MAR THOMA RESIDENTIAL SCHOOL, TIRUVALLA

SECOND TERM EXAM DECEMBER- 2017

CHEMISTRY

Class: XI

Marks: 80

Time : 3 hr

SECTION – A

[Answer separately]

QUESTION-1

(a) **FILL IN THE BLANKS:** **[2.5]**

(i) The bond order of He_2^+ is_____.

(ii) The indicator used in the titration of weak acid and strong base is _____.

(iii) The IUPAC name of the element with atomic number 135 is_____.

(iv) The conjugate base of NH_3 is _____.

(v) An aqueous solution of the salt of ammonium chloride is _____.

(b) **CHOOSE THE CORRECT ALTERNATIVE:** **[2.5]**

(i) If $N_2 + 3H_2 \leftrightarrow 2NH_3$ has equilibrium constant equal to K_C then for $2N_2 + 6H_2 \leftrightarrow 4NH_3$ has equilibrium constant equal to K_C^1, they are related by

(a) K_C^2 (b) $\sqrt{K_C}$ (c) $1/\sqrt{K_C}$ (d) $1/K_C^2$

(ii) The correct order of electron affinity is

(a)F>Cl>Br (b)F<Cl<Br (c)Cl>F>Br (d)Cl<Br<F

(iii) Which of the following is least volatile

(a)HF (b)HCl (c)HBr (d)HI

(iv) Which of the following contains covalent and ionic bond{ coordinate bond}

(a)CCl_4 (b) $CaCl_2$ (c) NH_4Cl (d)water

(v) With increase in temperature ionic product of water

(a)increases (b) decreases (c) remains unaffected (d) may increases or decreases

(c) **ANSWER THE FOLLOWING QUESTIONS:** **[5]**

(i) Draw the lewis structure of perchloric acid.

(ii) Name two conditions necessary for hydrogen bonding to take place

(iii) What happens to a reversible reaction when catalyst is added?

(iv) What is the pH of 0.005 M NaOH solution.

(v) Define bases and acids in terms of Lowry Bronsted concept.

QUESTION -2 [2]

K_p for the reaction $2NOCl_{(g)} \leftrightarrow 2NO_{(g)} + Cl_{2(g)}$ is 0.157 atm at 27^0C and 1 atm pressure.

Calculate K_C for the reaction [R= 8.314J/K/mol , 0.0821 L atm/k/ mol , 0.083 L bar / K/mol]

QUESTION – 3 [2]

A sample of HI(g) is placed in a flask at a pressure of 0.2 atm . At equilibrium the partial pressure

Of HI(g) is 0.04 atm. What is K_p for the given equilibrium.

QUESTION -4 [2]

Out of O_2 , O_2^+ ,O_2^- , O_2^{2-} Which is most sable and why? Predict their magnetic behaviour.

QUESTION - 5 [2]

Give four difference between sigma and pi bond.

QUESTION – 6 [2]

Give reasons for the following:

(i) Carbon dioxide has individual dipole moment but the net dipole moment is zero.

(ii) Methane , ammonia and water has the same hybridization but they differ in shape And bond angle.

QUESTION -7 [3]

Calculate the hydrolysis constant , degree of hydrolysis and pH of ammonium chloride.

Given K_b for ammonia is 1.6×10^{-5} .

QUESTION -8 [3]

Calculate the degree of dissociation , concentration of hydronium ions and pH

of 0.01 M acetic acid solution . k_a for acetic acid is 1.8×10^{-5} . State the law behind this.

QUESTION – 9 [3]

Define Hybridisation. Predict the hybridization and geometry of PCl_5 , CO_3^{2-}.

QUESTION – 10 [3]

(a) Define atomic volume . How does it vary across a period and down a group.

(b) Out of Li , K , Ca , S , Kr which has lowest and highest first ionization enthalpy.

QUESTION -11

[3]

(a) Why is NF_3 pyrammidal but BF_3 trigonal planar.

(b) Define resonance.

(c) Arrange the elements N, P, O, S in increasing electron affinity and increasing nonmetallic character.

