SET- A

Subject: Chemistry

Que. No.: 1

Solution: (C-1)

\[
\begin{align*}
\text{CH}_3\text{CH} = \text{CH}_2 & \rightarrow \text{CH}_3\text{CH} = \text{CH} - \text{CH}_2^+ \\
\text{CH} = \text{CH}_2 & \rightarrow \text{CH} - \text{CH}_2 - \text{CH}_2
\end{align*}
\]

1,2-methylen shift

Page no.
SET- A

Subject: Chemistry

Que. No.: 2

Solution: (2)

\[ \text{E}_4 \text{C} \text{O}_7 \text{Gd} \text{ [Xe]} \text{C}_4 \text{H}_4 \text{Eu} \text{D}_{5\text{r}} \text{As}_2 \text{P}_2 \text{S}_2 \text{O}_{10\text{r}} \text{K}_2 \text{O}(\text{aq}) \text{H}_2 \text{O}_{\text{aq}} \text{P}_5 \text{S}_3 \text{S}_2 \text{O}_{10\text{r}} \text{K}_2 \text{O} \text{H}_2 \text{O}} \]
SET- A
Subject: Chemistry
Que. No.: 3
Solution: (3)

Due to small size of oxygen second electron increase intraelectronic repulsion that decrease stability gained by noble gas configuration.
SET- A

Subject: Chemistry

Que. No.: 4

Solution: (3)

\[
\text{Ans: } 4 \quad \text{CH}_2-\text{CH}_2-\text{CH}_2-\text{NH}_2 \quad \text{Primary amine}
\]

\[
\text{CH}_3-\text{CH}-\text{NH}_2 \quad \text{Iso amine}
\]

\[
\text{CH}_3-\text{CH}_2-\text{NH}-\text{CH}_3 \quad \text{2° amine}
\]

\[
\text{CH}_3-\text{N}-\text{CH}_3 \quad \text{8° amine}
\]
SET- A

Subject: Chemistry

Que. No.: 5

Solution: (3)

\[ \text{Ans: } k^{1/2} \]

\[ \begin{align*}
N_2 + O_2 & \xrightarrow{k} 2NO \\
\frac{1}{2}N_2 + \frac{1}{2}O_2 & \xrightarrow{k} NO^{1/2}
\end{align*} \]
SET- A
Subject: Chemistry
Que. No.: 6
Solution: (a)

Ans: HClO₄ & NaClO₄

Acidic buffer solution is always a mixture of weak acid and its salt.
SET- A

Subject: Chemistry

Que. No.: 7

Solution: (4)

HCl is a strong acid will completely
ionised in aqueous medium and provide
high conductivity.
SET- A

Subject: Chemistry

Que. No.: 8

Solution: (i)

Ans: Nylon-6

\[
\text{Caprolactam} \xrightarrow{\text{+H}_2\text{O}} \text{HOOC-(CH}_2\text{)}_5\text{-NH}_2 \\
\text{Caproic acid} \downarrow
\]

\[
\text{OC-(CH}_2\text{)}_5\text{-NH}\_3 \quad \text{Nylon-6}
\]
SET- A

Subject: Chemistry

Que. No.: 9

Solution: (1)

MgCO₃ is thermally unstable due to high polymorphism and covalent character. In alkaline earth metal down the group thermal stability increases.
ANS: Presence of one -OH and two P-H bonds in $\text{H}_3\text{PO}_2$.
SET- A

Subject: Chemistry

Que. No.: 11

Solution: (3)

$\text{Ans: } O_2^+ > O_2 > O_2^- > O_2^{2-}$

Stability is directly proportional to bond order.

B.O.

$O_2^+ = 2.5$

$O_2 = 2$

$O_2^- = 1.5$

$O_2^{2-} = 1$
SET- A

Subject: Chemistry
Que. No.: 12

Solution: (2)

Ans: 18 mole of water.

No. of water molecule will be directly proportional to number of moles.

