# INDIAN SCHOOL SALALAH <br> FINAL EXAMINATION (FEBRUARY 2019) <br> CHEMISTRY 

Class - XI
Time: 3 Hrs
Max. Marks:70

## General instructions :-

(a)All questions are compulsory.
(b)Section A: Q. no 1 to 5 are very short answer type questions, carrying one mark each.
(c)Section B: Q. no. 6 to 12 are short answer type questions, carrying two marks each.
(d)Section C: Q. no. 13 to 24 are also short answer questions, carrying three marks each.
(e)Section D: Q.no. 25 to 27 are long answer type questions, carrying five marks each.
(f) There is no overall choice. However, an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
(g) Use of calculators is not permitted. However, you may use log tables, if necessary.

Number of printed pages - 4

## SECTION A

| 1. | What is the sign of $\Delta \mathrm{S}$ and $\Delta \mathrm{H}$ for a spontaneous process? |  |
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| 2. | Give the IUPAC name of Di-tert-butyl ketone. <br> OR | 1 |
| $3 .$. | What is the IUPAC name of the element with atomic number 117. | 1 |
| 4. | Why is boric acid not a protic acid? |  |
| OR |  |  |
| How does diamond differ from graphite in its hybridization? |  |  |$\quad$| 1 |
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| 5. |
| Find the conjugate acid and base of $\mathrm{H}_{2} \mathrm{O}$. |


| 9. | Give reasons: <br> (a)Third period has only eight elements. <br> (b)Chlorine has more negative electron gain enthalpy than Fluorine.. | 2 |
| :---: | :---: | :---: |
| 10. | Draw all the resonating structures of aniline and indicate the effect. <br> OR <br> Draw the resonating structures of Buta-1,3 diene. | 2 |
| 11 | Explain metamerism giving two examples. | 2 |
| 12. | Calculate the wavelength of an electron moving with velocity $2.05 \times 10^{7} \mathrm{~m} / \mathrm{s}$. | 2 |
| 13. | SECTION C <br> 2.9 g of a gas at $95^{\circ} \mathrm{C}$ occupied the same volume as 0.184 g of hydrogen at $17^{\circ} \mathrm{C}$ at the same pressure. Find the molar mass of the gas. | 3 |
| 14. | What is the wavelength of light emitted when an electron in the hydrogen atom undergoes transition from $\mathrm{n}=4$ to $\mathrm{n}=2$ level? <br> OR <br> State the postulates of Bohr's model of an atom. | 3 |
| 15. | Balance the redox equation in acid medium: $\mathrm{MnO}_{4}^{-}+\mathrm{C}_{2} \mathrm{O}_{4}{ }^{2-} \rightarrow \mathrm{Mn}^{2+}+\mathrm{CO}_{2}$ | 3 |
| 16. | Give reasons: <br> (a) Caesium is used in photoelectric cells. <br> (b) Be and Mg do not impart colours to flame. <br> (c)Alkali metal ions give blue coloured solutions in liquid ammonia <br> OR <br> (a) What is the oxidation number of O in $\mathrm{KO}_{2}$ ? <br> (b) Arrange the alkali metal ions in increasing order of their hydration enthalpies. <br> (c) Arrange the alkaline earth carbonates in decreasing order of their thermal stabilities. | 3 |
| 17. | Highlight the impact of Green Chemistry at the industrial level, giving suitable examples. | 3 |
| 18. | Write a short note on the following: <br> (a) Covalent hydrides <br> (b) Hydrogen economy <br> (c) Interstitial hydrides. | 3 |
| 19. | (a A sample of a salt has the percentage composition: $\mathrm{Fe}=36.76 \%$; $\mathrm{S}=21.11 \%$; $\mathrm{O}=42.14 \%$. Calculate the empirical formula of the compound. <br> (b)How many atoms are present in 52 u of He ? | 3 |


