Vitthalbhai Patel & Rajratna P. T. Patel Science College,
Vallabh Vidyanagar
B. Sc. (Semester-I)
Subject : GENERAL CHEMISTRY-I (US01CCHE21)

Date : 01-10-2018 Internal Test Marks : 50
Day : Monday Time : 12.30 to 2.30 p.m.

Note: (i) All questions are to be attempted.
(ii) Figures to the right indicate marks.

Q.1 Choose the correct option for the following : [08]

(i) Disappearance of purple colour of dil. $KMnO_4$ in its reaction with alkene is known as :
(a) Bayer's test (b) Saytzeff test (c) Grignard reaction (d) Iodoform test

(ii) Addition of HBr in presence of peroxide to alkene follows ..... .
(a) Markonikov's rule (b) Anti-Markonikov's rule
(c) Satyzeff rule (d) None of these

(iii) Which is the more fundamental property of the elements ?
(a) Atomic weight (b) Ionic radius (c) Atomic number (d) Ionization energy

(iv) ..... elements does not form ionic compound readily.
(a) Be (b) Sr (c) Ca (d) Mg

(v) A substance having tendency to lose H^+ is called ..... .
(a) Lewis acid (b) Arrhenius acid
(c) Lowry-Bronsted acid (d) Conjugate base

(vi) A weak base has strong conjugate ..... .
(a) acid (b) base (c) neutral (d) salt

(vii) Which of the following method is based on amount of sample?
(a) proximate analysis (b) partial analysis
(c) complete analysis (d) macro analysis

(viii) The degree of closeness between measured value and true value is ..... .
(a) accuracy (b) precision (c) method (d) analysis

Q.2 Answer the following (Attempt any Five) : [10]

(i) 1-Butyne gives white precipitation with Tollen's reagent while 2-butyne does not. Why?

(ii) Explain: Boiling point of n-butane is higher than iso-butane.

(iii) Define: (i) Ionization energy (ii) Shielding effect

(iv) Explain: Successive ionization energy is always higher than preceding one.

(v) What is the conjugate base of the following ions or compound?
(i) HS^- (ii) $H3O^+$ (iii) H_2SO_4 (iv) NH_3

(vi) What is common ion effect ?

(vii) "Precision always accompanies accuracy but high degree of precision does not mean accuracy" Justify the statement.

(viii) Discuss advantages and disadvantages of chemical method.

Q.3 Answer the following: [08]

[a] Calculate the percentage of isomeric products obtained upon monochlorination of n-pentane. The relative reactivity of 1^0, 2^0 and 3^0 H are 1: 3.8: 5 respectively.

[b] Define chain reaction. Write reaction mechanism for the bromination of ethane.

OR

Q.3 Answer the following: [08]

[a] Arrange the boiling point of following molecules in the increasing order of boiling point and explain your answer.
(a) Pentane (b) Isopentane (c) Neopentane.

[b] Write reaction mechanism for the Addition of Br_2 /H_2O to alkene.

Q.4 Answer the following : [08]

[a] Discuss the long form of periodic table.

[b] Calculate the screening constant and effective nuclear charge on 4s electron of (i) Mn (Z = 25) (ii) K (Z= 19)

OR

Q.4 Answer the following: [08]

[a] Discuss the factors affecting magnitude of ionization energy.

[b] On the basis of Hannay and Smith equation calculate the percentage ionic character in gaseous HF and HCl. (Given: χ_F =4.0 , χ_{Cl} = 3.2 , χ_H = 2.2)

Q.5 Answer the following : [08]

[a] What is hydrolysis ? Derive an equation correlating K_h and K_w for a sodium acetate in water.

[b] The solubility product of Lead sulphate is 1.8×10^{-8}. Calculate the solubility of Lead sulphate in (i) Pure water (ii) 0.1M $Pb(NO_3)_2$ solution

OR

Q.5 Answer the following : [08]

[a] Write note on selective precipitation with suitable example.

[b] A saturated solution of $La(IO_3)_3$ in pure water has a concentration of iodate ion equal to 2.07×10^{-3} M at 25 ^{0}C. What is the concentration of La^{+3} ion ? Calculate the solubility product of $La(IO_3)_3$.

Q.6 Answer the following : [08]

[a] During iron estimation of the sample the results obtained are 8.0, 8.2, 8.4, 8.5, 9.6 ppm. Check whether the questionable value 9.6 should be rejected or not. [Qcrit = 0.710].

[b] From the following results, calculate mean, standard deviation, relative standard deviation and variance. 29.8, 30.2, 28.6, 29.7%

OR

Q.6 Answer the following :

[a] Give classification of chemical analysis.

[b] What is sampling? Discuss sampling of solid, liquid and gas.

Vitthalbhai Patel & Rajratna P. T. Patel Science College,
Vallabh Vidyanagar
B. Sc. (Semester-I)
Subject : GENERAL CHEMISTRY-I (US01CCHE21)

Date : 09-10-2018 **Arrear Test** **Marks : 50**
Day : Tuesday **Time : 12.30 to 2.30 p.m.**

Note: (i) All questions are to be attempted.
(ii) Figures to the right indicate marks.

Q.1 **Choose the correct option for the following :** **[08]**

(i) How many isomers are possible for butane ?
(a) 2 (b) 3 (c) 4 (d) 5

(ii) Addition of HBr in presence of peroxide to alkene follows ..... .
(a) Markonikov's rule (b) Anti-Markonikov's rule
(c) Satyzeff rule (d) None of these

(iii) Which is the more fundamental property of the elements ?
(a) Atomic weight (b) Ionic radius (c) Atomic number (d) Ionization energy

(iv) ..... is not gas at room temperature.
(a) H_2 (b) N_2 (c) Br_2 (d) Ne

(v) A substance having tendency to lose H^+ is called ..... .
(a) Lewis acid (b) Arrhenius acid
(c) Lowry-Bronsted acid (d) Conjugate base

(vi) The conjugate base of H_3O^+ is ..... .
(a) OH^- (b) H_2O (c) HCO_3^- (d) NHO_3