QUESTION – 12

[5]

(a) What happens to the equilibrium $N_2 + 3H_2 \leftrightarrow 2NH_3 + \Delta$ when

(i) Inert gas is added at constant pressure (ii) pressure is increased.
State the law behind this.

(b) Explain briefly metallic bond. Why is metallic conduction decreases with increasing temperature

(c) Define coordinate bond.

SECTION B
(Answer Separately)

QUESTION: 1

(a) CHOOSE THE CORRECT ALTERNATIVE:

(i) From which of the following can ethane be prepared in one step
(a) Methyl iodide (b) sodium propionate (c) ethyl magnesium bromide (d) all the above.

(ii) A compound X produces methane when treated with water . X can be
(a) Aluminiumnitride (b) Calcium carbide (c) aluminium carbide (d) calcium phosphide.

(iii) Electrolytic decarboxylation of sodium propionate produces
(a) Propane (b) ethane (c) methane (d) butane.

(iv) Acetylene reacts with ammoniacal silver nitrate to form
(a) Silver mirror (b) metal silver (c) silver acetate (d) silver acetylide

FILL IN THE BLANKS:

[4]

(i) The addition of carbonyl compound to HCN is _____ addition while Addition of HBr to alkene is _____ addition.

(ii) The nitro group in benzene produces _____ directing effect while amino group produces _____ directing effect.

(iii) The breaking of covalent bonds may be either through _____ or by _____ fission.

(iv) An alkyl group attached to carboxylic acid produces _____ effect and thechloro group attached to carboxylic acid produces _____ effect.

STATE:

[4]

(i) MarowniKoff s rule (ii) Peroxide effect (iii) Saytzeff s rule (iv) HucKel's rule

[2]

QUESTION -2

Differentiate between:

(i) Electrophile and Nucleophile (ii) E_1 and E_2 mechanism

QUESTION -3 [2]

Write two uses of (i) ethene (ii) benzene

QUESTION – 4 [2]

Give chemical test to distinguish between :

(i) Ethane and ethene (ii) but- 1- yne and but- 2- yne

QUESTION – 5 [2]

Write the salient features of modern theory of aromaticity.

QUESTION -6 [2]

Convert:

(i) Ethyne to ethane (ii) benzene to chlorobenzene

QUESTION -7 [3]

Write balanced chemical equation for the following reaction:

(i) Ethylene passed through alkaline solution of $KMnO_4$
(ii) But -2- ene is treated with ozone and followed by boiling with water in presence of zinc metal.
(iii) Water added to calcium carbide.

QUESTION -8 [3]

How will you prepare

(i) Benzene from acetylene
(ii) Cyclohexane from benzene

(iii) Ethyne from 1,2- dibromo ethane

QUESTION -9 [3]

Give reasons for the following:

(i) Dichloro acetic acid is more acidic than mono chloro acetic acid.
(ii) $(CH_3)_3C^+$ is more stable than $CH_3 - CH_2^+$
(iii) Octa- 1,3,5,7-tetraene doesnot show aromaticity.

QUESTION- 10 [3]

Explain the directive influence and rate of second substitution by nitro benzene using

Resonating structure.

QUESTION – 11 [3]

Write balanced chemical equations:

(i) Ethyne treated with dilute sulphuric acid in presence of $HgSO_4$ at 60^0C.
(ii) Ethyne treated with hot and concentrated $KMnO_4$
(iii) Ethene treated with hot and concentrated $KMnO_4$

QUESTION -12 [5]

Classify the following into type of reaction and type of reagent

(i) $CH_3Br + KOH \dashrightarrow CH_3OH + KBr$
(ii) $CH_2 = CH_2 + HCl \dashrightarrow CH_3 - CH_2 - Cl$
(iii) $C_2H_5Br + KOH \xrightarrow{alc.} C_2H_4 + KBr + H_2O$
(iv) $C_6H_6 + HNO_3 \xrightarrow{conc.\ H_2SO_4} C_6H_5NO_2 + H_2O$
(v) $CH_2 = CH - CH_3 + HBr \xrightarrow{peroxide} CH_2Br - CH_2 - CH_3$

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