AAU
KINGABDULAZIZUNIVERSITY
ACADEMIC ASSESSMENT UNIT

COURSE PORTFOLIO

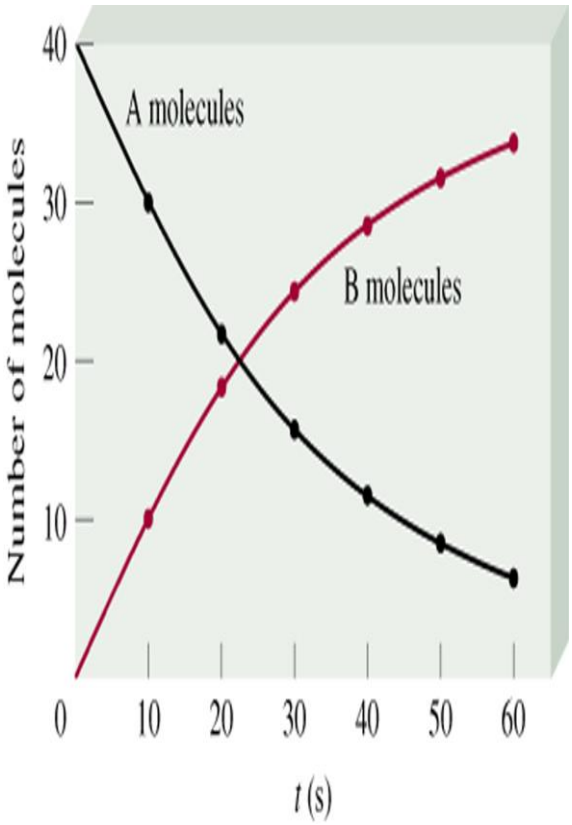
Faculty of Science - Faisaliha Branch
(King Abdul-Aziz University)

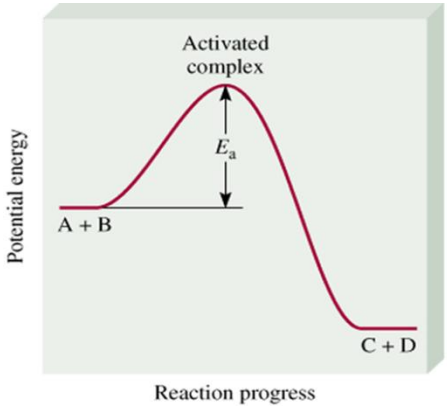
DEPARTMENTChemistry

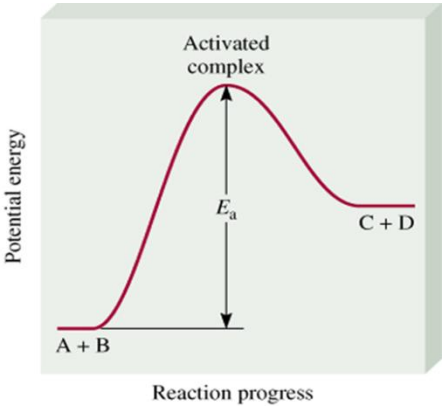
COURSE NAME:CHEM ,
COURSE NUMBER:641
SEMESTER/YEAR:2nd
DATE:05 / 07 /1434 H

COURSE PORTFOLIO BY

PROF. SANAA T. ARAB







PART II

COURSE SYLLABUS

Instructor Information

- ✍ Name of the instructor
- ✍ Office location
- ✍ Office hours, Contact number(s),E-mail address
- ✍ Instructor's profile (optional)
- ✍ A welcome letter to the student(optional)

Course Information

- ✍ Course name and number
- ✍ Course meeting times, places
- ✍ Course website address
- ✍ Course prerequisites and requirements
- ✍ Description of the course (what, why, philosophy, teaching methodology)
- ✍ **teaching methodology**

Course Objectives

- ✍ A statement of what the student will know and be able to do as the result of learning
- ✍ A statement on how they will be expected to demonstratetheir learning

Learning Resources

1. A list all of the materials needed for the course and where to obtain them (*i.e.*, text books, reading material, lab guide, and websites)
2. If the course involves a computer, list usage and software needed
3. If lab work is involved, list lab location, hours, safety precautions and other instructions for use.

