CH2

SUBJECT : **CHEMISTRY**

7216

Candidate's Roll No.

Time Allowed : 3 Hours	*Maximum Marks : 150*

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

1 There are eighteen (18) questions in all.

2 Candidate has to attempt any fifteen (15) questions in all.

3 Marks assigned to each question/part are given against it.

4 Word limit in questions, wherever specified should be adhered to.

5 Attempts of questions shall be counted sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the answer booklet must be clearly struck off.

6 No extra/additional sheet will be provided.

7 Answer must be written in the authorized medium. No marks will be given for answers written in a medium other than the authorized one.

1 i. Calculate the number of molecules of carbon dioxide present in 300 mL of gas at 273K and 2.5 atm pressure. **5**

ii. Gastric juice contains about 3 mg of HCl per millilitre. If a person produces about 225 mL of gastric juice per day, how many antacid tablets each containing 250 mg of $Al(OH)_3$ are needed to neutralize all the HCl produced in one day ? **5**

2 Predict the shapes of the following molecules on the basis of hybridisation : **$2\frac{1}{2} \times 4 = 10$**

BCl_3, CH_4, CO_2, NH_3

3 i. An organic compound contains 48% carbon, 8% hydrogen, 28% nitrogen. Calculate the empirical formula of the compound. **5**

ii. Explain conductometric titration between strong acid against strong base. **5**

4 Hydrolysis of sugar gives : **10**

Sucrose + $H_2O \rightleftharpoons$ Glucose + Fructose; Equilibrium constant K_c for reaction : 2×10^{13} at 300K.

Calculate ΔG° at 300K.

5 i. Derive an expression which shows relationship between equilibrium constant and EMF of the cell. **5**

ii. Explain the change in free energy for predicting spontaneity of a reaction. **5**

6 i. What is order of a reaction? Give an example for second order reaction. **2+3=5**

ii. Write any two differences between ideal and non-ideal solutions. **5**

7 i. Explain why both N and Bi do not form pentahalides while phosphorus does ? **5**

ii. Write any two anomalous behaviours of lithium. **5**

8 Write an equation in ionic form to represent the oxidizing action of $Cr_2O_7^{2-}$ in acidic medium. Also draw the structure of $Cr_2O_7^{2}$ ion. **5+5=10**

9 What is lanthanide contraction? What is its cause and what are its consequences ? **4+3+3=10**

10 i. Draw one of the geometrical isomers of the complex $[Pt(en)_2Cl_2]^{2+}$ which is optically active. **5**

ii. Explain on the basis of valence bond theory that $[Ni(CN)_4]^{2-}$ ion with square planar structure is diamagnetic and $[NiCl_4]^{2-}$ ion with tetrahedral geometry is paramagnetic. **5**

11 i. Explain any four sources of soil pollution. **6**

ii. Give the classification of organometallic compounds based on their hepticity. Give an example for each class. **2+2=4**

12 Using crystal field theory, draw energy level diagram, write electronic configuration of the central metal atom/ion and determine magnetic moment value of the following $[Co(CN)_6]^{3-}$, $[FeF_6]^{3-}$ **2+3+5=10**

13 i. Give the chemical test to distinguish between primary, secondary and tertiary Alcohols. **5**

ii. Give the classification of polymers based on their structures with one example for each class. **5**

14 i. Methyl amine is more basic than ammonia. Give reason. **5**

ii. Using chemical tests, explain the open chain structure of glucose. **5**

15 i. How are vitamins classified ? Name the vitamin responsible for the coagulation of Blood. **4+2=6**

ii. Give the chemical test using Hinsberg's reagent to distinguish between 1^o, 2^o and 3^o Amines. **4**

16. i. Give the biological functions of nucleic acids. **5**

ii. Write Gabriel phthalimide synthesis reaction and Hoffmann bromamide degradation Reaction. **5**

17 i. Write the distinguishing chemical test for aldehydes and ketones. **5**

ii. Give Williamson ether synthesis reaction. **5**

18 i. Write the mechanism of S_N1 reaction with taking suitable example. **5**

ii. State Huckel's rule for aromaticity. **5**