(vii) Which of the following method is based on amount of sample?
(a) proximate analysis (b) partial analysis
(c) complete analysis (d) macro analysis

(viii) The degree of closeness between measured value and true value is ..... .
(a) accuracy (b) precision (c) method (d) analysis

Q.2 **Answer the following (Attempt any Five) :** **[10]**

(i) What is Grignard reagent ?
(ii) Explain: Boiling point of n-butane is higher than iso-butane.
(iii) Define: (i) Activation energy (ii) Intervening electrons
(iv) Explain: Successive ionization energy is always higher than preceding one.
(v) What is the conjugate base of the following ions or compound?
(i) HS^- (ii) HF (iii) H_2SO_4 (iv) HNO_3
(vi) What is common buffer solution ?
(vii) "Precision always accompanies accuracy but high degree of precision does not mean accuracy" Justify the statement.
(viii) Discuss advantages and disadvantages of chemical method.

Q.3 **Answer the following:** **[08]**

[a] Calculate the percentage of isomeric products obtained upon monochlorination of n-pentane. The relative reactivity of 1^0, 2^0 and 3^0 H are 1: 3.8: 5 respectively.

[b] Write note on 1,2- elimination reaction.

OR

Q.3 **Answer the following:** **[08]**

[a] Arrange the boiling point of following molecules in the increasing order of boiling point and explain your answer.
(a) Pentane (b) Isopentane (c) Neopentane.

[b] Give Keto-enol tautomerism with illustration..

Q.4 **Answer the following :** **[08]**

[a] Discuss the defects of Mendeleeff's periodic table.

[b] Calculate the screening constant and effective nuclear charge on 4s electron of
(i) Mn (Z = 25) (ii) Cu (Z= 29)

OR

Q.4 **Answer the following:** **[08]**

[a] Discuss the factors affecting magnitude of electron affinity.

[b] On the basis of Hannay and Smith equation calculate the percentage ionic character in gaseous HF and HCl. (Given: χ_F =4.0 , χ_{Cl} = 3.2 , χ_H = 2.2)

Q.5 **Answer the following :** **[08]**

[a] What is hydrolysis ? Derive an equation correlating K_h and K_w for a sodium acetate in water.

[b] Calculate the solubility of Lead sulphate in a solution of 0.1M H_3O^+ by taking account of the reaction.

OR

Q.5 **Answer the following :** **[08]**

[a] Discuss the Arrhenius acid-base concept with its limitation .

[b] A saturated solution of $La(IO_3)_3$ in pure water has a concentration of iodate ion equal to 2.07×10^{-3} M at 25 ^{0}C. What is the concentration of La^{+3} ion ? Calculate the solubility product of $La(IO_3)_3$.

Q.6 **Answer the following :** **[08]**

[a] During iron estimation of the sample the results obtained are 8.0, 8.2, 8.4, 8.5, 9.6 ppm. Check whether the questionable value 9.6 should be rejected or not. [Qcrit = 0.710].

[b] Give the advantages and disadvantages of chemical methods and instrumental methods.

OR

Q.6 **Answer the following :**

[a] Give the application of chemical analysis.

[b] What is sampling? Discuss sampling of solid, liquid and gas.

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V.P. & R.P.T.P. SCIENCE COLLEGE

B.Sc. (SEMESTER – I) Internal Test Exam

General Chemistry - I: US01CCHE21 **Time: 1:00 pm to 2:15 pm**
Date: 03-10-2019, Thursday **Total Marks: 25**

Q-1. Choose the correct option (Multiple choice questions). (05)

(i) Which of the following compound is alkenol?
(a) 2-propanol (b) 2-butenal (c) Vinyl chloride (d) Allyl alcohol

(ii) Ozonolysis of 2-pentyne produces _____.
(a) propanoic acid (b) acetic acid (c) both 'a' & 'b' (d) none of these

(iii) Which of the following pair has not diagonal relationship?
(a) Li-Mg (b) Be-Al (c) N-S (d) C-Si

(iv) For given value of 'n' the degree of penetration of electron is least one for _____orbital.
(a) d (b) p (c) s (d) f

(v) The analysis in which we find out selected constituents of the sample is known as _____.
(a) Proximate analysis (b) Partial analysis
(c) Trace constituent analysis (d) Complete analysis

Q-2 (a) Define: (i) free radical (ii) chain reaction. (05)
Give reaction and reaction mechanism of free radical chlorination of Methane.

OR

Q-2 (a) Explain: (i) Boiling point of cis-2-butene is higher than trans-2-butene. (05)
(ii) 1-Butyne gives white precipitation with Tollen's reagent while 2-butyne does not.

Q-3 (a) Describe long form of periodic table with suitable diagram. (05)

OR

Q-3 (a) Discuss the applications of electronegativity. (05)

Q-4 (a) Explain selective precipitation for a mixture of 0.1M Zn^{+2} and 0.1M Fe^{+2} solution. (05)
Also explain the role of buffer solution to maintain sulfide ion concentration during this precipitation. Given: K_{sp} (ZnS) = 4.5 x 10^{-24}, K_{sp} (FeS) = 1 x 10^{-19} and K_a (H_2S) = 1.1 x 10^{-21}.

OR

Q-4 (a) Discuss the Arrhenius, Lowry-Bronsted and Lewis theories of acids and bases with suitable examples. Write limitations also. (05)

Q-5 (a) Define : (i) Accuracy (ii) Precision. (05)
Give the applications of chemical analysis.

OR

Q-5 (a) Define : Error. How will you minimize errors? (05)

[145 E+G]

SEAT No. _____ No. of Printed Pages : 4

SARDAR PATEL UNIVERSITY

Date: 22/10/2018 Monday

B.Sc. [semester-1] Examination October 2018 Marks =70

Subject- General Chemistry-1. (USO1CCHE21) Time: 2-00 to 5-00 PM

Q-1. Choose the correct option for the following : [10]

(i) The general formula of Gignard reagent is _____

(a) RMgX (b)ROH (c) RH (d) HX

(ii) E_1 mechanism involves _____as an intermediate.

