Subject: Chemistry Grade 12 Model Paper

Time: 20 minutes **Section:** A **Marks:** 18

Instructions: Attempt all questions of Section A by filling in the correct option (A, B, C, or D) on the OMR response sheet. No marks will be awarded for cutting, erasing, or overwriting.

i. **Identify the metalloid among the following:**
   A. Al
   B. Si
   C. P
   D. S

ii. **The covalent radius of Cl atom is:**
   A. 99 pm
   B. 89 pm
   C. 79 pm
   D. 69 pm

iii. **Silicon dioxide (SiO_2) is a:**
   A. Plasma
   B. Gas
   C. Liquid
   D. Solid

iv. **Rolled gold is a mixture of:**
   A. Cu + Zn
   B. Cu + Sn
   C. Cu + Al
   D. Cu + Zn + Ni

v. **Cyclopropane is a_____hydrocarbon:**
   A. Cyclic
   B. Alicyclic
   C. Aromatic
   D. Heterocyclic

vi. **The molecular formula of acetylene is:**
   A. CH_4
   B. C_2H_4
   C. C_2H_2
   D. C_6H_6

vii. **The oxidation number of carbon in CH_3Cl is:**
   A. −1
   B. −2
   C. −3
   D. −4

viii. **The most reactive alkyl halide of the following is:**
   A. R–F
   B. R–Cl
   C. R–Br
   D. R–I

ix. **In alcohol, the hybridization of oxygen is:**
   A. sp^4
   B. sp^3
   C. sp^2
   D. sp

x. **Ethyl alcohol reacts with conc. H_2SO_4 to give:**

A. Methane
B. Ethane
C. Ethene
D. Ethyne

xi. **Which of the following will give a positive test with Fehling's solution?**
A. Aldehydes
B. Ketones
C. Alcohols
D. Phenols

xii. **Which group is present in carboxylic acid?**
A. Hydroxyl group
B. Phenolic group
C. Carbonyl group
D. Carboxyl group

xiii. **The percentage of lactose in human milk is:**
A. 7.2
B. 8.2
C. 9.2
D. 10.2

xiv. **Anaemia is caused by the deficiency of:**
A. Phosphorus
B. Zinc
C. Calcium
D. Iron

xv. **Which of the following is a condensation polymer?**
A. Teflon
B. Polypropylene
C. Nylon 6,6
D. Orlon

xvi. **What is the colour of smog?**
A. Yellow brown
B. Reddish brown
C. Bluish brown
D. Gray brown

xvii. **The major gas contributing 50% to the greenhouse effect is:**
A. SO_2
B. O_2
C. N_2
D. CO_2

xviii. **The range of wavenumbers in the mid-IR region is:**
A. 4000–625 cm^{-1}
B. 4000–525 cm^{-1}
C. 4000–425 cm^{-1}
D. 4000–325 cm^{-1}

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Section B

Q2. Attempt any **TEN** parts. All parts carry equal marks. (**Marks:** 40)

(i) **Write reactions of water with:** (a) Na, (b) Mg, (c) Al, (d) Si. [1+1+1+1 = 04]

(ii) **What is an atomic radius?** Discuss its various types. [1+1+1+1 = 04]

(iii) How does beryllium differ from other members of its group? (Write any four points. 1+1+1+1 = 04

(iv) Define homologous series. Give characteristics of a homologous series. **[1+1+1+1 = 04]**

(v) Discuss the mechanism of free-radical substitution reactions in alkanes**.** [1+1+2 = 04]

(vi) Define metamerism and tautomerism with one example of each. [1+1+1+1 = 04]

(vii) Describe the mechanisms of nucleophilic substitution reactions. [2+2 = 04]

(viii) Explain the Sulphur analogues (thiols) with the help of definition, general formula, functional group, and physical properties. [1+1+1+1 = 04]

(ix) Describe isomerism in carboxylic acids with two examples. [2+2 = 04]

(x) What are enzymes? Describe the role of enzymes in digestion of fats, carbohydrates, and proteins. [1+1+1+1 = 04]

(xi) Describe the basic building-block processes of petrochemical technology. [2+2 = 04]

(xii) Explain different types of molecular vibrations in IR spectroscopy. [2+2 = 04]

(xiii) Explain the construction and working of a mass spectrometer. [2+2 = 04]

Section C

Note: Attempt any **THREE** questions. All questions carry equal marks. **Marks:** 27

Q3(a). What are halogens? Give the electronic configuration of $_{9}F$, $_{17}Cl$, $_{35}Br$, and $_{53}I$. [1+1+1+1+1 = 5]

Q3(b). Write the IUPAC names of the following: (i) $K_4[Fe(CN)_6]$ (ii) $Na_2[NiCl_4]$ (iii) $Pt(NH_3)_2Cl_4$ (iv) $Fe(CO)_5$ [1+1+1+1 = 04]

Q4(a). Draw the structural formula for the following: (i) cyclohexyne (ii) n-butane (iii) isobutane (iv) neopentane (v) cyclopentane [1+1+1+1+1 = 05]

Q4(b). Explain the E1 and E2 mechanisms in alkyl halides. [2+2 = 04]

Q5(a). Differentiate between the structures of alcohols and phenol. [2.5+2.5 = 05]

Q5(b). Describe chain isomerism and position isomerism in aldehydes and ketones with one example of each. [1+1+1+1 = 04]

Q6(a). What is meant by atmosphere? Describe the chemistry of the troposphere. [1+3 = 04]

Q6(b). What is spectroscopy? Write down the applications of UV-Visible spectroscopy. [1+4 = 05]