INDIAN SCHOOL SOHAR
UNIT TEST (2019 – 20)
CHEMISTRY

CLASS :	XII	**MAX. MARKS :**	**50**
DATE :	14.05.2019	**DURATION :**	**2.00 HRS**

General Instructions:

(a)   All questions are compulsory.

(b)   Section A: Question numbers 1 to 15 very short answer questions carrying 1 mark each.

(c)   Section B: Question numbers 16 to 20 are short answer questions carrying 2 marks each.

(d)   Section C: Question numbers 21 to 25 are also short answer questions carrying 3 marks each.

(e)   Section D: Question numbers 26 and 27 are long answer questions carrying 5 marks each.

(f)   There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.

(g)   Use log tables, if necessary, Use of calculator is not allowed.

SECTION A

I.   **Choose the correct answer:**

1.   Considering the formation, breaking and strength of hydrogen bond, predict which of the following mixtures will show a positive deviation from Raoult's law?

   (a) Methanol and acetone   (c)   Chloroform and acetone

   (b) Nitric acid and water   (d)   Phenol and aniline

2.   The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called

   (a) Cell potential   (c)   Cell emf

   (b) Potential difference   (d)   Cell voltage

3.   Which of the following expressions is correct for the rate of reaction given below?

   $5Br^-(aq) + BrO_3^-(aq) + 6H^+(aq) \rightarrow 3Br_2(aq) + 3H_2O(l)$

   (a) $\frac{\Delta[Br^-]}{\Delta t} = 5\frac{\Delta[H^+]}{\Delta t}$ (c) $\frac{\Delta[Br^-]}{\Delta t} = \frac{6\Delta[H^+]}{5\Delta t}$

   (b) $\frac{\Delta[Br^-]}{\Delta t} = \frac{5\Delta[H^+]}{6\Delta t}$ (d) $\frac{\Delta[Br^-]}{\Delta t} = \frac{6\Delta[H^+]}{\Delta t}$

4.   Which of the following is not tetrahedral in shape?

   (a) NH_4^+ (b) $SiCl_4$ (c) SF_4 (d) SO_4^{2-}

5.   Molecules whose mirror image is non-superimposable over them are known as chiral. Which of the following molecules is chiral in nature?

   (a) 2-Bromobutane   (c)   1-Bromobutane

   (b) 2-Bromopropane   (d)   2-Bromopropan-2-ol

II.   **In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.**

   (a)   Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b)   Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c)   Assertion is correct statement but reason is wrong statement.

(d)   Assertion and reason both are incorrect statements.

(e)   Assertion is wrong statement but reason is correct statement.

6.   **Assertion**   :   Molarity of a solution in liquid state changes with temperature.

     Reason   :   The volume of a solution changes with change in temperature.

7.   **Assertion**   :   Conductivity of all electrolytes decreases on dilution.

     Reason   :   On dilution number of ions per unit volume decreases.

8.   **Assertion**   :   All collision of reactant molecules lead to product formation.

     Reason   :   Only those collisions in which molecules have correct orientation and sufficient kinetic energy lead to compound formation.

9.   **Assertion**   :   NaCl reacts with concentrated H_2SO_4 to give colourless fumes with pungent smell. But on adding MnO_2 the fumes become greenish yellow.

     Reason   : MnO_2 oxidises HCl to chlorine gas which is greenish yellow.

10.   **Assertion**   :   KCN reacts with methyl chloride to give methyl isocyanide

     Reason   : CN^- is an ambident nucleophile.

11. Which allotrope of sulphur is thermally stable at room temperature?

12. What are isotonic solutions?

<div align="center">OR</div>

Measurement of which colligative property is preferred for determination of molar mass of biomolecules?

13. Represent the galvanic cell in which the reactions is $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$.

14. Identify the order of reaction from the following unit for its rate constant: $Lmol^{-1}s^{-1}$.

<div align="center">OR</div>

Why does the rate of a reaction not remain constant throughout the reaction process?

15. Arrange F_2, Cl_2, Br_2 and I_2 in the order of increasing bond dissociation enthalpy.

<div align="center">**SECTION B**</div>

16. A 0.561 m solution of an unknown electrolyte depresses the freezing point of water by 2.93^0C. What is van't Hoff factor for this electrolyte? The freezing point depression constant (K_f) for water is $1.86^0CKgmol^{-1}$.

17. Using the E^0 values of X and Y, predict which is better for coating the surface of iron to prevent rust and why? $E^0(Fe^{2+}/Fe^{3+}) = -0.44$ V; $E^0(X^{2+}/X) = -2.36$ V; $E^0(Y^{2+}/Y) = -0.14$ V)

<div align="center">OR</div>

Define electrochemical cell. What happens when applied external potential becomes greater than E^0_{cell} of electrochemical cell?

