Sig. of Supdt.................................

KT-XI-1901
Chemistry (Part – I)
Fresh/Reappear

Roll No..........................

Fic. No...

Fic. No...

Time allowed: 3 Hrs   **Chemistry (Part – I)** | Code-A | **Marks: 85**

Fresh / Reappear

Note: There are three sections of the paper, A, B & C. Attempt Section – A on the same paper and return it to the Superintendent within the given time. Mobile phone etc. are not allowed in the examination hall.

Time: 20 Mins   **Section "A"**   **Marks: 18**

Q.1 Write the correct option i.e. A, B, C or D in the empty box provided opposite to each part. No marks will be awarded for cutting, erasing or over writing.

i. Corrosion can be prevented by .... | D |
A. Galvanizing   B. Electroplating with Nickel   C. Alloying the metal   D. All of these

ii. 58.5 g of NaCl contain 6.023×10^{23} .... of NaCl. | C |
A. Moles   B. Ions   C. Formula units   D. Molecules

iii. % yield of a given reaction depends upon .... | C |
A. Actual yields   B. Theoretical yields   C. Both A & B   D. None of these

iv. The number of oxygen atoms in 22g of CO_2 is .... | A |
A. 6.023×10^{23} B. 3.011×10^{23} C. 6.023×10^{21} D. 6.023×10^{22}
$44g = 2 N_a \Rightarrow 22g = N_a$

v. The e/m ratio of Positive rays depends on the .... present in the discharge tube. | D |
A. Material of Anode   B. Voltage of the battery   C. Pressure of the gas   D. Nature of the gas

vi. 1nm = ... | C |
A. 10^9 m   B. 10^{-10} m   C. 10^{-9} m   D. 10^{-12} m

vii. The electron moves faster in an orbit with n = ... | D |
A. 1   B. 2   C. 3   D. 4

viii. Energy state with n = 2, for Hydrogen atom is .... state. | C |
A. Stable   B. Ground   C. Excited   D. None of these

ix. .... number of bond pair/s is/are present on the central atom of H_2O molecule. | B |
A. 1   B. 2   C. 3   D. 4

x. Two half filled atomic orbitals overlap linearly to form a .... bond. | A |
A. Sigma   B. Pi   C. conjugate   D. All of these

xi. The average kinetic energy of the gas molecules vary directly with .... | C |
A. Volume   B. Pressure   C. Absolute temperature   D. None of these

xii. $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ is the mathematical form of .... | B |
A. Boyle's Law   B. Charles's Law   C. Avogadro's Law   D. Ideal Gas

xiii. Identify the molecule with greater London dispersion forces. | D |
A. F_2 B. Cl_2 C. Br_2 D. I_2

xiv. Which of the following can affect the surface tension of liquid substances. | D |
A. Nature of liquid   B. Temperature   C. Addition of detergent   D. All of these

xv. A cubic crystal has .... Centre/s of symmetry. | A |
A. 1   B. 2   C. 3   D. 4

xvi. $If \Delta n = 0$ for a reaction, then ...... is correct. | A |
A. $K_p = K_c = K_x = K_n$ B. $K_p \neq K_c = K_x = K_n$ C. $K_p = K_c \neq K_x \neq K_n$ D. $K_p \neq K_c \neq K_x \neq K_n$

xvii. pH of the solution made from a salt of weak acid and weak base → Maybe '>7','<7' or '=7' | |
A. pH = 7   B. pH>7   C. pH <7   D. pH 7

xviii. For a reaction A → Product, doubling the concentration of A, can .... The rate of reaction when the reaction is second order. | C |
A. double   B. Triple   C. Quadruples   D. Eight fold

Section "B"

Marks: 40

Q.2 Attempt any TEN parts. All parts carry equal marks.

i.   How actual yield of a reaction can be increased?

ii.   Write main postulates of the Bohr's atomic theory.

iii. Write most stable electronic configuration for (a) Al(13) (b) Cr(24)

iv.   How geometry of H_2O and CO_2 can be predicted from their dipole moment.

v.   Write the condition under which deviation become appreciable from ideal behavior of gases.

vi.   What is vacuum distillation and write its significance.

vii. Why ice has smaller density than liquid water. Explain.

viii. Predict the effect of (i) Adding N_2 (ii) Catalyst upon the given equilibrium, $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$

ix.   Write any four application of buffer solution.

x.   Predict the effect of following upon the rate of reaction (i) concentration of reactants (ii) catalyst.

xi.   Define critical solution temperature with example.

xii. Write possible results for increase in internal energy.

xiii. Write advantages of the electrolytic cell.

Section "C"

Marks: 27

Note: Attempt any THREE questions. All questions carry equal marks.

Q.3 a. How X-rays can be produced from heavy metals.

b. $CO_{2(g)} + H_2O_{(\ell)} \rightarrow H_2CO_{3(aq)}$ If 80 gm of CO_2 is dissolved in 120gm of water, then calculate the maximum amount (in grams) of the product formed.

Q.4 a. Explain the paramagnetic nature of O_2 molecule by drawing MOT diagram.

b. Discuss the factors, which affect the viscosity.

Q.5 a. Define equilibrium constant (KC) and write its significance in predicting the extent of chemical reaction.

b. Calculate the ratio in which sodium acetate and acetic acid must be mixed in order to give a buffer solution of PH=5. The P_{ka} value of acetic acid is 4.74.

Q.6 a. How enthalpy change of a chemical reaction can be measured by direct Calorimetry?

b. For following data

(i) Mg^{2+} / Mg $E^0_{Red} = -2.38V$

(ii) Cu^{2+}/Cu $E^0_{Red} = +0.34V$

(a) Write the cell reaction   (b) Calculate the cell voltage (E^0).