(a) carbanion (b) free radical (c)carbocation (d) none of these

(iii) Which carbon cation is least stable?

(a) 1° (b) 2° (c) 3° (d) $^+CH_3$

(iv) The position of which element in periodic table is still a matter of dispute ?

(a) H (b) H_2 (c) Li (d) C

(v) The actual order of electron affinity of halogen elements is ....

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

(vi) sp^3 hybidization orbital has _____ % of s character.

(a) 25 (b) 50 (c) 75 (d) 100

(vii) The conjugated base of H_3O^+ IS _____

(a) H_2O (b) OH^- (c) H_2O_2 (d) none of these

(viii) Which concept classifies the acids and bases on basis of proton transfer ?

(a) Arhenious (b) Lewis (c) Lowery Bronsted (d) none of these

(ix) The difference between observed value and true value is called_____?

(a) Accuracy (b) Error (c) Precision (d) Reproducibility

(x) Number of significant figure for the data 0.00240 is _____

(a) 2 (b) 5 (c) 3 (d) 6

Q – 2 . Answer in short (Any ten) [20]

(a) Define E_1 and E_2

(b) Give structures and IUPAC names for all possible isomers of C_4H_8.

(c) Give Corey House reaction.

(d) Give definition of Ionization energy.

(e) Give the Pouling's equation for electro negativity.

(f) What is Mendeleef's periodic law?

(g) Write La Chatalier's principle.

(h) What is common ion effect ?

(i) Discuss the limitations of Arhenius theory.

(j) Define Qualitative and Quantitative analysis.

(k) Write advantages of Chemical method.

(l) Explain the term Accuracy and Precision.

Q-3. (a) Write a note on halogenations of alkane. [5]

(b) Discuss Ozonolysis of alkene with example. [5]

OR

Q-3 . (a) Discuss E_1 reaction mechanism with example. [5]

(b) Calculate the percentage of isomeric products obtain upon monochlorination of n-pentane. The relativity of 1°, 2° ,and 3° H are 1: 3.8: 5. [5]

Q- 4. Define ionization energy. Discuss the factors affecting the magnitude of Ionization energy. [10]

OR

Q- 4. Explain the long form of periodic table. [10]

Q-5. (a) Write a note on Buffer solution. [5]

(b) Calculate pH value of a solution obtained by mixing 50ml of 0.2N HCl with 50ml of 0.1N NaOH. [5]

OR

Q-5. (a) Write a note on Selective precipitation with suitable example. [5]

(b) The solubility of AgCl at $25^\circ C$ in water is 1.67×10^{-5} mole/lit. Calculate the solubility product of AgCl. [5]

Q-6. Give complete classification of chemical analysis and write stages of analysis. [10]

OR

Q-6. (a) What is Error? Discuss the types of error. Discuss different methods for the minimization of error. [10]

[145 E+G]

No. of Printed Pages : 4

SARDAR PATEL UNIVERSITY

Date: 22/10/2018 Monday **B.Sc. [semester-1] Examination October 2018** **Marks: 70**

Subject- General Chemistry-1. (USO1CCHE21) **Time: 2-00 to 5-00 PM**

Q-1. યોગ્ય વિકલ્પ લખો. **[10]**

1. ગ્રીગ્નાર્ડ પ્રક્રિયક નું સામાન્ય સૂત્ર ..... છે.

(a) RMgX (b)ROH (c) RH (d) HX

2. E_1 પ્રક્રિયા માં મધ્યવર્તી તરીકે ..... હોય છે.

(a) કાર્બએનાયન (b)મુક્તમુલક (c) કાર્બોકેટાયન (d) એક પણ નહી

3. કયો કાર્બોકેટાયન સૌથી ઓછો સ્થાયી છે ?

(a) 1° (b) 2° (c) 3° (d) $^+CH_3$

4. આવર્ત કોષ્ટક માં કયા તત્વ નું સ્થાન હજુ પણ વિવાદાસ્પદ છે ?

(a) H (b) H_2 (c) Li (d) C

5. હેલોજન તત્વો માં ઇલેક્ટ્રોન બંધુતા નો ક્રમ .....છે ?

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

6. sp^3 સંકૃત કક્ષક માં s કક્ષક નું પ્રમાણ .....% હોય છે.

(a) 25 (b) 50 (c) 75 (d) 100

7. H_3O^+ નો સૈયુગ્મી બેઇઝ .....છે.

(a) H_2O (b) OH^- (c) H_2O_2 (d) એક પણ નહી

8. કયા સિદ્ધાંત માં પ્રોટોન સ્થાનાંતર ને આધારે એસીડ-બેઇઝ નું વર્ગીકરણ કરવામાં આવે છે?

(a) આર્હેનીયસ (b) લુઇસ (c) લોરી-બ્રોન્સ્ટેડ (d) એક પણ નહી

9. સાચા મુલ્ય અને અવલોકિત મુલ્ય વચ્ચે ના તફાવત ને..... કહે છે.

(a) ચોકસાઈ (b) ત્રુટી (c) પરીશુદ્ધી (d) પુનઃનીર્મિતતા

10. 0.00240 માં અર્થસૂચક અંક .... છે.

(a) 2 (b) 5 (c) 3 (d) 6

Q-2. ટૂક માં જવાબ લખો. (ગમેતે દસ) **[20]**

(a) E_1 અને E_2 ની વ્યાખ્યા આપો.

(b) C_4H_8 ના બધા શક્ય બંધારણ દોરી તેમના IUPAC નામ લખો

(c) કોરે-હાઉસ પ્રક્રિયા આપો.

(P.T.O.)

(d) આયનીકરણ શક્તિ ની વ્યાખ્યા આપો.

(e) વિદ્યુત ઋણતા માટેનું પાઉલી નું સમીકરણ લખો.

(f) મેન્ડેલીફ નો આવર્ત કોષ્ટક નો નિયમ શું છે?

(g) લ-શેટેલીયર નો સિદ્ધાંત લખો.

(h) સમાન આયન અસર એટલે શું?

