
Roll No. Date:

NORTHWEST ACCREDITATION COMMISSION, USA

HIGH SCHOOL DIPLOMA (Sr. Secondary/12TH)

Subject- Chemistry(theory)
Subject Code – C402

C	H	6	1
C	T	2	3

Question Paper No. : Question Paper code:

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.

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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 question No. 1 to 5 are very short questions carrying 2 marks each.

b) Section B question No. 6 to 15 are short questions carrying 3 marks each.

c) Section C question No. 16 to 21 are long questions carrying 5 marks each.

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.

TIME: 3 Hours. **TOTAL MARKS: 100**

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

P.T.O.

SECTION A

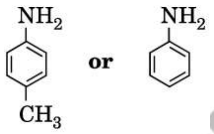
Total number of questions: 5	Marks allocated to each question: 2	Total marks: 10

Question 1. What is the IUPAC name of the complex $[Ni(NH_3)_6]C/_2$?

Question 2. Define 'mole fraction' of a substance in a solution.

Question 3. Why does NO_2 dimerise?

Question 4. Which of the two is more basic and why?



Question 5. What type of linkage holds together the monomers of DNA?

SECTION B

Total number of questions: 10	Marks allocated to each question: 3	Total marks: 30

Question 6. The rate of a reaction quadruples when the termperature changes from 293 K to 313 K. Calculate the energy of activiation of the reaction asuming that it does not change with temperature. ($R = 8.314\ J\ mol^{-1}\ k^{-1}$).

Question 7. Explain each of the following with a suitable example:

(i) Paramagnetism
(ii) Piezoelectric effect
(iii) Frenkel defect in crystals

Question 8. What is meant by 'disproportionation'? Give one example of disproportionation reaction in aqueous solutions.

Question 9. (a) Give one example of each of the following:

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(i) Acidic flux (ii) Basic flux

(b) What happens when:

(i) Cu_2O undergoes self reduction in a silica line converter.
(ii) Haematite oxidises carbon to carbon monoxide.

Question 10. How are vitamins classified? Name the vitamin responsible for the coagulation of blood.

Question 11. An aromatic compound 'A' on treatment with aqueous ammonia and heating forms compound 'B' which on heating with Br_2 and KOH forms a compound 'C' of molecular formula C_6H_7N. Write the structures and IUPAC names of compounds A, B and C.

Question 12. 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 13. (a) Give one example of each of the following:

P.T.O.

(i) Acidic flux (ii) Basic flux

(b) What happens when:

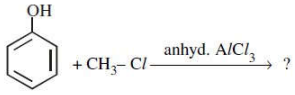
(i) Cu2O undergoes self reduction in a silica line converter.
(ii) Haematite oxidises carbon to carbon monoxide.

Question 14. (a) What is the role of depressant in froth floatation process.

(b) Describe a method or refining of nickel.

Question 15. Write the major product in the following equations:

(i) $CH_3 - CH_2OH \xrightarrow{PCl_5} ?$

(ii)  $+ CH_3 - Cl \xrightarrow{\text{anhyd. } AlCl_3} ?$

(iii) $CH_3 - Cl + CH_3CH_2 - ONa \rightarrow ?$

SECTION C

Total number of questions: 6	Marks allocated to each question: 5	Total marks: 30

Question 16. (a) Define the following terms:

(i) Molar conductivity (Λ_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

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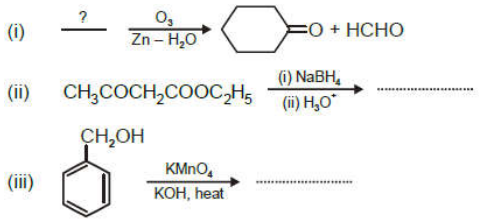
(a) Write structural formulae and names of four possible aldol condensation products obtained from Propanal and ethanal. Indicate which aldeyde acts as nucleophile and which as electrophile.

(b) Give reasons for the following:

(i) Carboxylic acids do not give characteristic reactions of carbonyl group.
(ii) Aldehydes are more reactive than ketones towards nucleophiles.

(c) Completye the following reaction statements by giving the missing starting material, reagent or product as required:



P.T.O.

(d) Write one chemical equation for each to illustrate the folloiwng reactions:

(i) Hell-Volhard-Zelinsky reaction
(ii) Cannizzaro reaction

Question 17. (a) State Raoult's law for the solutions containing nonvolatile solute. Give its mathematical expression also.

(b) A solution containing 0.5 g of KCl dissolved in 100 gm of water freezes at -0.24^{0}C. Calculate the degree of dissociation of the salt (K for water = 1.86^{0}C).

OR

(a) Indicate the steps involved in the preparation of $K_2Cr_2O_3$ from chromite ore. Write chemical equations of ractions involved.

(b) Account for the following:

(i) Copper is regarded transition metal although in has $3d^{10}$ configuration.
(ii) Transition metal ions are coloured in water.
(iii) On moving down Zr to Hf in group 4, it is observed that their atomic and ionic radii are almost the same.

Question 18. (a) What are reducing and non-reducing sugars? What is the structural feature characterizing reducing sugars? What is invert sugar?

(b) Define enzymes. What is the most important reason for their specificity in action?

OR

(a) What are essential and non-essential amino acids? Give two examples of each.

(b) What are the two types of photosynthesis in green plants? Give the basic equations of photosynthesis.

(c) Mention the two products of glycolysis.

Question 19. (a) How will you bring about the following conversions?

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(i) Propanone to propane
(ii) Benzoyl chloride to benzaldehyde
(iii) Ethanal to but-2-enal

(b) Draw the structure of the following molecules.

(i) XeF2
(ii) H2S2O8

OR

(a) Explain Kohlrausch's law of independent migration of ions. Why does the conductivity of any electrolyte decreases with dilution?

(b) Write the mechanism of corrosion. Explain why galvanised iron does nor rust even if the coating of zinc is broken.

Question 20. (a) Define the terms specific conductance and molar conductivity for solutions of electrolytes.

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

P.T.O.

(i) Rosenmund reduction
(ii) Cannizzaro's reaction

(c) Out of $CH_3CH_2–CO–CH_2–CH_3$ and $CH_3CH_2–CH_2–CO–CH_3$, which give iodoform test?

OR

Explain the following:

(a) Actinoids show large number of oxidation states.
(b) Transition metals form a large number of complex compounds.
(c) Chromium is a typical hard metal while mercury is a liquid.
(d) MnO is basic while Mn_2O_7 is acidic in nature.
(e) Silver is a transition metal but zinc is not.

Question 21. (a) Describe the following reactions.

(i) Canni zaro's reaction.
(ii) Cross aldol condensation.

(b) How will you convert:

(i) Methyl cyanide to acetamide
(ii) Acetaldehyde to but 2 enal.
(iii) Ethyl benzene to benzoic acid .

OR

(a) Define the following terms:

(i) Ideal solution
(ii) Azeotrope
(iii) Osmotic pressure

(b) A solution of glucose (C6H12O6) in water is labelled as 10% by weight. What would be the molality

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of the solution? (Molar mass of glucose = 180 g mol^{-1})

END OF THE QUESTION PAPER

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