### CBSE Class 12 Chemistry Question Paper Solution 2019

#### Marking scheme – 2019

**CHEMISTRY (043)/ CLASS XII**

**56/1/1**

<table>
<thead>
<tr>
<th>Q.No</th>
<th>Value Points</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SECTION A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>AgCl, Due to large difference in their size/ Due to small size of Ag⁺ ion.</td>
<td>½ , ½</td>
</tr>
<tr>
<td>2</td>
<td>$\text{(CH}_3\text{)}_3\text{N} &lt; \text{C}_2\text{H}_5\text{NH}_2 &lt; \text{C}_2\text{H}_5\text{OH}$</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Due to large surface area these are easily assimilated or adsorbed.</td>
<td>1</td>
</tr>
<tr>
<td>OR</td>
<td>3</td>
<td>Emulsion – both dispersed phase and dispersion medium are liquid Gel- Dispersed phase is liquid while dispersion medium is solid</td>
</tr>
<tr>
<td>4</td>
<td>Nucleophiles having two nucleophilic centres. CN⁻ /SCN⁻ / NO₂⁻ (any one)</td>
<td>½ , ½</td>
</tr>
<tr>
<td>5</td>
<td>Glucose has aldehydic group while fructose has ketonic group/ Glucose is aldose while fructose is ketose.</td>
<td>1</td>
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<tr>
<td>OR</td>
<td>5</td>
<td>Glucose and Galactose</td>
</tr>
<tr>
<td><strong>SECTION B</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>i) $2\text{XeF}_2$ (s) + 2H₂O(l) → 2Xe (g) + 4 HF(aq) + O₂(g)</td>
<td>1</td>
</tr>
<tr>
<td>ii) $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$</td>
<td>1</td>
<td></td>
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<tr>
<td>OR</td>
<td>6</td>
<td>i) H₂O &lt; H₂S &lt; H₂Se &lt; H₂Te</td>
</tr>
<tr>
<td>ii) HF &gt; HCl &gt; HBr &gt; HI</td>
<td>1</td>
<td></td>
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<tr>
<td>7</td>
<td>For a solution of volatile liquids, the partial vapour pressure of each component of the solution is directly proportional to its mole fraction present in solution. (i) $\Delta\text{H}$ = 0. (ii) $\Delta\text{H}$ = 0 (iii) The components have nearly same intermolecular force of attraction (any two)</td>
<td>½ , ½</td>
</tr>
<tr>
<td>8</td>
<td>i) Rate = $k [\text{H}_2\text{O}_2]$ [1]</td>
<td>1</td>
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<tr>
<td>ii) order = 2</td>
<td>½</td>
<td></td>
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<tr>
<td>iii) Step 1</td>
<td>½</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>A = $K_2\text{MnO}_4 / \text{MnO}_4^{2-}$, B = $\text{KMnO}_4 / \text{MnO}_4^{2-}$, C = IO₃⁻ or KIO₃, D = I₂</td>
<td>½ ×4</td>
</tr>
<tr>
<td>10.</td>
<td>Bis(ethan-1,2-diamine)dichloridoplatinum (II)</td>
<td>1</td>
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<td></td>
<td></td>
<td>½ , ½</td>
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<tr>
<td>OR</td>
<td>10.</td>
<td>i) $[\text{Co(NH}_3)_6]_2(\text{SO}_4)_3$</td>
</tr>
<tr>
<td>ii) $K_3[\text{Cr(ox)}_3]$</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>i) $[\text{CoF}_6]^{3-}$</td>
<td>½ ×4</td>
</tr>
<tr>
<td>ii) $[\text{Co(en)}_3]^{3+}$</td>
<td>½ ×4</td>
<td></td>
</tr>
<tr>
<td>iii) $[\text{Co(en)}_3]^{3+}$</td>
<td>½ ×4</td>
<td></td>
</tr>
<tr>
<td>iv) $[\text{CoF}_6]^{3-}$</td>
<td>½ ×4</td>
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</table>
### SECTION C

#### 13

\[ t = \frac{[R]_0 - [R]_t}{K} \]

\[ t = \frac{[0.1 - 0.064]}{4 \times 10^{-3}} \]

\[ t = 9 \text{ s} \]

