

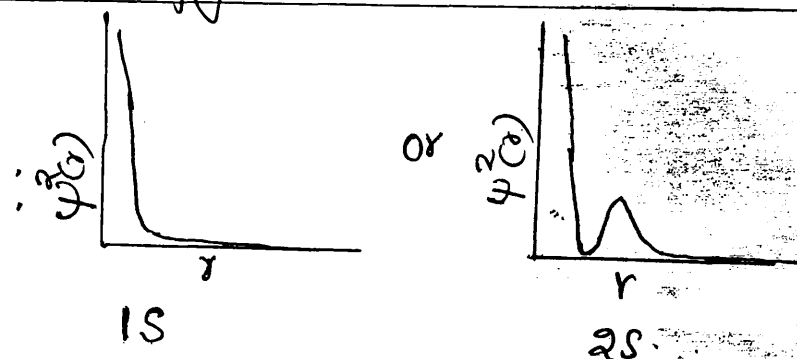
# FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2018

SUBJECT: CHEMISTRY

CODE. NO: 116

| Qn No | Sub Qns | Answer Key/Value Points                                                                                                                                                           | Score                 | Total |
|-------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------|
| 1.    |         | Classical smog/Reducing smog/London smog                                                                                                                                          | 1                     | 1     |
| 2.    |         | Square Planar or diagram                                                                                                                                                          | 1                     | 1     |
| 3.    |         | a) $\text{Cl}_2\text{O}_7$                                                                                                                                                        | 1                     | 1     |
| 4.    |         | 3 or 1                                                                                                                                                                            | 1                     | 1     |
| 5.    |         | Graphite                                                                                                                                                                          | 1                     | 1     |
| 6.    |         | $\text{O}_2$                                                                                                                                                                      | 1                     | 1     |
| 7.    |         | $30 \times N_A$ or $30 \times 6.022 \times 10^{23}$ or $5 \times 6 \times N_A$ or 30 moles                                                                                        | 1                     | 1     |
| 8.    |         | $\text{sp}^3$ hybridisation<br>Angular / Bent / V shape or diagram<br>or Correct explanation with structure<br>definition of hybridisation<br>Electronic configuration of oxygen  | 1<br>1<br>2<br>1<br>1 | 2     |
| 9.    | a)      | 3-Ethyl-1,1-dimethylcyclohexane                                                                                                                                                   | 2                     | 2     |
|       | b)      | 3-Bromo-3-chloroheptane                                                                                                                                                           | 2                     |       |
| 10.   |         | Dry cleaning of clothes / bleaching of Paper/<br>Synthesis of Chemical/reduction of<br>by products / maximum yield or any<br>correct application<br>Definition of green Chemistry | 2<br><br>1            | 2     |
| 11.   |         | Low Temp. favours forward reaction<br>High Pressure favours forward reaction<br>or correct explanation based on colour<br>or backward reaction                                    | 1<br>1<br>2           | 2     |

(1/6)

| Qn. No | Sub Qns                                      | Answer Key/Value Points                                                                                                                                                                                 | Score            | Total |
|--------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------|
| 12.    |                                              | Layer Structure / diagram<br>$\text{H}_3\text{BO}_3 / \text{B}(\text{OH})_3$<br>Lewis acid / does not release $\text{H}^+$ /<br>accepts electron pair from $\text{OH}^-$ /<br>accepts $\text{OH}^-$ ion | 2<br>1<br>2      | 2     |
| 13.    |                                              | Molecular Formula = $n \times$ Empirical Formula<br>Calculation of $n = 6$<br>Molecular Formula = $\text{C}_6\text{H}_6$                                                                                | 1<br>1<br>2      | 2     |
| 14.    | a) Entropy decreases<br>b) Entropy increases | Measure of degree of disorder /<br>randomness of a system                                                                                                                                               | 1<br>1<br>1      | 2     |
| 15.    |                                              |                                                                                                                     | 2                | 2     |
| 16.    |                                              | $PV = nRT$ $PV = \frac{w}{M} RT$ $M = \frac{w}{V} \frac{RT}{P}$ $M = \frac{d RT}{P}$                                                                                                                    | 1<br>1<br>1<br>1 | 2     |

| Qn. No | Sub Qns        | Answer Key/Value Points                                                                                                                                                                                                                                                                                        | Score                                              | Total |
|--------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------|
| 17.    |                | Definition or equation or any correct example.                                                                                                                                                                                                                                                                 | 2                                                  | 2     |
| 18.    |                | Definition of buffer solution<br>Correct example of acidic buffer or blood<br>Example of buffer                                                                                                                                                                                                                | 2<br>2<br>1                                        | 2     |
| 19.    |                | Yes / Aromatic<br>Huckel rule / $(4n+2)$ $\pi$ electron / delocalisation of $\pi$ electron                                                                                                                                                                                                                     | 1<br>1                                             | 2     |
| 20.    |                | $6C_{(s)} + 3H_{2(g)} \rightarrow C_6H_{6(l)}; \Delta_f H^\circ = +49 \text{ kJ/mol}$<br>Equation without physical state                                                                                                                                                                                       | 2<br>1                                             | 2     |
| 21.    | a)<br>b)<br>c) | a) Stable configuration / Octet of electron / noble gas / correct explanation<br>b) Small size of F / high interelectronic repulsion in F / correct explanation<br>c) For isoelectronic species, size of ion decreases with increase in nuclear charge / atomic number or Cation has a smaller size than anion | 2<br>2<br>2                                        | 3     |
| 22.    |                | X $\rightarrow$ $CH_3-CH=CH_2$ / Propene<br>Y $\rightarrow$ $CH_3-CH \begin{array}{c} \diagup O \\ \diagdown \end{array} CH_2$ / Ozonide<br>Z $\rightarrow$ $CH_3CHO$ / Ethanal / Acetaldehyde                                                                                                                 | $1\frac{1}{2}$<br>$1\frac{1}{2}$<br>$1\frac{1}{2}$ | 3     |