(i) આર્હેનીયસ સિદ્ધાંત ની મર્યાદા જણાવો.

(j) ગુણાત્મક અને ભારાત્મક પૃથક્કરણ ની વ્યાખ્યા આપો.

(k) રસાયણિક પદ્ધતી ના ફાયદા જણાવો.

(l) સમજાવો- ચોકસાઈ અને પુનઃનીર્મિતતા

Q-3. (a) આલ્કેન ના હેલોજીનેશન ઉપર નોધ લખો. [05]

(b) આલ્કીન નું ઓઝોનાલીસીસ ઉદાહરણ સહિત સમજાવો. [05]

અથવા

Q-3. (a) E_1 પ્રક્રિયા ની ક્રિયાવિધિ ઉદાહરણ સહિત સમજાવો. [05]

(b) n- પ્રોપેન ના મોનો કલોરીનેશન થી મળતી નીપજ નું ટકાવાર પ્રમાણ શોધોકે જેમાં $1^{\circ}, 2^{\circ}$,અને 3° H ની સાપેક્ષ સક્રિયતા 1: 3.8: 5. છે. [05]

Q-4. આયનીકરણ શક્તિ ની વ્યાખ્યા આપો. આયનીકરણ શક્તિ ના મુલ્ય ને અસરકર્તા પરિબળો વિશે ચર્ચા કરો. [10]

અથવા

Q-4. આવર્ત કોષ્ટક ના વિસ્તૃત સ્વરૂપ ની ચર્ચા કરો. [10]

Q-5. (a) બફર દ્રાવણ વિશે નોધ લખો [05]

(b) 50ml 0.2N HCl ને 50ml 0.1N NaOH સાથે મિશ્ર કરતા બનતા દ્રાવણ ની pH શોધો. [05]

અથવા

Q-5. (a) યોગ્ય ઉદાહરણ સાથે પસંદગીના અવક્ષેપન વિશે નોધ લખો. [05]

(b) 25°C તાપમાને AgCl ની પાણીમાં દ્રાવ્યતા 1.67×10^{-5} mole/lit. છે. તો AgCl નો દ્રાવ્યતા ગુણાકાર શોધો. [05]

Q-6. રસાયણિક પૃથક્કરણ નું સંપૂર્ણ વર્ગીકરણ આપો અને પૃથક્કરણ ના તબક્કા લખો. [10]

અથવા

Q-6. ત્રુટી એટલે શું? ત્રુટી ના પ્રકાર વર્ણવો. ત્રુટી ની કમી કરવાની વિવિધ રીતો વર્ણવો. [10]

—X—

SEAT No. 200

No. of printed pages: 02

[11-E]

SARDAR PATEL UNIVERSITY

B.Sc. (SEMESTER-I) EXAMINATION

GENERAL CHEMISTRY-I (US01CCHE21)

Date: 11 - 6 -2019

Time: 10.00 A.M. To 1.00 p.m.

Day : Tuesday

Total Marks: 70

Q:1 Choose the most appropriate option for the following: **[10]**

(i) Ozonolysis of 2-butene gives_____.
(a) Butanoic acid (b) Acetic acid (c) Formaldehyde (d) Acetaldehyde

(ii) Addition of HBr to 1-propene follow..... Rule.
(a) Markovnikov's (b) Anti- Markovnikov's (c) Satyzeff's (d) Grignard's

(iii) Which of the following is a correct name of isobutylene according to the IUPAC rules?
(a) 2-methyl-1-propene (b) 2-methyl-2-propene
(c) 3,4-dimethylpentane (d) isobutene.

(iv) The position of ____ element in modern periodic table is still a matter of dispute.
(a) Helium (b) Hydrogen (c) Lithium (d) Carbon

(v) The electron affinity of ____ elements is either close to zero or slightly negative.
(a) Alkali (b) Alkaline earth (c) Halogen (d) Nobel gas

(vi) Which of the following is the Lowery-Bronsted base as well as Lewis base ?
(a) NH_4^+ (b) NH_3 (c) BF_3 (d) CO_2

(vii) On self-ionization, water molecules produce _____ .
(a) H_3O^+ ion (b) OH^- ion (c) H_3O^+ and OH^- ion (d) oxygen molecule

(viii) Which of the following is conjugated base of HF?
(a) H_2F^+ (b) HF_2^- (c) H^+ (d) F^-

(ix) In Analytical chemistry, the difference between observed value and true value is known as _____.
(a) accuracy (b) Error (c) reproducibility (d) precision

(x) Number of significant figure for the data 0.03030090 is _____.
(a) 5 (b) 6 (c) 7 (d) 8

Q:2 Answer the following in very short: (Any Ten) **[20]**

(i) 1-butyne gives white precipitates with Tollen's reagent but 2-butyne does not. Explain

(ii) Why acetylene is stronger acid than ethane?

(iii) What precautions should be taken for hydroxylation of alkene with $KMnO_4$?

(iv) On the basis of Hannay and Smith equation calculate % ionic character of covalent bond in gaseous HF and HBr molecules.
(Given: $\chi_H = 2.2$, $\chi_F = 4.0$ and $\chi_{Br} = 3.0$)

(v) Explain: Electron affinity values of nitrogen and phosphorous are very law.

(vi) Define: Electron affinity and Electronegativity.

(vii) What are acid-base indicators?

(viii) Complete the following equations and distinguish conjugate acid-base pair.
(a) $CH_3COOH + H_2O \rightleftharpoons$
(b) $H_2O + NH_3 \rightleftharpoons$

(ix) The buffer solution can be diluted without change in H_3O^+ concentration. Explain

(x) Define: Accuracy and Precision.

(xi) Write advantages of Instrumental Methods.

