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**NORTHWEST ACCREDITATION COMMISSION, USA
HIGH SCHOOL DIPLOMA (Sr. Secondary/12th) 2018-2019**

Subject- CHEMISTRY (THEORY)

Question Paper No. :

C	T	4	2
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Subject Code : CH1205

Question Paper Code:

C	H	8	3
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Total Time: 03.00 Hours.

Total Marks: 70

GENERAL INSTRUCTIONS

1. OPENING AND CHECKING OF THE QUESTION-BOOKLET

Break open the seal of the Question-Booklet only when the announcement is made by the Invigilator. After breaking the seal and before attempting the questions, student should immediately check for:

- a) The number of the printed page in the Question-Booklet is the same as mentioned on the cover page of the Booklet and
- b) Any printing error in the Booklet pages, if any.
Any discrepancy or error should be brought to the notice of the Invigilator who will then replace the Booklet. No additional time will be given for this.

2. No student, without the permission of the Superintendent or the Invigilator concerned, is to leave his/ her seat or the Examination Room.

3. FILLING UP THE REQUIRED INFORMATION ON QUESTION-BOOKLET AND ANSWER SHEET

After breaking open the seal and checking the Booklet, student should:

- a) Fill up the **Question Paper No.** and **Question Paper Code** (mentioned on the cover of Question-Booklet) in the space provided on the First Answer Sheet.
- b) Fill up his/her Roll Number on the First Answer Sheet and on each Supplementary Answer Sheet, if taken.
- c) Student should mention the total number of **Supplementary Answer Sheet**, if taken, in the space provided on the First Answer Sheet and also fill up the Serial Number mentioned on each **Supplementary Answer Sheet** along with his/her Roll Number in the register maintained by the Invigilator. Student must tie all the Answer Sheets with the thread provided by the Invigilator.

4. INSTRUCTIONS ABOUT QUESTION PAPER

This Question Paper is divided into three Sections – A, B and C. All Sections are compulsory. Attempt all Sections as per instructions.

- a) Section A contains 4 questions which are very short carrying 3 marks each in approximately 20-30 words.
- b) Section B contains 7 questions which are short carrying 4 marks each in approximately 30-50 words.
- c) Section C contains 5 questions which are long carrying 6 marks each in approximately 80-120 words.

5. Student found in possession of Cellular Phone / Mobile Phone / Pager or any other Communication Device and/or any Book/Note whether using or not, will be liable to be debarred for taking examination(s) either permanently or for specified period or/and dealt with as per law or/and ordinance of the School/SERI according to the nature of offence, or/and he/she may be proceeded against and shall be liable for prosecution under the relevant provision of the Statutory Law.

THE ANSWER SHEET IS TO BE RETURNED ON COMPLETION OF THE TEST

This Question Paper MUST be attached with Answer Sheet

SECTION A

Total number of questions: 4	Marks allocated to each question: 3	Total marks: 12
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- Question 1. What type of stoichiometric defect is shown by AgCl?
- Question 2. Draw the structure of 3-methylpentanal.
- Question 3. What is the no. of atoms per unit cell (z) in a body-centred cubic structure?
- Question 4. In reference to surface chemistry, define dialysis.

SECTION B

Total number of questions: 7	Marks allocated to each question: 4	Total marks: 28
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- Question 5. Define the following terms:
(a) Mole fraction (x)
(b) Molality of a solution (m)
- Question 6. Define osmotic pressure of a solution. How is the osmotic pressure related to the concentration of a solute in a solution?
- Question 7. Draw the structures of the following:
(a) H_2SO_4
(b) XeF_2

OR

Describe the following processes:

- (a) Dialysis
(b) Electrophoresis
(c) Tyndall effect

- Question 8. Explain any four characteristics of coordination.
- Question 9. The rate constants of a reaction at 500 K and 700 K are 0.02 s^{-1} and 0.07 s^{-1} respectively. Calculate the value of activation energy, E_a . ($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)

Question 10. What is lanthanoid contraction? What are the consequences of lanthanoid contraction?

OR

Write down the reactions taking place in different zones in the blast furnace during the extraction of iron. How is pig iron different from cast iron?

Question 11. Explain the term 'copolymerization' and give two examples of copolymerization.