| Qn. No | Sub Qns | Answer Key/Value Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Score                             | Total |
|--------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------|
| 23.    |         | $\text{Molarity} = \frac{\text{no. of moles of solute} \times 1000}{\text{Vol. of solution in ml}}$ or any correct Equation<br>correct substitution<br>3.15 g only<br>Molecular mass of oxalic acid = 126                                                                                                                                                                                                                                                                                         | 1/2<br><br>1/2<br>1<br>1          | 3     |
| 24.    |         | Assigning oxidation number to<br>all atoms decreases by 2 OR<br>$\overset{+6}{\text{Cr}_2\text{O}_7^{2-}} + \overset{+4}{\text{SO}_3^{2-}} \rightarrow \overset{+3}{\text{Cr}} + \overset{+6}{\text{SO}_4^{2-}}$ increases by 6 OR<br>$\text{Cr}_2\text{O}_7^{2-} + 6e^- \rightarrow 2\text{Cr}^{3+}$ $\text{SO}_3^{2-} \rightarrow \text{SO}_4^{2-} + 2e^-$ $\text{Cr}_2\text{O}_7^{2-} + 3\text{SO}_3^{2-} + 8\text{H}^+ \rightarrow 2\text{Cr}^{3+} + 3\text{SO}_4^{2-} + 4\text{H}_2\text{O}$ | 1/2<br><br>2<br><br>1<br>1<br>1/2 | 3     |
| 25.    |         | Any one correct method of Preparation/<br>Explanation of structure of diborane/<br>Equation<br>Diagram                                                                                                                                                                                                                                                                                                                                                                                            | 1<br><br>2                        | 3     |
| 26.    |         | Extent of reaction or direction<br>of reaction<br>$K_c > 10^3$ reaction proceeds to<br>completion                                                                                                                                                                                                                                                                                                                                                                                                 | 1/2                               |       |

| Qn. No | Sub Qns  | Answer Key/Value Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Score                                                                | Total |
|--------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------|
|        |          | $K_c < 10^{-3}$ , reaction proceeds rarely<br>$Q_c > K_c$ , backward reaction<br>$Q_c < K_c$ , forward reaction<br>$Q_c = K_c$ , no net reaction occurs or at equilibrium                                                                                                                                                                                                                                                                                                                             | $1\frac{1}{2}$<br>$1\frac{1}{2}$<br>$1\frac{1}{2}$<br>$1\frac{1}{2}$ | 3     |
| 27.    | a)<br>b) | $H_2O_2$ decomposes in the presence of light/alkali content in glass/<br>to prevent decomposition<br>wastage of soap/scur or ppt formation<br>or no lather with soap/correct eqn.                                                                                                                                                                                                                                                                                                                     | 2<br>1                                                               | 3     |
| 28.    |          | no. of moles of $N_2 = \frac{3.5}{28} = 0.125$<br>or<br>no. of moles of $O_2 = \frac{16}{32} = 0.5$<br>$\therefore p_{N_2} = \frac{n_{N_2} RT}{V} = \frac{0.125 \times 0.083 \times 300}{2}$<br>or $= 1.56$<br>$p_{O_2} = \frac{n_{O_2} RT}{V} = \frac{0.5 \times 0.083 \times 300}{2}$<br>$= 6.22$<br>Total pressure $= p_{N_2} + p_{O_2} = 1.56 + 6.22$<br>$= 7.78$<br>or<br>Total pressure $= \frac{(n_{N_2} + n_{O_2}) RT}{V}$<br>$= \frac{(0.125 + 0.5) \times 0.083 \times 300}{2}$<br>$= 7.78$ | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1                            | 3     |

| Qn. No | Sub Qns              | Answer Key/Value Points                                                                                                                                                                                                                              | Score                           | Total |
|--------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------|
| 29.    |                      | $\Delta H = \Delta U + \Delta n_g RT$<br>$\Delta H = -7.42 \times 10^3 + (-0.5) \times 8.314 \times 298$<br>$\Delta H = -743938 \text{ J/mol or}$<br>$-743.938 \text{ kJ/mol}$<br>Calculation of $\Delta n = -0.5$                                   | 1<br>1<br>1<br>1                | 3     |
| 30.    |                      | M.O. configuration of $N_2$ / diagram<br>M.O. Configuration / diagram of $O_2$<br>Equation of Bond Order<br>B.O of $N_2$<br>B.O of $O_2$<br>$N_2$ is stable than $O_2$<br>$N_2$ is diamagnetic<br>$O_2$ is paramagnetic                              | 1<br>1<br>1<br>1<br>1<br>1<br>1 | 4     |
| 31.    |                      | Description of any three techniques<br>Example of any one technique                                                                                                                                                                                  | 3<br>1                          | 4     |
| 32.    |                      | Any two postulates of Bohr model<br>Two merits<br>Two demerits/limitation                                                                                                                                                                            | 2<br>2<br>2                     | 4     |
| 33.    | a)<br>b)<br>c)<br>d) | Due to ammoniated electron/solvated $e^-$<br>Similar size or similar electronegativity of Li and Mg / Diagonal relationship<br>Formation of NaOH / it is a salt of strong base and weak acid<br>$\Delta_{hyd} H > \Delta_{lattice} H$ or explanation | 2<br>2<br>2<br>2                | 4     |