(xii) Following are the results for percentage Zn in the samples. Check the reliability of the outlying result with the help of Q-test.
8.0, 8.2, 8.4, 8.5, 9.6 %Zn Qcrit= 0.710

d a a b d a c d b d

Q:3 Attempt the following:

[a] Write reaction mechanism for the monochlorination of alkane. [05]

[b] The following names are objectionable. Write their structure and correct IUPAC name. [05]

(1) 2-isopropyl-2-butene (2) 1,1-dimethyl-1-butene

(3) 2,2-diethyl butane (4) 2-n-propyl-1-propene

(5) 1,1-diethyl-1-butene

OR

Q:3 Attempt the following:

[a] Explain kinetics and detailed stepwise mechanism of E_1 and E_2 reaction. [05]

[b] Calculate percentage yield of the products obtained upon monochlorination of isopentane. The relative reactivity of 1^0, 2^0 and 3^0 H–atom is 1:3.8:5 respectively. [05]

14 %
35 %
23 %
28 %

Q:4 Define ionization energy. Discuss the factors affecting the magnitude of ionization energy. [10]

OR

Q:4 What is effective nuclear charge? How it changes with change in number of intervening electrons and size of the atom? Calculate screening constant (σ) and effective nuclear charge (Z_{eff}) of 4s electron in (i) Mn (Z=25) and (ii) Cu (Z=29). [10]

σ = 21.40
Zeff = 3.6
σ = 25.3
Zeff = 3.7

Q:5 Attempt the following:

[a] What is hydrolysis? Derive an equation correlating K_h and K_w for a sodium acetate salt in water. [05]

[b] Calculate solubility of $PbSO_4$ in (i) 0.1M $Pb(NO_3)_2$ and (ii) 0.001M Na_2SO_4 solution. (K_{sp} of $PbSO_4 = 1.8 \times 10^{-8}$) [05]

1.8×10^{-7}
1.8×10^{-5}

OR

Q:5 Attempt the following:

[a] Discuss the Arrhenius acid-base theory with its limitations and write a short note on Lowry- Bronsted concept. [05]

[b] A solution contains 0.1M Cl^- ion and 0.01M CrO_4^{-2} ion. When aqueous $AgNO_3$ is added to this solution, which salt will precipitate first? What will be the value of $[Ag^+]$ when the first salt starts to precipitate? What will be the value of $[Ag^+]$ when the second salt starts to precipitate? What will be the value of $[Cl^-]$ when the second salt starts to precipitate? K_{sp} of $Ag_2CrO_4 = 1.9 \times 10^{-12}$ and K_{sp} of $AgCl = 2.8 \times 10^{-10}$ [05]

Q:6 Attempt the following:

[a] Explain the classification of chemical analysis based on data to be generated and amount of sample. [05]

[b] Discuss applications of chemical analysis in different fields. [05]

OR

Q:6 Attempt the following:

[a] Write a note on Sampling of solid, liquid and gas. [05]

[b] Define error and give classification of errors. [05]

****

c a c c bb a b c c

SEAT No.____ No. of printed pages : 2

[37]

સરદાર પટેલ યુનિવર્સીટી

બી.એસ.સી.સેમેસ્ટર-૧ પરીક્ષા

તા. 10th August 2019 Saturday

US01CCHE21 (General Chemistry)

સમય : 10.00 AM TO 01.00 PM

[કુલ ગુણ : ૭૦]

સૂચના : પ્રશ્નની જમણી બાજુ દર્શાવેલ અંક પ્રશ્નના ગુણ દર્શાવે છે.

પ્ર-૧ નીચેના માંથી સાચો વિકલ્પ પસંદ કરો. [૧૦]

૧. આલ્કાઇલ મેગ્નેશિયમ હેલાઈડ___પ્રક્રિયક તરીકે ઓળખાય છે.
(અ) ટોલન્સ (બ) બેયર (ક) ગ્રીગ્નાર્ડ (ડ) વુર્ટઝ

૨. દ્વિતીયક બ્યુટાઈલ બ્રોમાઈડની Zn અને એસિડ સાથેની પ્રક્રિયાથી ___બને છે.
(અ) n-બ્યુટેન (બ) આઈસો બ્યુટેન (ક) n-ઓક્ટેન (ડ) આઈસો ઓક્ટેન

૩. E2 પ્રક્રિયા-ક્રિયાવિધિ,____ક્રમની ગતિકીને અનુસરે છે.
(અ) શૂન્ય (બ) પ્રથમ (ક) દ્વિતીય (ડ) તૃતીય

૪. ઓરડાનાં તાપમાને, _____વાયુરૂપે હોતો નથી. (અ) H_2 (બ) N_2 (ક) Br_2 (ડ) Ne

૫. SP-સંકરણ ક્ષક્ષક,____%S લક્ષણ ધરાવે છે. (અ) ૭૫ (બ) ૫૦ (ક) ૨૫ (ડ) 33.33

૬. લેવિસ સિધ્ધાંત મુજબ એસિડ એ_____છે.
(અ) ઇલેક્ટ્રોન દાતા (બ) ઇલેક્ટ્રોન સ્વીકારક (ક) પ્રોટોન દાતા (ડ) પ્રોટોન સ્વીકારક

૭. _____સિધ્ધાંત મુજબ BF_3 એસિડ છે.
(અ) લેવિસ (બ) આર્હેનિયસ (ક) લોરી-બ્રોન્સટેડ (ડ) એકેય નહિ

૮. H_2O નો સંયુગ્મ બેઇઝ____છે. (અ) H_3O^+ (બ) OH^- (ક) H_2O^+ (ડ) H_3O

૯. સૂક્ષ્મ પૃથ્થકરણ માટે, પદાર્થના નમૂનાનો જથ્થો___જેટલો લેવામાં આવે છે.
(અ) 0.1 g અને વધુ (બ) 0.1 g થી 0.001 g (ક) 0.001 g થી 0.0001 g (ડ) એકેય નહિ

૧૦. કદમાપક અને ભારમાપક પૃથ્થકરણ,____પ્રકારના પૃથ્થકરણ છે.
(અ) ઉષ્મીય (બ) પ્રકાશીય (ક) જથ્થાત્મક (ડ) આપેલ બધાં જ

પ્ર-૨ નીચેના પ્રશ્નોના ટૂંકમાં જવાબ આપો.(ગમે તે દશ) [૨૦]

૧. વ્યાખ્યા આપો : (અ) મુક્ત મૂલક (બ) સાંકળ પ્રક્રિયા

૨. કોરી-હાઉસ પ્રક્રિયાનો ઉપયોગ કરી મિથાઈલ બ્રોમાઈડમાંથી n-નોનેનનું સંશ્લેષણ આપો.