(i) $18 \text{ g of H}_2\text{O} = 1 \text{ mole}$

(ii) $18 \text{ mole H}_2\text{O} = 18 \text{ mole}$

(iii) $18 \text{ mole of water} = 2.989 \times 10^{23} \text{ mole}$

(iv) $1.8 \text{ g of H}_2\text{O} = \text{1 mole}$. 
SET- A

Subject: Chemistry

Que. No.: 13

Solution: (2)

Ans: XeF$_4$ and XeO$_4$

XeF$_4$ $\rightarrow$ $sp^3d$ hybridization
  Square planar geometry

XeO$_4$ $\rightarrow$ $sp^3$ hybridization
  Tetrahedral geometry
SET- A
Subject: Chemistry
Que. No.: 4
Solution: (b)

Ans. (a) and (b) both

\[
\begin{align*}
\text{C}_6\text{H}_5 + \text{HCl} & \rightarrow \text{C}_6\text{H}_5\text{Cl} \\
\text{C}_6\text{H}_5 + \text{HCl} & \rightarrow \text{C}_6\text{H}_6\text{Cl}
\end{align*}
\]
SET - A

Subject: Chemistry

Que. No.: 15

Solution: (3)

\[ \text{Add: } \text{FeSO}_4 \]

\[ 1 \text{ mole } \text{FeSO}_4 \rightarrow \frac{3}{5} \text{ mole } \text{KMnO}_4 \]
\[ 1 \text{ mole } \text{Fe(NO}_3)_2 \rightarrow 1 \text{ mole } \text{KMnO}_4 \]
\[ 1 \text{ mole } \text{FeSO}_4 \rightarrow \frac{1}{5} \text{ mole } \text{KMnO}_4 \]
\[ 4 \text{ mole } \text{FeSO}_4 \rightarrow \frac{2}{5} \text{ mole } \text{KMnO}_4 \]
SET- 4
Subject: Chemistry
Que. No.: 16

Solution:

\[
\text{ON} + \text{CHO}_2 + 3\text{NaOH} \xrightarrow{\text{OH}} \text{CHO} + 3\text{NaO} + 2\text{H}_2\text{O}
\]

This is an example of the Reimer Tiemann reaction.
SET-__

Subject: Chemistry
Que. No.: 17

Solution:

Ans.: Acc unit cell

Efficiency packing = 68%.

Vacant space = 100 - 68

= 32%.

Solution 18.: Answer (3) i.e. fluorine

- ONF = \( \text{O}^2- \text{N}^+ \text{F}^- \)
- \( \text{Q}^2^+ \text{W}^- = \text{Z} \text{A}^+ \text{C}^- \)
- \( \text{H}_2 \text{C}_2 \text{O}_4 + \text{H}_2 \text{O} \rightarrow \text{C}_2 \text{H}_4 \text{O}_7 \)

Anhydride of perchloric acid

Page no. ___
SET- __
Subject: Chemistry
Que. No.: 19

Solution:

\[ \text{Hexa cyanide iron (III) ion} \]

\[ \text{Fe(CN)}_6^{3-} \]

\[ \text{Am(3)} \]

\[ \text{NA} = 6.022 \times 10^{23} \text{ mol}^{-1} \]

Convert in

\[ 6.022 \times 10^{20} \text{ mol}^{-1} \]

Then it would change the mass of one mole of Carbon.

\[(2) \text{ Nucleophile acts as Lewis base} \]

\[ \text{Not act as Lewis Acid} \]

\[ \text{Am(3)} \]

\[(2) \text{ for Ideal gas law:} \]

\[ \text{High temperature and low pressure for Carbon monoxide gas} \]
SET- A
Subject: Chemistry
Que. No.: 8.2
Solution:

