SAMPLE PAPER
CLASS XI
CHEMISTRY

Time: 3 Hours Maximum Marks: 70

General Instructions:

(3) All questions are compulsory.
(4) Marks of each question are indicated against it.
(5) Question nos. 1 to 8 are very short answer questions and carry 1 mark each.
(6) Question nos. 9 to 18 are short answer questions and carry 2 marks each.
(7) Question nos. 19 to 27 also short answer questions and carry 3 marks each.
(8) Question nos. 28 to 30 are long answer question and carry 5 marks each.
(9) Use log tables if necessary, use of calculators is not allowed.

Q1 How are 0.50 mol Na$_2$CO$_3$ and 0.50 M Na$_2$CO$_3$ different?

Q2 How many subshells are present in M shell?

Q3 Which property of element is used to classify them in long form of periodic table?

Q4 Write resonance structure of Ozone or sulphurdioxide.

Q5 Write conjugate base for water and NH$_4^+$ species.

Q6 What do you understand by Hydrogen economy?

Q7 Find out oxidation number of chromium in K$_2$Cr$_2$O$_7$ molecule

Q8 Indicate sigma and pie bonds in CH$_2$=C=CH$_2$. 1 X 8 = 8 Marks

Q9 Calculate number of photons with a wavelength of 3000pm that provides 1 Joule of energy. 2 Marks

Q10 Explain why bond angle in NH$_3$ is more than in H$_2$O molecule though both have sp3 hybridization. 2 Marks

Q11 At constant temperature if the pressure of a fixed mass of gas is doubled what happens to its volume? Which law governs this behavior of gases? 2 Marks

Q12 How many grams of oxygen is required for complete combustion of 29g of butane as per the equation C$_4$H$_{10}$+ 4.5O$_2$=2CO$_2$+5H$_2$O 2 Marks
Q13 Calculate bond order of oxygen molecule. List all the information provided about this molecule.  

Q14 Calculate the total pressure in a mixture of 16 g of oxygen and 4g of Hydrogen confined in a vessel of 1 dm\(^3\) at 27 degree celsius. (Molar mass of oxygen 32 Hydrogen 2 \(R=0.083\text{bar dm}^3\text{K}^{-1}\text{mol}^{-1}\))

Q15 Balance following equation in acidic medium showing all steps,
\[\text{Br}_2 + H_2O_2 \rightarrow \text{BrO}_2 + H_2O\]

Q16 How are silicones prepared? Write necessary reaction. Write two uses of silicones.

Q17 What is demineralised water? How is it obtained?

Q18 What is the reason of diagonal relationship of elements? Write two properties of any two diagonally related elements.

Or

Give reasons
(1) why alkali metals when dissolved in Liquid ammonia give blue solution?
(2) Beryllium and Magnesium do not impart colour to the flame while other members do.

Q19 (1) State Heisenberg’s Uncertainty principle.
(2) Write electronic configuration of Cu metal (Z=29) and Cr\(^{3+}\) ion.
(3) Which orbital is represented by \(n=4\) and \(l=3\)?

Q20 Explain why
(1) Halogens act as good oxidizing reagent.
(2) Electron gain enthalpy of inert gases is zero.
(3) Ionization enthalpy of Mg is higher than that of Na.

Q21 (1) What do you mean by Bond Enthalpy?
(2) Calculate bond enthalpy of Cl—Cl bond from following data.
\[\text{CH}_4(g) + \text{Cl}_2 (g)\rightarrow\text{CH}_3\text{Cl}(g) + \text{HCl} (g) \quad \Delta H= --109.3\text{kJ mol}^{-1}\]
Bond enthalpy of C—H Bond = 413kJ, C—Cl Bond =326 kJ and H—Cl Bond =431kJ mol \(^{-1}\)

Q22 (1) What are extensive properties?
(2) Write Gibbs free energy equation giving meaning of each term used.
(3) Under what condition \(\Delta U = \Delta H\)?
Q23 Write chemical equation only for preparation of
(1) Plaster of Paris
(2) Quick lime
(3) Slaked lime. 3 Marks

Q24 (1) What do you mean by functional isomerism?
(2) What are electrophiles?
(3) What is inductive effect? Give an example. 3 Marks

Or
(1) Write IUPAC names for $C_6H_5CH_2CHO$ and $(CH_3)_2CH(NH_2)CH_3$.
(2) Write an example of geometrical isomerism.
(3) What do you mean by electromeric effect? 3 Marks

Q25 (1) Draw eclipsed and staggered conformations of ethane.
(2) Write one equation each to show Wurtz reaction and Friedal craft alkylation. 3 Marks

Q26 (1) How nitrogen is detected in an organic compound? Write necessary reactions.
(2) How a molecular formula is different from empirical formula? 3 Marks