૩. ટોલન્સ પ્રક્રિયક સાથે 1-બ્યુટાઈન સફેદ અવક્ષેપ આપે છે, જયારે 2-બ્યુટાઈન આપતા નથી.શા માટે ?

૪. વ્યાખ્યા આપો : વિદ્યુતઋણતા(ઇલેક્ટ્રોનેગેટીવીટી)

૫. વ્યાખ્યા આપો : ઇલેક્ટ્રોન બંધુતા(ઇલેક્ટ્રોન એફિનિટી)

૬. ઇલેક્ટ્રોન એફિનિટીની માત્રા ઉપર અસર કરતાં પરિબળો આપો.

૭. શુધ્ધ પાણીમાં AgCl ની દ્રાવ્યતા ગણો.[AgCl નો $K_{SP} = 2.8 \times 10^{-10}$] 1.7×10^{-5} M

૮. CO_2 લેવિસ એસિડ છે, પણ લોરી-બ્રોન્સટેડ એસિડ નથી.સમજાવો

૯. pH વ્યાખ્યાયિત કરો. દ્રાવણોને વર્ગીકૃત કરવા માટે pH માપકમ કેવીરીતે ઉપયોગી છે ?

૧૦. વિશ્લેષણની રાસાયણિક(chemical methods of analysis)પધ્ધતિઓના ફાયદા જણાવો.

૧૧. વ્યાખ્યા આપો : અર્થસૂચક અંક

૧૨. શુધ્ધતા(accuracy) પદ સમજાવો.

(P.T.O.)

a a c c b b a b c c

પ્ર-૩	(અ) E1 પ્રક્રિયાની ક્રિયાવિધિ તથા ગતિકી ચર્ચો.	[૫]
	(બ) ઓઝોનીકરણ પ્રક્રિયા પર નોંધ લખો.	[૫]
	અથવા	
પ્ર-૩	(અ) આલ્કેનના પ્રકાશકલોરીનેશન(photochlorination) પ્રક્રિયાની ક્રિયાવિધિ ચર્ચો.	[૫]
	(બ) આલ્કીનમાં હેલોજનનું ઉમેરણ(addition) પ્રક્રિયા,ક્રિયાવિધિ-સહ ચર્ચો.	[૫]
પ્ર-૪	(અ) આયનીકરણ શક્તિની વ્યાખ્યા આપો.ધાતુંના આયનીકરણ પોટેન્શિયલ અને વિદ્યુતધ્રુવ(electrode) પોટેન્શિયલ વચ્ચેનો ભેદ આપો.	[૪]
	(બ) આયનીકરણ શક્તિની માત્રા પર અસર કરતાં પરિબળો ચર્ચો.	[૬]
	અથવા	
પ્ર-૪	(અ) CsOH બેઝિક છે, જયારે IOH એસિડિક છે. શા માટે ?	[૪]
	(બ) વિદ્યુતઋણતા(ઇલેક્ટ્રોનેગેટીવીટી)ની માત્રા પર અસર કરતાં પરિબળો ચર્ચો.	[૬]
પ્ર-૫	(અ) આર્હેનિયસ સિધ્ધાંતની મર્યાદાઓ આપો અને લોરી-બ્રોન્સટેડ સિધ્ધાંત સમજાવો.	[૬]
	(બ) સમજાવો. (૧) અલ્પદ્રાવ્ય ક્ષાર અને દ્રાવ્યતા ગુણાકાર	[૪]
	(૨) સમાન આયન અસર	
	અથવા	
પ્ર-૫	(અ) બફર દ્રાવણો પર નોંધ લખો.	[૬]
	(બ) પાણીનું સ્વયં આયનીકરણ સવિસ્તર સમજાવી $pH + pOH = pK_W = 14$ પુરવાર કરો.	[૪]
પ્ર-૬	(અ) રાસાયણિક પૃથ્થકરણ(analysis) એટલે શું ? અને તેનું સંપૂર્ણ વર્ગીકરણ આપો.	[૫]
	(બ) ચર્ચો. (૧) વિશ્લેષણના તબક્કા(stages of analysis)	[૫]
	(૨) વિશ્લેષણની ઉપકરણીય પધ્ધતિ(instrumental methods)ના ફાયદા તથા મર્યાદાઓ.	
	અથવા	
પ્ર-૬	(અ) ક્ષતિ(ભૂલ)(error) ની વ્યાખ્યા આપો અને તેનું સંપૂર્ણ વર્ગીકરણ આપો.	[૫]
	(બ) વ્યવસ્થિત ભૂલો(systematic errors)ને ન્યૂનતમ(minimization) કરવા માટેની કોઇ પણ ચાર પદ્ધતિઓ ચર્ચો.	[૫]

X

[98/A32 Eng]

Seat No.:_____

No. of printed pages: 2

SARDAR PATEL UNIVERSITY

B.Sc.(First Semester Examination)

General Chemistry-1. (USO1CCHE21)

Date:-11th Nov 2019 **Total Marks :70**

Day:- Monday **Time : 2-00 to 5-00**

Note:(i) All questions are to be attempted.(ii) Figures to the right indicate marks.

