HOLIDAY HOMEWORK
Grade : XII
Subject:Chemistry

1.The reaction $NO_2 + CO \rightarrow NO + CO_2$ occurs in two steps. Locate the rate law.

$2NO_2 \rightarrow NO + NO_3$ (k1) – slow

$NO_3 + CO \rightarrow CO_2 + NO_2$ (k2) – fast

a) $R = k1 [NO_2]^3$

b) $R = k2 [NO_3] [CO]$

c) $R = k1 [NO_2]$

d) $R = k1 [NO_2]^2$

2.Dimethyl ether breakdown is a fractional order process. rate $=k(PCH_3OCH_3)^{3/2}$ gives the rate. What are the units of rate and rate constant if pressure is measured in bars and time is measured in minutes?

(a) bar min^{-1}, bar^2 min^{-1}

(b) bar min^{-1}, $bar^{1/2}$ min^{-1}

(c) $bar^{1/2}$ min^{-1}, bar^2 min^{-1}

(d) bar min^{-1}, $bar^{1/2}$ min^{-1}

3.Molar conductivity of 0.15 M solution of KCl at 298 K, if its conductivity is 0.0152 S cm^{-1} will be

(a) 124 Ω^{-1} cm^2 mol^{-1}

(b) 204 Ω^{-1} cm^2 mol^{-1}

(c) 101 Ω^{-1} cm^2 mol^{-1}

(d) 300 Ω^{-1} cm^2 mol^{-}

4.How many coulombs of electricity is required to reduce 1 mole of $Cr_2O_7^{2-}$ to Cr^{2+}in acidic medium?

(a) 4 × 96500 C

(b) 6 × 96500 C

(c) 2 × 96500 C

(d) 1 × 96500 C

5.The main difference between C – X bond of a haloalkane and a haloarene is

(a) C – X bond in haloalkanes is shorter than haloarenes

(b) In haloalkanes the C attached to halogen in C – X bond is sp^3 hybridised while in haloarenes it is sp^2 hybridised.

(c) C – X bond in haloalkanes acquires a double bond character due to higher electronegativity of X than haloarenes.

(d) haloalkanes are less reactive than haloarenes due to difficulty in C – X cleavage in haloalkanes.

6.Aryl halides are less reactive towards nucleophilic substitution reactions as compared to alkyl halides due to

(a) formation of a less stable carbonium ion in aryl halides

(b) resonance stabilization in aryl halides

(c) presence of double bonds in alkyl halides

(d) inductive effect in aryl halides

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.

(i)Both assertion and reason are correct and the reason is correct explanation

of assertion

(ii)Both assertion and reason are correct but reason does not explain

assertion

(iii)Both assertion and reason are correct but reason does not explain

assertion.

(iv) Assertion is incorrect but reason is correct.

7.***Assertion:*** SN^2 reaction of an optically active aryl halide with an aqueous solution of KOH always gives an alcohol with opposite sign of rotation.
Reason: SN^2 reactions always proceed with inversion of configuration.

8.Assertion: The enthalpy of reaction remains constant in the presence of a catalyst.

Reason: A catalyst participating in the reaction, forms different activated complex and lowers down the activation energy but the difference in energy of reactant and product remains the same.

9.Assertion: All collision of reactant molecules leads to product formation.

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

10.**Assertion:** On increasing dilution, the specific conductance keeps on increasing.
Reason: On increasing dilution, degree of ionisation of weak electrolyte increases and molality of ions alsoincreases.

11.What happens to most probable kinetic energy and the energy of activation with increase in temperature?

12.Explain the difference between instantaneous rate of a reaction and average rate of a reaction.

13.With the help of an example explain what is meant by pseudo first order reaction.

14.Determine the values of equilibrium constant (K_c) and $\Delta G°$ for the following reaction:
$Ni(s) + 2Ag^+ (aq) \rightarrow Ni^{2+} (aq) + 2Ag(s)$,
$E° = 1.05$ V
($1F = 96500$ C mol^{-1})

15.A zinc rod is dipped in 0.1 M solution of $ZnSO_4$. The salt is 95% dissociated at this dilution at 298 K. Calculate the electrode potential.
[$E°_{Zn^{2+}}/Zn = -0.76$ V]

16.Calculate the degree of dissociation (a) of acetic acid if its molar conductivity (Λ_m) is 39.05 S cm^2 mol^{-1}.
Given: $\lambda°(H^+) = 349.6$ S cm^2 mol^{-1} and $\lambda°(CH3COO^-) = 40.9$ S cm^2 mol^{-1}

17. The rate of the chemical reaction doubles for an increase of 10 K in absolute temperature from 298 K. Calculate E_a.

18.What is the effect of temperature on the rate constant of reaction? How can this temperature effect on the rate constant be represented quantitatively?

19.Write the equations for the preparation of 1-iodoobutanefrom (i)1-butanol (ii)1-chlorobutane (iii) but-1-ene.

20.Predict all the alkenes that would be formed by dehydrohalogenation of the following halides with sodium ethoxide in ethanol and identify the major alkene:
(I) 1-Bromo-1-methylcyclohexane
(ii) 2-Chloro-2-methylbutane.
(iii) 2,2,3-Trimethyl-3-bromopentane

Note:

Revise Chapter 2,3 & 6 for the class test to be held after the vacations.

Prepare the investigatory project on the assigned topic.