| 20. | Illustrate the following reactions: <br> (a)Wurtz reaction <br> (b)Kharasch effect <br> (c)Decarboxylation reaction. | 3 |
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| 21. | The combustion of 1 mole of benzene takes place at 298 K and 1 atm . After combustion, $\mathrm{CO}_{2(\mathrm{~g})}$ and $\mathrm{H}_{2} \mathrm{O}_{(\mathrm{g})}$ are produced and 3267 kJ of heat is liberated. <br> Calculate the standard enthalpy of formation of benzene. if the standard enthalpies of formation of $\mathrm{CO}_{2(\mathrm{~g})}$ and $\mathrm{H}_{2} \mathrm{O}_{(\mathrm{g})}$ are $-393.5 \mathrm{~kJ} / \mathrm{mol}$ and $-285.83 \mathrm{~kJ} / \mathrm{mol}$. | 3 |
| 22. | Define the following terms: <br> (a) Gibbs free energy <br> (b) Lattice enthalpy <br> (c) Molar enthalpy of fusion. <br> OR <br> Enthalpies of formation of $\left.\left.\mathrm{CO}_{(\mathrm{g}}\right), \mathrm{CO}_{2(\mathrm{~g}}\right), \mathrm{N}_{2} \mathrm{O}_{(\mathrm{g})}, \mathrm{N}_{2} \mathrm{O}_{4}{ }_{(\mathrm{g})}$ are $-110,--393,81$ and $9.7 \mathrm{~kJ} / \mathrm{mol}$, respectively. Find the value of reaction enthalpy for the reaction: $\mathrm{N}_{2} \mathrm{O}_{4(\mathrm{~g})}+3 \mathrm{CO}_{(\mathrm{g})} \rightarrow \mathrm{N}_{2} \mathrm{O}_{(\mathrm{g})}+3 \mathrm{CO}_{2(\mathrm{~g})}$ | 3 |
| 23. | Complete the following reactions: <br> (a) $\mathrm{CH}_{3} \mathrm{CH}_{2} \mathrm{OH}+$ conc. $\mathrm{H}_{2} \mathrm{SO}_{4}$ (Heat) $\rightarrow$ <br> (b) $\mathrm{CH}_{3} \mathrm{CH}=\mathrm{CH}_{2}+\mathrm{Br}_{2} / \mathrm{CCl}_{4} \rightarrow$ <br> (c) $\mathrm{CH}_{3} \mathrm{CH}(\mathrm{Br}) \mathrm{CH}_{2}(\mathrm{Br})+\mathrm{Zn}$ (heat) $\rightarrow$ | 3 |
| 24. | Predict the shapes of the following using VSEPR theory: <br> (a) $\mathrm{PH}_{3}$ <br> (b) $\mathrm{SF}_{4}$ <br> (c) $\mathrm{NH}_{4}{ }^{+}$ <br> OR <br> Distinguish between intermolecular and intramolecular hydrogen bonding, giving examples. | 3 |
| 25. | SECTION D <br> (a) Draw the structure of silica. <br> (b) Arrange the following in increasing order of their property mentioned: <br> (i) $\mathrm{NH}_{3}, \mathrm{PH}_{3}, \mathrm{AsH}_{3}, \mathrm{SbH}_{3}, \mathrm{BiH}_{3}$ (basic character) <br> (ii) $\mathrm{B}, \mathrm{Al}, \mathrm{Ga}, \mathrm{In}, \mathrm{Tl}$ (Ionization enthalpies) <br> (c) Give reasons: <br> (i) Stability of +3 oxidation states decreases down group 13 . <br> (ii) Conc. $\mathrm{HNO}_{3}$ can be transported in Al containers. <br> OR | 5 |


|  | (a) Give reasons: <br> (i) $\mathrm{BF}_{3}$ is a Lewis acid. <br> (ii) Diamond is used an abrasive. <br> (iii) A mixture of Al and NaOH can be used to open drains. <br> (b) Draw the structure of diborane. <br> (c) Arrange the group 14 elements in decreasing order of their catenation ability. |  |
| :---: | :---: | :---: |
| 26. | (a) State Le Chatetlier's principle. <br> (b) The pH of black coffee is 3.4. Calculate the hydrogen ion concentration in it. <br> (c) A sample of $\mathrm{HI}(\mathrm{g})$ is placed in a flask at a pressure of 0.6 atm . At equilibrium, the partial pressure of $\mathrm{HI}(\mathrm{g})$ is 0.02 atm . What is Kp for the given equilibrium? <br> (d) What are buffers? Give one example. <br> OR <br> (a) Explain common ion effect with an example. <br> (b) Calculate the pH of 0.03 M NaOH , assuming complete dissociation. <br> (c) What will be the effect of increasing pressure on the following equilibrium? <br> (i) $\mathrm{PCl}_{5(\mathrm{~g})}==\mathrm{PCl}_{\left.3_{(\mathrm{g}}\right)}+\mathrm{Cl}_{2(\mathrm{~g})}$ <br> (ii) $\mathrm{CaCO}_{3(\mathrm{~s})}==\mathrm{CaO}{ }_{(\mathrm{s})}+\mathrm{CO}_{2}(\mathrm{~g})$ <br> (d) The equilibrium constant for the forward reaction is 36 . What will be the value of equilibrium constant for the backward reaction? | 5 |
| 27 | (a)Why is benzene exceptionally stable, though it has three double bonds? <br> (b)Draw the cis-trans isomers of hex-2-ene and compare them on the basis of their boiling points. <br> (c)Distinguish between --E and +E effect with an example. <br> (d) Convert benzene to m-Chloronitrobenzene. <br> OR <br> (a)Explain hyper conjugation taking propene as an example. <br> (b)Draw the functional isomer of butanal. <br> (c)The order of stability of carbocations is tertiary > secondary > primary. Why? <br> (d)Convert benzene to acetophenone. | 5 |
| [mass of electron $=9.1 \times 10^{-31} \mathrm{Kg}$, Speed of light $=3.0 \times 10^{8} \mathrm{~m} / \mathrm{s}$, charge on electron $=-1.6 \times 10^{-19} \mathrm{C}$ $\mathrm{R}_{\mathrm{H}}=1.09 \times 10^{7} / \mathrm{m}$, Plank constant $=6.63 \times 10^{-34} \mathrm{Js}, \mathrm{R}=8.314 \mathrm{~J} \mathrm{~K}^{-1} \mathrm{~mol}^{-1}, \mathrm{R}=0.083 \mathrm{~L}^{\mathrm{bar} \mathrm{K}}{ }^{-1} \mathrm{~mol}^{-1}$ |  |  |