Course Requirements and Grading

- ✍ Student assessment: A clear rationale and policy on grading
- ✍ Expectations from students: Attitudes, involvement, behaviors, skills, and ethics
- ✍ Student responsibilities to the course
- ✍ Expectations for each assignment and project
- ✍ Important rules of academic conduct
- ✍ Lab plan and assignments, if it applies

Detailed Course Schedule

- ✍ Detailed contents of topics and activities planned for each class or lab sessionduring the term.
- ✍ Reading assignments for each topic.
- ✍ Assignments and Exam due dates.

(Thefollowing pages include templates of tables for course schedule and practical sessions)

✍ Name of the instructor :Prof. SanaaTahirSaeed Arab
✍ Office location : Chemistry Dep., 2nd floor
Room No. : 309 –A
Office Tel. No :0966 2 2577466 – ext. .2387
E-mail : dr.s.Arab@hotmail.com
Starab@kau.edu.sa
✍ Office hours :

St9.30 – 12.00
Mn 9.30 – 12.00

Instructor's profile

Section	**Day**	Course name and number	**Time**	Place of Lecture
Chem.	St	CHEM-641	**12.00 – 1.30**	**TBA**
	Sn	CHEM-344	**9.30-10.50**	**308- A**
		CHEM-202	**11.00- 12.20**	**304- A**
	Mn	CHEM-202	**8.00 – 11**	**TBA – B11**
		CHEM-641	**12.00 – 1.30**	**TBA**
	Th	CHEM-344	**11.00- 12.20**	**308- A**
		CHEM-202	**11.00- 12.20**	**304- A**
	We	–		

NAME : Prof. SanaaTaherSaeed Arab .
UNIVERSITY:Faculty of Science - Faisaliha Branch (King Abdul-Aziz University).
FIELD OF STUDY : Corrosion
MAJOR SPECIALIZATION : Chemistry
MINOR SPECIALIZATION : Electrochemistry.
Number of publications : 39 papers .

PROFILE:

Lecturing prescribed curricula in Physical Chemistry (Electrochemistry) and supervisingpostgraduate students at M.Sc., and Ph.D. levels
Areas of Interest: Electrochemical behavior studies of metals and their alloys, the use of inhibitors as organic substances or form natural sources to protect metals from corrosion.
Authorization to be: Assistant Dean, head of Chemistry Department, Dean of Education for Girls College, and other consultant fairs.

EDUCATION

- 1977 : Bachelor degree from chemistry, Girls Colleges of Education in Jeddah, Agency for Girls Colleges, Jeddah, KSA.
- 1983 : Master degree from Chemistry, Girls Colleges of Education in Jeddah, Agency for Girls Colleges, Jeddah, KSA.
- 1986 : Doctorate degree from chemistry, Girls College in Jeddah., Agency for Girls Colleges, Jeddah, KSA.
- 1997 : Associated doctor in physical chemistry . Girls College in Jeddah., Agency for Girls Colleges, Jeddah, KSA.
- 2004 : Full professor in physical chemistry . King Abdul-Aziz University ,Jeddah, KSA.

EMPLOYMENT:

- 1983 - 1986 : Deputy Chairwoman of Examination Marks Committee, Girls Colleges of Education Jeddah, KSA.
- 1983: Lecture, Girls College -Scientific Section, Jeddah, KSA.
- 1987 - 1989 : Assistant Dean for Postgraduate Studies, Girls Colleges of Education in Jeddah, Jeddah, KSA.
- 1993 - 1995 : Head of Chemistry, Girls Colleges of Education , Jeddah, KSA.
- 1996 - 2000 : Assistant Dean for Postgraduate Studies, Science Sections, Girls Colleges of Education , Jeddah, KSA.
- 2002 - 2008 : Dean of Girls College - Scientific Section, Girls College -Scientific Section.

RESEARCH INTERESTS:

Areas of Interest : Corrosion studies is one of the most important fields of concern . Corrosion is more than just an inevitable natural process; it is also one of the most serious engineering problems in a modern society. Losses incurred as a result of corrosion total in the billions each year. Much of this loss is due to the, corrosion of iron and steel, although many other metals may corrode as well.

