Studentpad

K-CET CHEMISTRY PAPER 2022-23

Time : 120 Min	Chem : Full Portion Paper	Marks : 60

Hints and Solutions

01) Ans: **B)** coagulates.

02) Ans: **D)** $\left[Cr(H_2O)_6\right]^{3+}$

Sol: $\left[Cr(H_2O)_6\right]^{3+}$

03) Ans: **D)** KIO_3

Sol: $2KClO_3 + I_2 \rightarrow 2KIO_3 + Cl_2$

04) Ans: **A)** increasing of pressure.

Sol: In this reaction, ΔH is negative, thus reaction moves forward by decreasing temperature while value of $\Delta n = 2-3 = -1$ i.e. negative, hence the reaction moves forward by increasing pressure.

05) Ans: **B)** Yes

Sol: As, E^o for $Fe/Fe^{2+} = 0.44\,V$.

06) Ans: **C)** In acidic solutions protons coordinate with ammonia molecules forming NH_4^+ ions and NH_3 molecules are not available.

Sol: In acidic solutions protons coordinate with ammonia molecules forming NH_4^+ ions and NH_3 molecules are not available.

07) Ans: **B)** 8.3 J $mol^{-1}K^{-1}$

Sol: 8.3 J $mol^{-1}K^{-1}$

08) Ans: **A)** enzymes

Sol: $Starch \xrightarrow{Enzymes} Alcohol$

09) Ans: **A)** concentration of the solution decrease.

Sol: As acetic acid gets adsorbed on charcoal, concentration of the solution decreases.

10) Ans: **C)** gluconic acid.

Sol: Glucose on reaction with bromine water followed by oxidation yields gluconic acid.

$$\underset{\text{Glucose}}{C_6H_{12}O_6} + (O) \xrightarrow{Br_2/H_2O} \underset{\text{Gluconic acid}}{CH_2OH(CHOH)_4COOH}$$

11) Ans: **B)** Ca^+ ions form ccp and F^- ions are present in all the tetrahedral voids

Sol: In fluorite structure $(CaF_2), Ca^{2+}$ form ccp while F^- ions are present in all available tetrahedral sites.

12) Ans: **A)** HN_3

Sol: HN_3

13) Ans: **A)** H_2S gas

Sol: H_2S gas

14) Ans: **A)** Ethanol

Sol: Because of hydrogen bonding.

15) Ans: **B)** eight chloride ions.

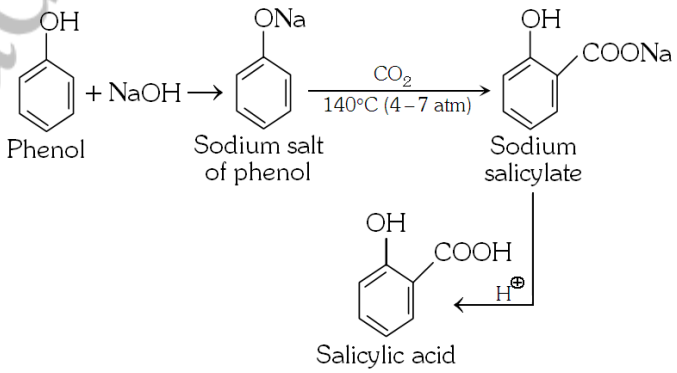
Sol: Each Cs^+ in CsCl is surrounded by eight Cl^- while each Cl^- in CsCl is surrounded by eight Cs^+.

16) Ans: **A)** hydrogen cyanide.

17) Ans: **B)** complex forming behavior.

18) Ans: **A)** salicylic acid.

Sol: Treatment of sodium salt of phenol with CO_2 under pressure will substitute the carbonyl group –COOH, for the hydrogen of the ring. This is known as Kolbe's reaction.



19) Ans: **A)** CaH_2

Sol: $\overset{+2}{Ca}\,\overset{x}{H_2} \Rightarrow 2+2x=0$ i.e. $x=-1$

20) Ans: **D)** +1

21) Ans: **C)** Covalent

Sol: Covalent bond is formed by similar atoms.

22) Ans: **C)** 8 g

Sol: Here, CH_4 required $= \dfrac{445.15\times 16}{890.3} = 8\,gm$

23) Ans: **D)** 2-acetoxy benzoic acid.

24) Ans: **A)** inversely proportional to the square root of its molecular mass.

25) Ans: **D)** none of these.