SECTION C

Total number of questions: 5	Marks allocated to each question: 6	Total marks: 30
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Question 12. (a) Define the following terms:

(i) Molar conductivity (\wedge_m)

(ii) Secondary batteries

(iii) Fuel cell

(b) State the following laws:

(i) Faraday first law of electrolysis

(ii) Kohlrausch's law of independent migration of ions

OR

(a) Define the term degree of dissociation. Write an expression that relates the molar conductivity of a weak electrolyte to its degree of dissociation.

(b) For the cell reaction

$\text{Ni(s)} \mid \text{Ni}^{2+}(\text{aq}) \parallel \text{Ag}^{+}(\text{aq}) \mid \text{Ag(s)}$

Calculate the equilibrium constant at 25 °C. How much maximum work would be obtained by operation of this cell?

$E^\circ_{\text{Ni}^{2+}/\text{Ni}} = 0.25 \text{ V}$ and $E^\circ_{\text{Ag}^{+}/\text{Ag}} = 0.80 \text{ V}$.

- Question 13. (a) Elements of Gr. 16 generally show lower value of first ionization enthalpy compared to the corresponding periods of Gr. 15. Why?
- (b) What happens when
- concentrated H_2SO_4 is added to CaF_2 ?
 - sulphur dioxide reacts with chlorine in the presence of charcoal?
 - ammonium chloride is treated with $\text{Ca}(\text{OH})_2$?

OR

- (a) Draw the structure of the following:
- BrF_3
 - XeO_3
- (b) Answer the following:
- Why is NH_3 more basic than PH_3 ?
 - Why are halogens strong oxidising agents?
 - Draw the structure of XeOF_4 .

- Question 14. The elements of 3d transition series are given as:

Sc Ti V Cr Mn Fe Co

Answer the following:

- Write the element which shows maximum number of oxidation states. Give reason.
- Which element has the highest m.p.?
- Which element shows only +3 oxidation state?
- Which element is a strong oxidising agent in +3 oxidation state and why?

OR

- The conductivity of 0.001 mol L⁻¹ solution of CH_3COOH is $3.905 \times 10^{-5} \text{ S cm}^{-1}$. Calculate its molar conductivity and degree of dissociation (α)
Given $\lambda^\circ(\text{H}^+) = 349.6 \text{ S cm}^2 \text{ mol}^{-1}$ and $\lambda^\circ(\text{CH}_3\text{COO}^-) = 40.95 \text{ cm}^2 \text{ mol}^{-1}$.
- Define electrochemical cell. What happens if external potential applied becomes greater than E° cell of electrochemical cell?

- Question 15. (a) Account for the following:
- Interhalogens are more reactive than pure halogens.
 - N_2 is less reactive at room temperature.
 - Reducing character increases from NH_3 to BiH_3 .

(b) Draw the structures of the following:

(i) $\text{H}_4\text{P}_2\text{O}_7$ (Pyrophosphoric acid)

(ii) XeF_4

OR

(a) Which poisonous gas is evolved when white phosphorus is heated with conc. NaOH solution? Write the chemical equation involved.

(b) Which noble gas has the lowest boiling point?

(c) Fluorine is a stronger oxidising agent than chlorine. Why?

(d) What happens when H_3PO_3 is heated?

(e) Complete the equation: $\text{PbS} + \text{O}_3 \longrightarrow$

Question 16. (a) Account for the following:

(i) $\text{Cl}-\text{CH}_2\text{COOH}$ is a stronger acid than CH_3COOH .

(ii) Carboxylic acids do not give reactions of carbonyl group.

(b) Write the chemical equations to illustrate the following name reactions:

(i) Rosenmund reduction

(ii) Cannizzaro's reaction

(c) Out of $\text{CH}_3\text{CH}_2-\text{CO}-\text{CH}_2-\text{CH}_3$ and $\text{CH}_3\text{CH}_2-\text{CH}_2-\text{CO}-\text{CH}_3$,
Which gives iodoform test?

OR

(a) Write the name of monomers used for getting the following polymers:

(i) Bakelite

(ii) Neoprene

(b) Illustrate the following reaction giving suitable example in each case:

(i) Hoffmann bromamide degradation reaction

(ii) Diazotisation

(iii) Gabriel phthalimide synthesis

END OF THE QUESTION PAPER