#### 14

i) Adsorption of toxic gases

ii) Negative charge; \( \text{Fe}_2\text{O}_3\times\text{H}_2\text{O}/\text{OH} \)

iii) Increases with increase in temperature/ First increases then decreases

#### 15

\[ d = \frac{2m}{a^2 N} \]

\[ N = \frac{108 \times 4}{10.8 \times 27 \times 10^{-24}} \]

\[ N = 1.48 \times 10^{24} \text{ atoms} \]

Or

\[ M = \frac{a^3 N_w \times d}{Z} \]

\[ M = \frac{27 \times 10^{-24} \times 6.022 \times 10^{23} \times 10.8}{4} \]

\[ M = 43.88 \text{ g mol}^{-1} \]

43.88 g mol\(^{-1}\) contains \(6.02 \times 10^{23}\) atoms

So, 108 g contains \(\frac{6.02 \times 10^{23} \times 108}{43.88} = 1.48 \times 10^{24}\) atoms

#### 16

\[ \Delta T_f = K_f m \]

\[ K_f = \Delta T_f \times \frac{M_2 \times w_1}{w_2 \times 1000} \]

\[ = \frac{2 \times 342 \times 96}{4 \times 1000} \]

\[ = 16.4 \text{ K} \]

\[ \Delta T_f = K_f m' \]

\[ = \frac{K_f w_2 \times 1000}{M_2 \times w_1} \]

\[ = \frac{16.4 \times 5 \times 1000}{95 \times 180} \]

\[ = 4.8 \text{ K} \]

\[ \Delta T_f = T_f^0 - T_f \]

\[ 4.8 = 273.15 - T_f \]

\[ T_f = 268.35 \text{ K} \]
17. a) i) Zone refining  ii) Distillation
   b) \[2Cu_2S + 3O_2 \rightarrow 2Cu_2O + 2SO_2\]
   \[2Cu_2O + Cu_2S \rightarrow 6Cu + SO_2\]

18. i) Due to variable oxidation state
   ii) Mn\(^{2+}\) is stable due to exactly half filled 3d\(^5\) configuration/ Due to high \(\Delta H^0\) and low \(\Delta H_{hyd}^0\) for Cu\(^{2+}\)/ Cu is positive.
   iii) Due to comparable energies of 5f, 6d and 7s orbitals.

19. i) HOOC\((\text{CH}_2)_4\text{COOH}\), \(\text{H}_2\text{N}\) \((\text{CH}_2)_6\text{NH}_2\)
   ii) HO-CH\(_2\)-CH\(_2\)-OH
   iii) \(\text{CH}_3=\text{CH}-\overset{\text{O}}{\text{CH}}=\text{CH}_2\)

20. i) Tranquilizers
   ii) Anionic detergents
   iii) It is difficult to control the sweetness.

21. i) \((\text{CH}_3)_3\text{C}-\text{I}\), Due to large size of iodine / better leaving group / Due to lower electronegativity.
   ii) \[\begin{array}{c}
   \text{NO}_2 \\
   \text{C}_6\text{H}_5 - \text{CH(OH)} - \text{CN} \end{array}\]
   \[\text{O\underline{H}}\text{H}\]
   \[\begin{array}{c}
   \text{NO}_2 \\
   \text{C}_6\text{H}_5 \end{array}\]

22. \[\begin{array}{c}
   \text{CONH}_3 \\
   \text{A}= \end{array}\]
   \[\begin{array}{c}
   \text{NH}_2 \\
   \text{B}= \end{array}\]
   \[\begin{array}{c}
   \text{N} \\
   \text{C}= \end{array}\]

23. i) \(\text{C}_6\text{H}_5-\text{CH(OH)}-\text{CN}\)
   ii) 2 \(\text{CH}_3\text{COCH}_2\text{C}_6\text{H}_5\) + \(\text{CdCl}_2\)
   iii) \((\text{CH}_3)_2-\text{C(Br)COOH}\)
### Section A