18. Give reasons for the following:

(i)   Aquatic species are more comfortable in cold water than warm water.

(ii)   At higher altitudes people suffer from anoxia resulting in inability to think.

<div align="center">OR</div>

What type of azeotropic mixture will be formed by a solution of acetone and chloroform? Justify on the basis of strength of intermolecular interactions that develop in the solution?

19. A reaction is of second order with respect to a reactant. How is its rate affected if the concentration of the reactant is (i) doubled (ii) reduced to half?

20. Draw the structures of major monohalo products in each of the following reaction:

1. $-OH + SOCl_2 \rightarrow$

2. $+ HCl \rightarrow$
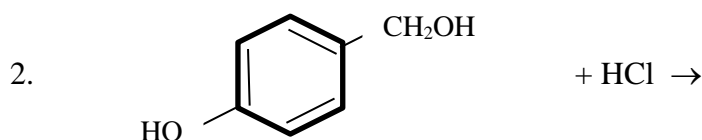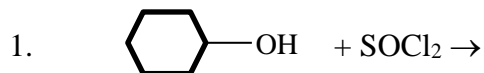
SECTION C

21. At 300 K, 30 g of glucose present in a litre of its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of a glucose solution is 1.52 bar at the same temperature, what would be its concentration?

22. Give the reasons for the following:
    (i) The presence of $-NO_2$ group at ortho or para position increases the reactivity of haloarenes towards nucleophilic substitution reactions.
    (ii) P-dichlorobenzene has higher melting point than that of ortho or meta isomer.
    (iii) Thionyl chloride method is preferred for preparing alkyl chloride from alcohols.

    OR

    (a) Write equation for preparation of 1-iodobutane from 1-chlorobutane.
    (b) Out of 2-bromopentane, 2-bromo-2-methylbutane and 1-bromopentane, which compound is most reactive towards elimination reaction and why?
    (c) Give IUPAC name of $CH_3CH=CH-C(CH_3)_2Br$

23. How do you convert the following?
    (i) Prop-1-ene to propan-2-ol
    (ii) Bromobenzene to 2-bromoacetophenone
    (iii) 2-bromobutane to but-2-ene

24. Complete the following reactions:
    (i) $I_2 + H_2O + Cl_2 \rightarrow$
    (ii) $XeF_6 + H_2O \rightarrow$
    (iii) NaOH (dil. & cold) + $Cl_2 \rightarrow$

    OR

    How would you account for the following?
    (i) SF_6 is kinetically inert.
    (ii) Sulphur vapour exhibits paramagnetic behaviour.
    (iii) The majority of known noble gas compounds are those of Xenon.

25. The rate of a reaction becomes four times when the temperature changes from 293 K to 313 K. Calculate the energy of activation (E_a) of the reaction assuming that it does not change with temperature. [R = 8.314 JK^{-1}mol^{-1}; log 4 = 0.6021]

SECTION D

26. Draw the structures of the following:

    (i) $HClO_3$ (ii) $H_2S_2O_8$

    Give reasons for the following:

    (i)   Although electron gain enthalpy of fluorine is less negative than that of chlorine, yet fluorine is a better oxidising agent than chlorine.

    (ii)   Oxygen has less electron gain enthalpy with negative sign than sulphur.

    (iii)   Iron dissolves in HCl to form $FeCl_2$ and not $FeCl_3$.

    OR

    Complete the following reactions:

    (i) $PbS(s) + O_3 \rightarrow$

    (ii) $XeF_6 + NaF \rightarrow$

    Arrange the following in increasing order of property indicated, giving reason:

    (i)   Hydrides of group-16 – boiling points

    (ii)   Hydrides of group 17 – acidic strength

    (iii)   Hydrides of group 16 – reducing character

27. Calculate the emf for the given cell at 25^0C:

    $Cr|Cr^{3+}(0.1M)||Fe^{2+}(0.01M)|Fe$ [Given: $E^0(Cr^{3+}/Cr)$ = -0.74 V; $E^0(Fe^{2+}/Fe)$ = -0.44 V]

    Calculate the strength of the current required to deposit 1.2 g of magnesium from molten $MgCl_2$ in 1 hr. [1F = 96500 $Cmol^{-1}$; Atomic mass of Mg = 24]

    OR

    (a)   Write the anode and cathode reactions and the overall reaction occurring in a lead storage battery.

    (b)   A copper-silver cell is set up. The copper ion concentration is 0.10 M. The concentration of silver ion is not known. The cell potential when measured was 0.422 V. Determine the concentration of silver ions in the cell. [Given $E^0(Ag^+/Ag)$ = 0.80V, $E^0(Cu^{2+}/Cu)$ = 0.34 V]