Que.1 **Choose the correct option for the following:** 10

1 Both symmetrical and unsymmetrical alkanes can be synthesized using.....
(a)Wurtz reaction (b) Corey-house reaction
(c) Kolbe reaction (d) Wurtz-fitting reaction

2 Initiation step for the photochemical halogenations of alkane is.....
(a) exothermic (b) endothermic
(c) both exothermic and endothermic (d) depend on alkane

3 How many isomers are possible for C_6H_{14}?
(a) 4 (b) 5 (c) 6 (d) 7

4 _____element does not form ionic compound readily.
(a) Be (b) Sr (c) Ca (d) Mg

5 sp hybridization orbital has _____ % of s character.
(a) 25 (b) 50 (c) 75 (d) 100

6 _____is not gas at room temperature.
(a) H_2 (b) N_2 (c) Br_2 (d) Ne

7 Which of the following is the Lowery Bronsted base as well as Lewis base.
(a) NH_4^+ (b) NH_3 (c) BF_3 (d) CO_2

8 _____is a sparingly soluble salts.
(a) KCl (b) AgCl (c) NaCl (d) All of these

9 Volumetric analysis and Gravimetric analysis are the types of:
(a)Thermal analysis (b) quantitative analysis
(c) optical analysis (d) All of these

10 The difference between observed value and true value is called_____?
(a) Accuracy (b) Error (c) Precision (d) Reproducibility

Que.2 **Answer in short (Any ten)** 20

1 What is Grignard Reagent?
2 Explain Wurtz reaction?
3 Define E_1 reaction?
4 What is Modern Periodic Law?
5 Name the Factors affecting the magnitude of ionization energy?
6 Which group of periodic table has highest value of electronegativity?
7 What is common ion effect?
8 Define sparingly soluble salts with example.
9 Discuss the Concept of Lowery-Bronsted acid-base with suitable example.
10 Discuss limitations of Chemical method?
11 Discuss Advantages of instrumental method.
12 Explain: Accuracy and Precision.

Q-3	**Attempt the following**	
A	Write a note on Markovnikov's rule.	5
B	Calculate the percentage of isomeric products obtain upon monochlorination of Isopentane. The relativity of 1o, 2o ,and 3o H are 1: 3.8: 5.	5
	OR	
Q-3	**Attempt the following**	
A	Write a note on halogenations of alkane.	5
B	Discuss E_2 reaction mechanism with example.	5
Q.4	**Attempt the following**	
(A)	Define electron affinity. Discuss the Factors affecting the magnitude of electron affinity.	10
	OR	
(A)	Discuss the Defects of Mendeleef's periodic table.	10
Q.5	**Attempt the following**	
A	Discuss the Arrhenious acid –base concept with its limitation.	5
B	Calculate the solubility of CaF_2 (i) pure water (ii) in 0.1M$Ca(NO_3)_2$ Solution . Ksp =1.7 x 10^{-10}	5
	OR	
Q.5	**Attempt the following**	
A	Write a note on Selective precipitation with suitable example	5
B	Calculate pH value of a solution obtained by mixing 50ml of 0.2N HCI with 50ml of 0.1N NaOH.	5
Q-6	**Attempt the following**	
A	Define the term chemical analysis and discuss application of chemical analysis .	5
B	List out different methods for the minimization of systematic error and explain on any three of them.	5
	OR	
Q-6	**Attempt the following**	
A	Define Error .Give Complete classification of error	5
B	The following values were obtained for the determination of cadmium in a sample of dust: 4.3, 4.1, 4.0, 3.2, 4.2, 3.9 and 4.0 µg g-1. Should the value, 3.2, be rejected? (Qcrit= 0.570).	5

—X—

dbd abc abb a

[50] Eng.

Seat No :_____

No. of printed pages: 02

SARDAR PATEL UNIVERSITY

B.Sc. (SEMESTER-I) EXAMINATION

(On Demand Exam)

GENERAL CHEMISTRY-I (US01CCHE21)

Date: 10-02-2020, monday

Time: 10.00am to 1.00 pm.

Total Marks: 70

Q:1 Choose the most appropriate option for the following: **[10]**

(i) Which carbocation is least stable ?
(a) 2° (b) 3° (c) 1° (d) $^{+}CH_3$

(ii) E2 mechanism is a ..... step reaction.
(a) two (b) single (c) three (d) Zero

(iii) How many isomers are possible for butane ?
(a) 2 (b) 3 (c) 4 (d) 5

(iv) *sp* hybridization orbital has ..... % s-character.
(a) 50 (b) 33 (c) 75 (d) 25

(v) ..... is not gas at room temperature.
(a) H_2 (b) Br_2 (c) N_2 (d) Ne

(vi) Which of the following element do not form ionic compound readily?
(a) Mg (b) Sr (c) Be (d) Ca

(vii) pH of an acidic solution is less than ..... .
(a) 7 (b) 9 (c) 14 (d) 10

(viii) The conjugate base of H_2O is ..... .
(a) H_3O^+ (b) OH^- (c) HNO_3 (d) HCO_3^-

(ix) The degree of closeness between measured value and true value is ..... .
(a) Error (b) accuracy (c) reproducibility (d) precision

(x) Number of significant figure for the data 0.1025 is _____.
(a) 4 (b) 3 (c) 2 (d) 1

Q:2 Answer the following in very short: (Any Ten) **[20]**

(i) M.P. of trans-2-butene is higher than cis-2-butene. Explain
(ii) Give the synthesis of 2-pentyne from 1-butyne .
(iii) Give difference between E1 and E2 mechanism.
(iv) What are defects of Mendeleef's periodic table ?
(v) Explain: NaOH is base while ClOH is an acid.
(vi) The ionization energy of N is higher than expected. Explain
(vii) Give the difference between strong electrolytes and weak electrolytes.
(viii) Give the limitations of Lowry-Bronsted theory for acid and base.
(ix) Give the difference between strong base and weak base.
(x) Write limitations of Chemical Methods.
(xi) Define: Qualitative and Quantitative analysis.
(xii) Give limitations of Analytical methods.