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<tr>
<td><strong>23</strong></td>
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</table>
| i) | \[
\begin{align*}
2\text{CH}_2\text{CO-CH}_3 \xrightarrow{\text{Ba(OH)}_2} & \text{CH}_3\text{C-CH}_2\text{CO-CH}_3 \\
\text{Propane} & \text{vinyl alcohol}
\end{align*}
\] |
| ii) | \[
\begin{align*}
\text{O} & \xrightarrow{\text{Zn-Hg, HCl}} \text{CH}_3
\end{align*}
\] |
| iii) | \[
\begin{align*}
\text{O} & \xrightarrow{\text{Pd - BaSO}_4} \text{CH}_3
\end{align*}
\] |

### Section B

i) Amylose is water soluble component while amlopectin is water insoluble
ii) Peptide linkage is \(-\text{CONH}-\) formed between two amino acids while glycosidic linkage is an oxygen linkage between two monosaccharides.
iii) In fibrous protein, the polypeptide chains run parallel while in globular, the chains of polypeptides coil around to give a spherical shape (or any other correct difference.)

### Section C

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<td><strong>24</strong></td>
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</table>
| i) | \[
\begin{align*}
\text{CHO} \xrightarrow{\text{HI, } \Delta} & \text{CH}_3\text{-CH}_2\text{-CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3 \\
\text{(CHOH)}_4 & \xrightarrow{\text{Acetic anhydride}} \text{(CH-O-C-CH}_2)_4 \\
\text{CH}_2\text{OH} & \xrightarrow{\text{Br}_2 \text{ water}} \text{(CHOH)}_2 \xrightarrow{\text{COOH}} \text{CH}_2\text{OH}
\end{align*}
\] |
| ii) |   |
| iii) |   |

### Section D

**SECTION D**

\[
\begin{align*}
E_{\text{cell}} &= E_{\text{cell}}^\circ - 0.059 \log K_c^\circ \\
&= E_{\text{cell}}^\circ - 0.059 \log 10^{-3} \\
&= 2.71 + 0.0295 \\
E_{\text{cell}} &= 2.7395 \text{ V}
\end{align*}
\]

i) Cu to Mg / Cathode to anode / Same direction
ii) Mg to Cu / Anode to cathode / Opposite direction

### Section E

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<tbody>
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<td><strong>25</strong></td>
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| a) | \[
\begin{align*}
m &= z I t \\
2.8 \text{ g} &= \frac{56 \times 2 \times t}{2 \times 96500} \\
t &= 4825 \text{ s} / 80.417 \text{ min}
\end{align*}
\] |
26. 
\[ \frac{2.8}{m_{Zn}} = \frac{56}{2} \times 65.3 \]
\[ m_{Zn} = 3.265 \text{ g} \]

b) i) A- strong electrolyte, B- Weak electrolyte
ii) \( \Lambda^0 \) for weak electrolytes cannot be obtained by extrapolation while \( \Lambda^0 \) for strong electrolytes can be obtained as intercept.

OR

26. a) i) \( o \)-Nitrophenol is steam volatile due to intramolecular hydrogen bonding while \( p \)-nitrophenol is less volatile due to intermolecular hydrogen bonding.
ii) Due to the formation of stable intermediate tertiary carbocation / \( \text{CH}_3\text{O}^- \) being a strong base favours elimination reaction.

b) i) 
ii) (Award 1 mark if attempted in any way)

27. a) i) In vapour state sulphur partly exists as \( \text{S}_2 \) molecule which has two unpaired electrons like \( \text{O}_2 \).
ii) Due to greater interelectronic repulsion
iii) Because decomposition of ozone into oxygen results in the liberation of heat (\( \Delta H \) is negative) and an increase in entropy (\( \Delta S \) is positive), resulting in large negative Gibbs energy change (\( \Delta G \)) for its conversion into oxygen.

b) i) \( \text{NO} \) gas/ Nitric oxide
ii) \( \text{NO}_2 \) gas / Nitrogen dioxide

OR

27. a) i) 

\[ 4\text{H}_3\text{PO}_2 \rightarrow 3\text{H}_3\text{PO}_4 + \text{PH}_3 \]
b) i) Due to small size and low bond dissociation enthalpy
ii) As the size increases, electronegativity decreases / non-metallic character decreases

c) \[ 5\text{SO}_3 + 2\text{MnO}_4^- + 2\text{H}_2\text{O} \rightarrow 5\text{SO}_4^{2-} + 4\text{H}^+ + 2\text{Mn}^{2+} \]