TEACHING INTERESTS:

Supervision of postgraduate 9 M.Sc., and 4 Ph.D. students.
Examiner to discuss 10 M.Sc., and 5 Ph.D. students.
Participated in the Evaluation and Examination of paper submitted for the acceptance for the position of Assistant Professor and for the publication in Journal.

COURSES:

- Chemical Kinetic Chem. 344
- General Chemistry (2) ,Chem. 202 .
- Training project 390
- Research project 391
- Ph. 2-2 : Special Studies in Physical -chemistry
- Post -MS 1-1 : Advanced Physical Chemistry (1)
- Post -MS 1-2 : Advanced Physical Chemistry(2
- Post -MS 2-3 : Reading in Physical-Chemistry

List of publications

جهة النشر	سنة الإنجاز	مسمى المؤلفات والبحوث باللغة الانجليزية	م
International Jour. Chem.	1991	Structural Effects and Mechanism of the inhibition Of Acid Corrosionof Steel by some Nitriles. Corrosion	**1**
Proc Pakistan AcadSci	1991	Comments on Gill's Approach to the Evaluation of Ionic Radii in Non- Aqueous Solvents.	**2**
Internationl Jour. Chem .	1992	Effect of some S- Alkylisothiouroniumiodides on the Corrosion of Steel in 1.0 M Hydrochloric Acid.	**3**
Corrosion	1993	Inhibition of Acid Corrosion of Steel by Some S-Alkylisothiouroniumlodide.	**4**
The Electrochemical Socity of India	1994	Effect of Water –Organic Solvent Mixtures on Pitting Corrosion of Mild Steel.	**5**
PortuglineElectrochmicaActa.	1995	Intermolecular Interaction and the Conductance of some tetraAlkyl Ammonium Salts in Ethylene Glycol-Ethanol Mixture at 30°C.	**6**
Bull of Electro Chemistry	2001	Electrochemical Behavior of Al–Si Alloys in Acid and Alkaline Media.	**7**
Journal of Applied Electro –chemistry	2001	The role of chloride ions and pH in the corrosion and pitting of Al -Si alloys.	**8**
Corrosion	2002	Influence of N-heterocyclic compounds on the corrosion of Al-Si alloy in hydrochloric acid-effect of pH and temperature	**9**
International Journal of Chemistry	2002	The effect of temperature on the inhibition of the acid corrosion of mild steel by some sulfonium bromide derivatives.	**10**
Al-AZhar Bull Sci	2004	Inhibition effect of phenacyl dimethylsulfonium bromide and some of It's ρ -substituted derivatives on corrosion of mild steel in acid solutions	**11**
Al-AZhar Bull Sci	2004	Inhibition of steel corrosion in acid solution by five memberd ring of sulfonium bromides .	**12**
Bull. Electro.Chem.	2005	Effect of temperature on corrosion inhibition of iron base metallicglass alloy in neutral solutions.	**13**
Metrial. Sci. Res.	2005	Utilization of Ammimajus L.Fruits Extracts as Inhibitors forMild Steel Corrosion in Acid Media.	**14**