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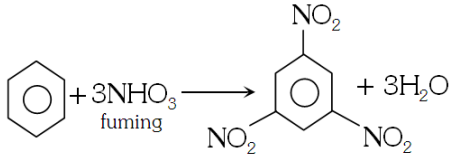
Sol: $H_2S + 2HNO_3 \rightarrow 2NO_2 + S + 2H_2O$

26) Ans: **A)** Carbon dioxide
Sol: Because carbon dioxide is necessary for photosynthesis in plants and non-harmful for human beings

27) Ans: **B)** sym-trinitrobenzene.
Sol:



sym-trinitro benzene

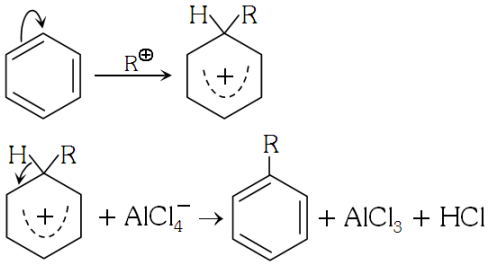
28) Ans: **A)** It is highly inflammable.

29) Ans: **D)** All of these.
Sol: Fuel cells run till reactants are active, are more efficient, and also they free from pollution.

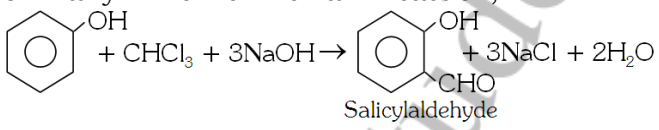
30) Ans: **A)** benzoic acid.

31) Ans: **D)** Both (2) and (3).
Sol: New carbon-carbon bond formation occurs in Friedel Craft's alkylation and Reimer-Tiemann reaction. In Friedel Craft's alkylation, following mechanism is involved.

$$R-Cl + AlCl_3 \rightleftharpoons \underset{\text{Alkyl carbonium ion}}{R^{\oplus}} + AlCl_4^{\ominus} + HCl$$



Here new C-C bond formed between carbon of benzene ring and alkyl group.
Similarly in Reimer-Tiemann reaction,



Salicylaldehyde

Here, new C-C bond is formed between carbon of benzene ring and -CHO group.

32) Ans: **A)** Number of molecules present in one gram molecular mass of a substance

33) Ans: **A)** absorb the heat generated by nuclear fission.
Sol: Molten sodium is used as a coolant in nuclear reactors.

34) Ans: **B)** benzoyl Chloride.
Sol: $\underset{\text{Benzaldehyde}}{C_6H_5CHO} + Cl_2 \rightarrow \underset{\text{Benzoyl chloride}}{C_6H_5COCl} + HCl$

35) Ans: **D)** Ionic, ionic
Sol: Lithium oxide as well as calcium fluoride show ionic characters.

36) Ans: **B)** $[Cu(NH_3)_4]SO_4$
Sol: $[Cu(NH_3)_4]SO_4$ is Schweitzer's reagent which is used in the manufacturing of artificial silk.

37) Ans: **A)** 16
Sol: As volume is reduced to $\frac{1}{4}$, the concentration becomes four times.

38) Ans: **D)** 0.07
Sol: For HCl $M = N = 0.1$
Now, $N_1V_1 = N_2V_2 \Rightarrow 25 \times N_1 = 0.1 \times 35$

$$N_1 = \frac{0.1 \times 35}{25} \qquad \therefore M = \frac{0.1 \times 35}{25 \times 2} = 0.07$$

39) Ans: **B)** 5
Sol: (i) $\underset{\substack{\text{Nitric oxide}\\ \text{Colourless gas}}}{NO}$ (ii) $\underset{\substack{\text{Nitrous oxide}\\ \text{Colourless gas}}}{N_2O}$ (iii) $\underset{\substack{\text{Dinitrogen}\\ \text{trioxide}\\ \text{Blue liquid}}}{N_2O_3}$

(iv) $\underset{\substack{\text{Dinitrogen}\\ \text{tetraoxide}\\ \text{colourless liquid}}}{N_2O_4}$ (v) $\underset{\substack{\text{Dinitrogen}\\ \text{pentaoxide}\\ \text{colourless gas}}}{N_2O_5}$

40) Ans: **B)** $PbCl_2$
Sol: $PbCl_2$ is the most ionic, as on going down the group the metallic character increases and also the inert pair effect predominates.

41) Ans: **D)** SbF_5
Sol: $K_2MnF_6 + 2SbF_5 \rightarrow 2KSbF_6 + MnF_3 + \frac{1}{2}F_2$
Here, the stronger Lewis acid SbF_5 displaces the weaker one, MnF_4 from its salt. MnF_4 is unstable and readily decomposes to produce MnF_3 and fluorine.

42) Ans: **B)** 1.07 V
Sol: $E = E^o - \frac{0.059}{n}\log\frac{[Zn^{++}]}{[Cu^{++}]} = 1.10 - \frac{0.059}{2}\log\frac{1}{0.1}$
$E = 1.10 - 0.0295 \log 10 = 1.07\ V$

43) Ans: **A)** $Cl - Br$
Sol: $Cl - Br$. Both belong to VII-A group having 7 electrons in valence shell.