(P.T.O.)

dba abc abb a

Q:3 Attempt the following:

[a] Explain kinetics and stepwise mechanism of E2 reaction. **[05]**

[b] The following names are objectionable. Write their structure and correct IUPAC name. **[05]**
(1) 2-isopropyl-1-propene **(2)** 1-ethylpentane
(3) 2-ethyl-1-propene **(4)** 2,4,5-trimethylhexane **(5)** 2,2-diethylbutane

OR

Q:3 Attempt the following:

[a] Discuss Keto-enol tautomerism giving illustration. **[05]**

[b] Calculate percentage yield of the products obtained upon monochlorination of n-butane. The relative reactivity of 1^0, 2^0 and 3^0 H–atom is 1:3.8:5 respectively. **[05]**

Q:4 Define electronegativity. Discuss the factors affecting the magnitude of electronegativity . **[10]**

OR

Q:4 Give Slatter's rules. Calculate screening constant (σ) and effective nuclear charge (Z_{eff}) of 4s electron in (i) Mn (Z=25) and (ii) K (Z=19). **[10]**

Q:5 Attempt the following:

[a] Discuss Arrhenius acid-base concept with its limitations. **[05]**

[b] Calculate solubility of CaF_2 in (i) 0.1M NaF and (ii) pure water. **[05]**
(K_{sp} of CaF_2= 1.7×10^{-10} M)

OR

Q:5 Attempt the following:

[a] Write notes on Selective precipitation giving suitable example. **[05]**

[b] The solubility product of $Mg(OH)_2$ at 25 °C is 1.4×10^{-11} M . What is the solubility of $Mg(OH)_2$ in gm/lit.(Molecular weight of $Mg(OH)_2$ =58 gm/mole) **[05]**

Q:6 Attempt the following:

[a] Discuss applications of chemical analysis in different fields. **[05]**

[b] Write a note on Sampling of solid, liquid and gas. **[05]**

OR

Q:6 Attempt the following:

[a] Discuss on stages of analysis. **[05]**

[b] Give the brief account on Interferences. **[05]**

SARDAR PATEL UNIVERSITY

B. Sc. Examination (First Semester)

USO1CCHE21 (General Chemistry-I)

SOLUTION

Q -1 Choose the correct option for the each of the following.

(1) Alkyl magnesium halide is known as_____reagent.
(a) Tollen's (b) Bayer's (c) **Grignard** (d) Wurtz

(2) Sec. Butyl bromide upon reaction with Zn and acid produce_____
(a) **n-butane** (b) isobutane (c) n-octane (d) isooctane

(3) E2 mechanism follows _____order kinetics.
(a) zero (b) first (c) **second** (d) third

(4) _____ is not a gas at room temperature. (a) H_2 (b) N_2 (c) **Br_2** (d) Ne

(5) SP hybridization orbital has ___% S-character. (a) 75 (b) **50** (c) 25 (d) 33.33

(6) According to lewis concept, acid is _____
(a) electron donor (b) **electron acceptor** (c) proton donor (d) proton acceptor

(7) BF_3 is an acid according to_____concept.
(a) **Lewis** (b) Arrhenious (c) Lowery-Bronsted (d) None

(8) The conjugate base of H_2O is____. (a) H_3O^+ (b) **OH^-** (c) H_2O^+ (d) H_3O

(9) The amount of the substance taken for the micro analysis is_____
(a) 0.1 g and more (b) 0.1 g to 0.001 g (c) **0.001 g to 0.0001 g** (d) None

(10) Volumetric and gravimetric analysis are the types of_____analysis.
(a) Thermal (b) Optical method (c) **Quantitative** (d) All of these

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ondemand
10/8/19

સરદાર પટેલ યુનિવર્સીટી

બી.એસ.સી.સેમેસ્ટર-૧ પરીક્ષા

US01CCHE21 (General Chemistry)

SOLUTION

પ્ર-૧ **નીચેના માંથી સાચો વિકલ્પ પસંદ કરો.** [૧૦]

૧. આલ્કાઇલ મેગ્નેશિયમ હેલાઈડ__પ્રક્રિયક તરીકે ઓળખાય છે.
(અ) ટોલન્સ (બ) બેયર (ક) **ગ્રીગ્નાર્ડ** (ડ) વુર્ટઝ

૨. દ્વિતીયક બ્યુટાઈલ બ્રોમાઈડની Zn અને એસિડ સાથેની પ્રક્રિયાથી ___બને છે.
(અ) **n-બ્યુટેન** (બ) આઈસો બ્યુટેન (ક) n-ઓક્ટેન (ડ) આઈસો ઓક્ટેન

૩. E2 પ્રક્રિયા-ક્રિયાવિધિ,____ક્રમની ગતિકીને અનુસરે છે.
(અ) શૂન્ય (બ) પ્રથમ (ક) **દ્વિતીય** (ડ) તૃતીય

૪. ઓરડાનાં તાપમાને, _____વાયુરૂપે હોતો નથી. (અ) H_2 (બ) N_2 (ક) **Br_2** (ડ) Ne

૫. SP-સંકરણ ક્ષક,____%S લક્ષણ ધરાવે છે. (અ) ૭૫ (બ) ૫૦ (ક) ૨૫ (ડ) 33.33

૬. લેવિસ સિધ્ધાંત મુજબ એસિડ એ._____છે.
(અ) ઇલેક્ટ્રોન દાતા (બ) **ઇલેક્ટ્રોન સ્વીકારક** (ક) પ્રોટોન દાતા (ડ) પ્રોટોન સ્વીકારક

૭. _____સિધ્ધાંત મુજબ BF_3 એસિડ છે.
(અ) **લેવિસ** (બ) આર્હેનિયસ (ક) લોરી-બ્રોન્સટેડ (ડ) એકેય નહિ

૮. H_2O નો સંયુગ્મ બેઇઝ____છે. (અ) H_3O^+ (બ) OH^- (ક) H_2O^+ (ડ) H_3O

૯. સૂક્ષ્મ પૃથ્થકરણ માટે, પદાર્થના નમૂનાનો જથ્થો___જેટલો લેવામાં આવે છે.
(અ) 0.1 g અને વધુ (બ) 0.1 g થી 0.001 g (ક) **0.001 g થી 0.0001 g** (ડ) એકેય નહિ

૧૦. કદમાપક અને ભારમાપક પૃથ્થકરણ,____પ્રકારના પૃથ્થકરણ છે.
(અ) ઉષ્મીય (બ) પ્રકાશીય (ક) **જથ્થાત્મક** (ડ) આપેલ બધાં જ