جهة النشر	سنة الإنجاز	مسمى المؤلفات والبحوث باللغة الانجليزية	م
Commun.Fac.Sci.	2006	Synergistic action of some thiosemiarbazone derivatives with chloride ion on the corrosion inhibition of iron base metallic glass.	**15**
Chem. Sau.J	2006	Synergim and antagonism in iron base metallic glass corrosion inhibition by thiosemiarbazone compounds and bromide ions.	**16**
PortugaliaeElectrochimicaActa	2006	Corrosion inhibition of steel in phosphric acid by phenacyl dimethyl sulfonium bromide and some ofit's ρ - substituted derivatives.	**17**
Inter.Jou.App.Che.	2007	Thermodynamic Study on Corrosion Inhibition of Fe78 B13 Si 9 Metallic Glass in Na_2 SO_4 Solution at Different Temperatures.	**18**
Oriental Juornal. of electro chem.	2007	Electrochemical Study of Amorphous Ni89P11 Alloy in HCl Solutions.	**19**
Materials Letters	2008	Structure effect of some thiosemicarbazone derivatives on the corrosion inhibition of Fe78 B13 Si9 glassy alloy in Na_2 SO_4 solutions.	**20**
Materials Research Bulletin	2008	Inhibition action of thiosemicarbazone and some of its p-substituted compounds on the corrosion of iron-base glass alloy in 0.5M H_2 SO_4 at30°C	**21**
Inter.JouApp.Chem.	2008	Effect of strong acids on the electrochemical behavior Ni89P11 glassy alloy.	**22**
Chem. Sau.J	2008	Use of some drugs for steel corrosion inhibition in sulfuric acidssolutions in presence of some halides.	**23**
Egyption Chem. Soc.	2008	Chemical Composition of Ammimajus its Inhibition Activity Against Corrosion .	**24**
J. of Korean chemical society	2008	Synergistic Effect ofAzadirachtaIndica Extract and Iodide Ions on the Corrosion Inhibition of Aluminium in Acid Media.	**25**
Inter-national Journal of electro- chemical science	2008	Effect of Temperature on the Corrosion Inhibition on MildSteel in 2.0M H_2SO_4 by Some Organic Compounds Containing S and N Atoms in Absence and Presence of Halides .	**26**
J. of Korean chemical society	2009	The electrochemical behavior of Ni –base metallic glasses containing Cr in H_2SO_4 solutions.	**27**
Phys. Chem. News	2009	INFLUENCE OF Cr ADDITION ON THE ELECTROCHEMICAL BEHAVIOR OF Ni –BASE METALLIC GLASSES IN HCl	**28**

جهة النشر	سنة الإنجاز	مسمى المؤلفات والبحوث باللغة الانجليزية	م
Modern Applied Science	2010	Aloe Plant Extract as Environmentally Friendly Inhibitor on the Corrosion of Aluminum in Hydrochloric Acid in Absence and Presence of Iodide Ions.	**29**
Oriental Journal of Chemistry	2010	The use of Rutachalepensi as corrosion inhibitor for steel corrosion in 2M H_2SO_4 solution.	**30**
International Journal of Chemistry	2010	Corrosion and Corrosion Inhibition of Mild Steel in H_2SO_4 Solutions by ZizyphusSpina-Christi as Green Inhibitor.	**31**
Journal of American Science	2010	Voltammetry Determination Of Some Trace Elements In Tap Water Samples Of Jeddah Area In The Kingdom Of Saudi Arabia	**32**
Life Science Journal	2010	Estimating Of Some Trace Elements In Mineral Water In The Kingdom Of Saudi Arabia.	**33**
Nature and Science	2010	Electrochemical techniques for measuring some trace heavy metals in Taps Water of Riyadh in Saudi Arabia .	**34**
Journal of Saudi Chemical Society	2011	MedicagoSative plant as safe inhibitor on the corrosion of steel in 2.0M H_2SO_4 solution.	**35**
Nature and Science	2012	The Role Of Natural Mineral Dead Sea Waters Therapy In Various Rheumatic Diseases.	**36**
CORROSION	2012	Synergistic Effect of ZizyphusSpina-Christi and Chloride Ions on the Corrosion Inhibition of Mild Steel in Sulfuric Acid Solution.	**37**
Science Journal	2012	The use of Clay Minerals of the Dead Sea as Drugs.	**38**
Journal of Saudi Chemical Society	2011	Passivity characteristics on Ni(Cr)(Fe)SiB glassy alloys in phosphate solution.	**39**

✍ A welcome letter to the student (optional)

To my students,

I hope to you a pleasant and helpful course

Course Schedule Model(meeting two times a week)

