula is M_2O_3, find correct metal which can form basic oxide.

(1) B (2) Al (3) Ga (4) In

Ans. (4)

21. How many of the given molecules are square planar in shape

(1) XeF_4

(2) SF_4

(3) $[Ni(CO)_4]$

(4) $[Ni(CN)_4]^{2-}$

(5) $[NiCl_4]^{2-}$

(6) $[FeCl_4]^{2-}$

(7) $[Cu(NH_3)_4]^{2+}$

(8) $[PdCl_4]^{2-}$

Ans. (1,4,7,8)