44) Ans: **C)** Nitrobenzene.

45) Ans: **C)** 3
Sol: $R = K[A]$, $1.02 \times 10^{-4} = 3.4 \times 10^{-5}[N_2O_5]$

$$(N_2O_5) = \frac{1.02 \times 10^{-4}}{3.4 \times 10^{-5}}, K = 3$$

46) Ans: **B)** 10.22

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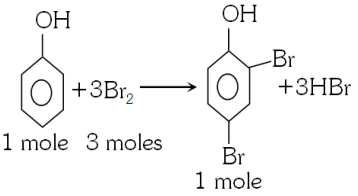


Sol:
94 grams of phenol reacts with 480 gm of Br_2

$\therefore$ 2 gm of phenol - $\frac{480}{94} \times 2 = 10.22$ gms

47) Ans: **A)** active mass.
Sol: As per the law of mass action.

48) Ans: **D)** $\begin{matrix} CH_3 \\ C_2H_5 \end{matrix}\!\!\rangle CH - \underset{\displaystyle NH_2}{\underset{|}{C}}H.COOH$

Sol: $\begin{matrix} CH_3 \\ C_2H_5 \end{matrix}\!\!\rangle CH - \underset{\displaystyle NH_2}{\underset{|}{C}}H.COOH$

49) Ans: **A)** molecularity

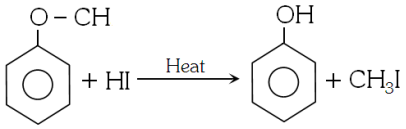
50) Ans: **A)** Spin
Sol: Spin quantum number is not related with Schrodinger equation as they always show $+1/2$, $-1/2$ value.

51) Ans: **B)** Wrought iron less than 0.15% carbon; steel 0.15 to 2.0% carbon; and pig iron over 2% carbon.

52) Ans: **A)** $CH_3CH_2Cl + HCl + SO_2$
Sol:

$$C_2H_5OH + SOCl_2 \xrightarrow{\text{Pyridine}} C_2H_5Cl + SO_2 + HCl$$

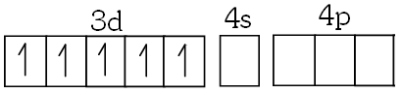
53) Ans: **A)** C_6H_5 - OH and CH_3 - I
Sol:



54) Ans: **D)** M / 6
Sol: $Cr_2O_7^{2-} + 14H^+ + 6e \rightarrow 2Cr^{3+} + 7H_2O$
Now, equivalent weight of $K_2Cr_2O_7$

$= \frac{\text{Molecular Mass}}{6} = \frac{294.2}{6} = \frac{M}{6}$

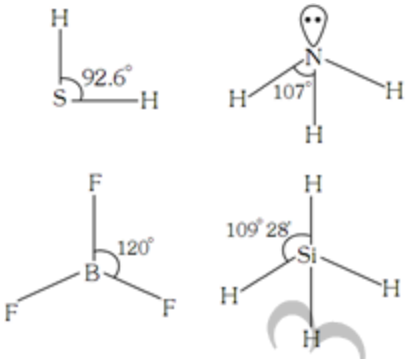
55) Ans: **B)** 5.91 BM
Sol: Given $K_3[FeF_6]$, $Fe^{3+} = [Ar]3d^5\,4s^0$



So, Number of unpaired electrons = 5
$\therefore$ Magnetic moment $= \sqrt{n(n+2)} = \sqrt{5(5+2)}$
$= \sqrt{35}$ = 5.91 BM

56) Ans: **A)** $H_2S < SiH_4 < NH_3 < BF_3$

Sol: The correct order of bond angle (Smallest first) is as follows
$H_2S < NH_3 < SiH_4 < BF_3$
$92.6^\circ < 107^\circ < 109^\circ 28' < 120^\circ$.



57) Ans: **C)** $a = b \neq c$ and $\alpha = \beta = \gamma = 90^o$
Sol: The tetragonal system possesses the unit cell dimension $a = b \neq c, \alpha = \beta = \gamma = 90^\circ$

58) Ans: **B)** ethylene bromohydrin.
Sol: $CH_2 = CH_2 \xrightarrow{Br_2, H_2O} \underset{\displaystyle Br}{\underset{|}{C}}H_2 - \underset{\displaystyle OH}{\underset{|}{C}}H_2$
Ethylene bromohydrin
Thus, compound A is ethylene bromohydrin.

59) Ans: **D)** none of these.
Sol: Aldehyde and ketone are colourless as well as stable compound.

60) Ans: **D)** HCN.

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