Week	Date	Topic	Reading Assignment	What is Due
1	14/3/1434H	Introduction to the course. **Symbols, terminology and abbreviations.**	**Chap.1 (vol. 1)**	Buy Book
	16/3/1434H	**Basic Concepts of Reaction Kinetics** **Reaction Rate and Stoichiometry** **Rate Law & Reaction Order** **Units for the rate constant.**		**Problems on Reaction Rates**
2	21/3/1434H	**First and Second Order Reactions (Half-life).** **Determining Reaction Order.** **Differential and Integrated Rate Laws.**		
	23/3/1434H	**Molecular Kinetics.** **Order and molecularity.**	**Chap.2 (vol. 1)**	**Problems on Activation Energy.**
3	28/3/1434H	**The ArrheniusEquation.** **Activation Energy.**		
	1/4/1434H	**Theoretical Models for Chemical Kinetics – Introduction.** **The Kinetic Theory of Collision for Reaction Rates. The Collision Model .**		**Problems On Frequency Factor and Partition Functions**
4	6/4/1434H	**Statistical Mechanics of Chemical Equilibrium.** **The Kinetic Theory of Absolute Reaction Rates.**		
	8/4/1434H	**Derivation of the Rate Equation** **Molecular partition functions** **Partition Functions** **Partition function for vibrational motion** **partition function for rotational motion** **Partition function for translational motion.**		
5	13/4/1434H	**An Alternative Derivation** **Reactions between Molecules.**		**Problems**
	15/4/1434H	**Temperature Dependence of the Frequency Factor** **The influence of temperature and pressure on rate constants.**		
6	20/4/1434H	**Exam .(1)**	**Chap.1 (vol. 2)**	**Problems on reactions in solution**
	22/4/1434H	**Reactions in solution (General Principles).** **-Reactions between Ions .** **i. Influence of Solvent.**		
Week	**Date**	**Topic**	**Reading Assignment**	**What is Due**

7	27/4/1434H	ii. Influence of Ionic Strength.	Chap.1 (vol. 2)	Problems On reactions in solution
	29/4/1434H	-Reactions Involving Dipoles . i. Influence of Solvent. ii. Influence of Ionic Strength.		
8	4/5/1434H	The Influence of Pressure on Rates in Solution.		
	6/5/1434H	Substituent Effects. i. Hammett Relationship. ii. The Taft Equation.		Problems
9	11/5/1434H	Med Term Holly day		
10	18/5/1434H	Revision of previous part		Problems
	20/5/1434H	Exam .(2)		
11	25/5/1434H	Some Reaction Mechanisms in solution: i. Proton- Transfer Reactions. ii. Electron- Transfer Reactions.	Chap.2 (vol. 2)	Exercises
	27/5/1434H	i. Organic Substitution Reactions.		Exercises
12	3/6/1434H	Nucleophilic Substitution(SN) Effect of variables on SN Reactions 1)The nature of the nucleophile 2)The nature of the Leaving Group 3) the solvent effect The SN1 Reaction SN1 Mechanism Characteristics of SN1 reactions .		Exercises
	5/6/1434H	Structure of Substrate on SN2 Reactions Characteristics of the SN2 Reaction SN2 Transition State.		Reports on Characteristics of the SN2 and SN2 Reactions
13	10/6/1434H	A QUICK SUMMARY OF TWO SUBSTITUTION REACTIONS: SN1 / SN2 NUCLEOPHILES IMPORTANCE IN SN1 AND SN2 REACTIONS		
	12/6/1434H	Acid Hydrolysis of Esters Mechanism of Ester Hydrolysis under acidic condition Base hydrolysis of Esters		PowerPoint about Hydrolysis of Esters
Week	Date	Topic	Reading Assignment	What is Due
14	17/6/1434H	Reactions of Alkyl Halides The SN2 reaction Factors that affect the SN2:		

			Chap.2 (vol. 2)	PowerPoint about Hydrolysis of Alkyl Halides
	19/6/1434H	The SN1 reaction Factors that affect the SN1:		
15	24/6/1434H	Eliminations The E2 reaction , The E1 reaction		
	26/6/1434H	*Group Project Presentations*		PowerPoint
16	15/7/1434H	Final Exam all sections		

Learning Resources :

Text books:

1. **Keith J.Laider ,Reaction Kinetics ,Vol.1 ,(Homogeneous Gas Reactions),Pergamon Press ,Oxford ,New York ,Toronto.2009.**

2. **Keith J.Laider ,Reaction Kinetics ,Vol.2 ,(Reactions in Solution), Pergamon Press ,Oxford ,New York ,Toronto.2009.**

Useful books:

1. C.Castellan , Physical Chemistry , Addison –Wesley Publishing Company , 2nd Ed (1971).
2. S. Glasstone, physical Chemistry, S. G. Wasani for the Macmillan Co. of India Limited , 2nd Ed (1977).
3. J.Bares, C.Cerny, V.Fried and J.Pick, Collection of Problems in Physical Chemistry, Pergamon Press New Delhi (1974).