Hybridisation in \([\text{Ni}(\text{C})]+]^{2-}\)

\[\text{Ni}^{2+}, \text{C}^{3-}, \text{e}^{-2}\]

for Ni$:  \[\begin{array}{c}
\text{1}\text{V} \\
\text{1}\text{V} \\
\text{1}\text{V} \\
\text{1}\text{V} \\
\text{1}\text{V} \\
\end{array}\]

for Ni$:  \[\begin{array}{c}
\text{1}\text{V} \\
\text{1}\text{V} \\
\text{1}\text{V} \\
\text{1}\text{V} \\
\text{1}\text{V} \\
\end{array}\]

\[= \text{d}^5\text{p}^2\]
Subject: Chemistry
Que. No.: 24
Solution:

\[ C + O_2 \rightarrow CO_2 \]

\[ (44 \text{ gm}) \]

for \( 44 \text{ CO}_2 \) Combustion Heat \( \Delta H = -393.5 \text{ kJ} \)

\[ 25 \times \text{ CO}_2 \implies \frac{-393.5 \times 25.2}{44} \]

\[ = -214.8 \]

\[ \approx -215 \text{ kJ} \]
SET- A
Subject: Chemistry
Que. No.: 25
Solution:

\[ \text{MgCO}_3 \rightarrow \text{MgO} + \text{CO}_2 \]

<table>
<thead>
<tr>
<th>1 mol</th>
<th>1 mol</th>
<th>1 mol</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 g</td>
<td>40 g</td>
<td>44 g</td>
</tr>
</tbody>
</table>

40 gMgO then MgCO\(_3\) = 84 g

\[ \frac{8 \text{ g}}{84 \text{ g}} \times 100 = 16.7\% \]

16.7% of MgCO\(_3\) in sample

= 8.4% (Option 2)
SET-____
Subject: Chemistry
Que. No.: 26
Solution:

\[ 1.50 \text{ mol} \]
\[ = \frac{1\text{mol}}{1000\text{g}} \cdot 170 \]
\[ = \frac{100}{18} = 55.5 \text{ mol} \]

Mole fraction of solute
\[ = \frac{1}{55.5 + 1} \]
\[ = \frac{1}{56.5} > 0.0177 \quad (21\%) \]
SET- ___

Subject: ________

Que. No.: 27

Solution: And.

Option (i)

Frankel defect is a dislocation defect in crystalline solid.

(28) Due to inert pores effect, stability of +1 oxidation state increased.

So

Al $<$ Ga $<$ In $<$ Ti

Page no. ___
SET- A
Subject: Chemistry
Que. No.: 29
Solution:

\[
\text{The stereoisomers which are non-superimposable mirror images of each other are called exceptional isomers.}
\]
Solution:

\[
\text{Benzoylation of aniline is Schotten - Baumann reaction.}
\]
SET-___

Subject: Chemistry.
Que. No.: 31

Solution:

\[
\left[ M\left\{\text{en}\right\}_2\left(S_2O_4\right)^{2-}\right]^{3+}
\]

Bidentate (en), \( S_2O_4 \)

Sum of Co-ordination Number and Oxidation Number = \( 6 + 2 = 8 \)

Optim = \([3]\)
SET-

Subject: _______

Que. No.: 32

Solution:

\[ C=O^- + H^+ \rightarrow C=O + H \]

\[ \overset{\text{N}_{2}H_{5}}{C-O-H} \rightarrow \overset{\text{N}_{2}}{C-O^- + H} \]

\[ -H_2O \]

\[ C=\overset{\text{N}_{2}}{N-H_2} \rightarrow C=N - \overset{\text{N}_{2}}{N-H_2} \]

Page no. ___
SET- A
Subject: Chemistry
Que. No.: 23
Solution: 3

Decreasing order of hydrolysis

Page no. ___
In an SN, attack on chiral center rear attack of nucleophile takes place easily as compare to front attack.
So inversion takes place more than retention leading to partial racemization.
SET-____

Subject: Chemistry

Que. No.: 35

Solution:

\[ K = 0.6 \times 10^{-2} \text{ mol L}^{-1} \text{ second}^{-1} \]

1st and Zero Order Reaction

\[ K = \frac{a-n}{t} \]

\[ 0.6 \times 10^{-2} = \frac{a-n}{20 \times 60} \]

\[ a-n = \frac{0.6 \times 1200}{1000 \times 10} \]

\[ a-n = \frac{720}{100} \]

\[ a-n = 0.72 \text{ M} \]