Q27 (1) What do you mean by green chemistry?
(2) Explain terms BOD and COD with reference to environmental chemistry. 3 Marks

Q28 (1) For the reaction $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ the value of $K_p$ is $3.6 \times 10^2$ at 500 K.
Calculate the value of $K_c$ for the reaction at the same temperature. $R=0.083 \text{ bar L K}^{-1} \text{ mol}^{-1}$.
(2) What do you understand by (1) Common ion effect (2) Buffer solution. 3+2 Marks

Or
(1) For the reaction $PCl_5 \rightarrow PCl_3 + Cl_2$ at 473K the value of equilibrium constant $K_c$ is $8.3 \times 10^{-3}$ at 473K.
(1) Write an expression for $K_c$ (2) What is the value of $K_c$ for reverse reaction at same temperature. (3) What would be effect on $K_c$ if pressure is increased.
(2) State Henry’s Law. Write pH value of 1x10^{-5} M HCl solution. 3+2 Marks

Q29 Give reasons for
(1) $[SiF_6]^{2-}$ is known whereas $[SiCl_6]^{-2}$ is not known.
(2) Diamond is a covalent solid, yet it has highest Melting Point.
(3) Boric acid is considered a weak base.
(4) BF$_3$ behaves as Lewis acid.
(5) CO₂ is a gas while SiO₂ is a solid at room temperature.

Or

(1) What are fullerenes?
(2) Why is boric acid monobasic?
(3) What is inert pair effect?
(4) Why is PbCl₂ a good oxidizing reagent?
(5) Write the formula of inorganic benzene.

Q30 (1) State Markovnicoff’s rule. Using this write the reaction of propene with HCl.

(2) Carry out following conversions
   (1) Ethyl alcohol to ethane.
   (2) Sodium acetonilide to benzene.
   (3) Benzene to nitrobenzene.

Or

(10) Write two reactions to show acidic nature of ethyne

(11) Complete the following reactions -
    ozone/Zn/H₂O

(12) CH₃—CH=CH₂____________ →
    aqueous KMnO₄

(13) CH₃—CH=CH₂--------------------- →

(14) CH=CH + Br₂ water------------- →

Marking Scheme
SESSION ENDING EXAMINATION
CLASS XI
CHEMISTRY

Q1 Correct meaning ½ +1/2
Q2 Two one s and one p ½ +1/2
Q3 Atomic Number
Q4 Correct structure 1 mark
Q5 Correct answer ½ +1/2
Q6 correct answer 1 mark
Q7 +6 1 mark
Q8 Sigma 6 pie 2 1 mark
Q9 E=\nu 1/2

\[ \frac{6.626 \times 10^{-34} \times 3000 \times 10^{-10}}{19.878 \times 10^{-41}} = 5.03 \times 10^{-39} \text{ photons} \]

Q10 Correct explanation with correct structure 1+1 mark
Q11 Decreases to half, Boyle’s Law 1+1 mark
Q12 Correct formula 1/2 mark

Correct values and calculation 1 mark
Ans. 2.06 mol/Kg 1/2 mark
Q13 Correct formula 1/2 mark
Correct values and calculation 1 mark
Correct answer with units 1/2 mark
Q14 Correct bond order 1 mark + correct information 1 mark
Q15 Correct steps 4x1/2 = 2
Q16 Correct method + correct uses 1+1 mark
Q17 Correct reasons 1+1 or correct reason 1 mark + two properties 1 mark
Q18 Correct definition + One correct method 1+1 mark
Q19 (1) Correct definition 1 mark
(2) Correct configuration 1/2 + 1/2
(3) 4f 1 mark
Q20 Correct answer 1 mark each
Q21 Correct definition 1 mark

\[ \sum \text{ Bond enthalpy of reactants} - \sum \text{ Bond enthalpy of Products} \]

Correct value and calculation 1 mark
Answer 234.7 kJ 1/2 mark
Q22 Correct answer 1 mark each
Q23 Correct method with equation 1 mark each
Q24 Correct Answer of each part 1 mark each
Q25 Correct Answer of each part 1 mark each
Q26 Correct method with equation 2 mark
   Correct relation 1 mark
Q27 Correct answer of each part 1 mark each
Q28 (1) Correct relation ½ mark, Δn = -2 ½ mark
   Correct value and calculation 1 mark, answer ½ mark
   (2) Correct meaning 1 mark each
Or (1) Correct answer of each part 1 mark each
   (2) Correct statement 1 mark, pH = 5 1 mark
Q29 Correct answer of each part 1 mark each.
Q30 (1) Correct rule 1 mark, correct reaction 1 mark
   (2) Correct answer of each part 1 mark each
Or
   (1) two correct reaction 2 mark
   (2) Correct answer of each part 1 mark each.