Answer: (2)
SET- ___
Subject: Chemistry
Que. No.: 36
Solution:

\[ \text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} \]

\[ 0.1 \text{ M} \quad 0.01 \text{ M} \]

\[ 0.1 - 0.01 
\]

\[ 0.09 \]

\[ \frac{v_1 \cdot v_2}{v_1 + v_2} \]

\[ \frac{0.1 \times 100 - 0.01 \times 100}{100 + 100} \]

\[ = \frac{10 - 1}{200} = \frac{9}{200} = 0.045 \]

\[ \text{pH} \text{ titration} = 4.5 \times 10^{-2} \]

\[ = 2 \log 10 - 1 \log 4.5 \]

\[ = 2 - 0.67 = 1.33 \]

\[ \text{pH} = 1 + 1.33 = 12.33 \]

Page no. ___
SET: ___
Subject: _______
Que. No.: 37
Solution:

\[ \text{Cl} \quad \text{Co} \quad (\text{en})_2 \text{Cl}_2 \quad \text{Cl} \]

Trans

\[ \text{Cis} \quad \text{Cl} \quad \text{Co} \quad (\text{en})_2 \text{Cl}_2 \quad \text{Cl} \quad \text{Cis} \]

Page no. - disomur

\[ \text{Cis} \quad \text{Cl} \quad \text{Co} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cis} \]

\[ \text{Cis} \quad \text{Cl} \quad \text{Co} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cis} \]

\[ \text{Cis} \quad \text{Cl} \quad \text{Co} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cis} \]

\[ \text{Cis} \quad \text{Cl} \quad \text{Co} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cl} \quad \text{en} \quad \text{Cis} \]
SET- ___
Subject: ________
Que. No.: 38
Solution: 4

Boiling points of hydrogen halides is in the order

\[ \text{H}_2\text{F} > \text{H}_2\text{I} > \text{H}_2\text{Br} > \text{H}_2\text{Cl} \]

It is because of strong H-Bonding in HF molecules.
Set A

\[ \text{AgNO}_3 \]

100 g ------ 16.9 g

50 g ------ 8.45 g

\[ \text{NaCl} \]

12 g ------ 58.5 g

50 g ------ 2.9 g

\[ \text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3 \]

1 mole 1 mole 1 mole 1 mole

170 g 58.5 g 143.5 g 85 g

\[ \frac{8.45}{170} = \frac{2.9}{58.5} \]

0.049 mole 0.049 mole 0.049 mole 0.049 mole

Mass of AgCl = \( \text{Mole} \times \text{Molar mass} \)

= 0.049 \times 143.5

= 7 g
SET- _____
Subject: ________
Que. No.: 40
Solution: 4

\[
\text{Maleic acid} \quad \text{Maleic anhydride}
\]

Page no. _____
Tertiary alcohol follows E1 mechanism during dehydration. According to the stability of carbocation formed during the reaction, so carbocation (I) is more stable than carbocation (II).

Hence product is not formed.
By Gabriel's phthalimide reaction only primary aliphatic amines can be prepared, aromatic amines cannot be prepared by this method.
SET- ___

Subject: ________

Que. No.: 43

Solution: 3

Alkyl halide can be prepared by following reactions:

I. CH₃CH₂OH + HCl → CH₃CH₂Cl + H₂O
II. (CH₃)₃COH + HCl → (CH₃)₃C-Cl + H₂O
III. (CH₃)₂CHON + HCl → (CH₃)₂CHCl + H₂O

SET-

Subject: Chemistry

Que. No.: 44

Solution:

\[ \text{II} \quad (Z=22) \]

\[ 1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^6 \, 4s^2 \, 3d^{10} \]

\[ \text{(M.N.)} \quad \text{for} \quad 2s = 2t0 = 2 \]
\[ 2p = 2t1 = 4 \]
\[ 4s = 4t0 = 4 \]
\[ 3d = 3t2 = 5 \]

Thus, the correct order of increasing energy is

\[ 2s, 2p, 4s, 2d \]

Option (2)

- \[ 8+11 = 19 \] Auto Reduction

\[ 2 \, \text{Cu}^{3+} + \text{Cu}_2\text{O} \rightarrow 6 \, \text{Cu} + \text{SO}_2 \]

Option (1)