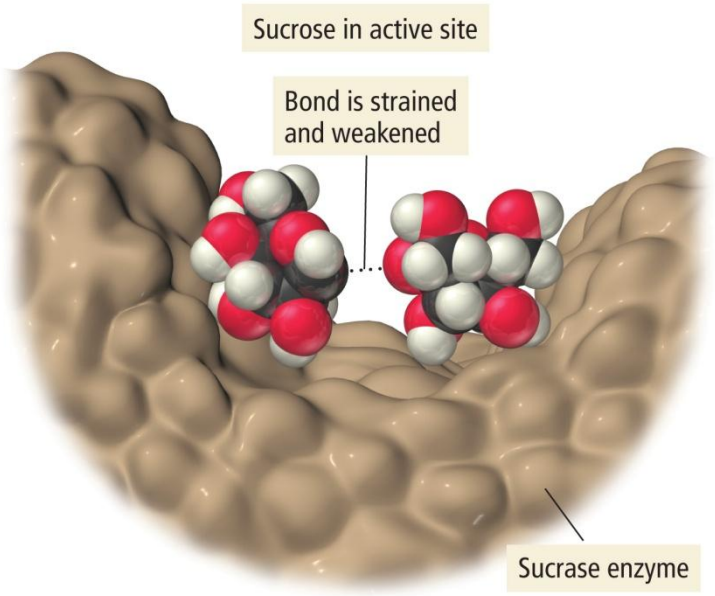
PART III

COURSE RELATED MATERIAL

Contains all the materials considered essential to teaching the course, includes:

Quizzes, lab quizzes, mid-terms, and final exams and their solution set
Paper or transparency copies of lecture notes/handouts (optional)
Practical Session Manual (if one exists)
Handouts for project/term paper assignments

Mid-terms (1&2) , and Final exams



CHEM 641 -Kinetic Chemistry (2012 – 2013 2nd SEMESTER)

EXAM (1) Time : 120 min Name: Number:

Useful Information		
R= 1.987 cal deg-1mol^{-1}	N= 6.023X10^{23} mol^{-1}	kT/h=10^{13}

Answer the following questions:

1- a. writes and compare between:

- The rate of reaction and the rate constant of reactions.

- Molecularity and order of a reaction .

b. Drive the equation of the first order reactions .

c. Consider the decomposition of N_2O_5 to give NO_2 and O_2: $2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$

Time (s)	Concentration (M)		
	N_2O_5	NO_2	O_2
0	0.0200	0	0
100	0.0169	0.0063	0.0016
200	0.0142	0.0115	0.0029
300	0.0120	0.0160	0.0040
400	0.0101	0.0197	0.0049
500	0.0086	0.0229	0.0057
600	0.0072	0.0256	0.0064
700	0.0061	0.0278	0.0070

Show by drawing the relation between the reactant and /or the products and the time.

2- a. Discuss the Arrhenius theory to explain the effect of temperature on the rate of reactions.

b. For the reaction of the first order : A→B the following equation is obtained :

$K = 5.4x\ 10^{11}\ e^{-29300/2T}$

Define the parameters in the equation then, calculate the rate constant of the reaction ($min.^{-1}$). How long of time it will take for [B] to be 300 mm if the initial [A] = 760 mm at 150°C .

3- Discuss the collusion theory and calculate the frequency factor in mol/l .

Good Luck

Prof. Sanaa Arab

CHEM 641 -Kinetic Chemistry (2012 – 2013 2nd SEMESTER)

EXAM (2) Time : 120 min Name: Number:

Useful Information		
R= 1.987 cal deg-1mol^{-1}	N= 6.023X10^{23} mol^{-1}	kT/h=10^{13}

Answer the following questions:

1- a. Discuss the influence of the solvent on the rate of reaction between ions when the ions are presented at distance d_{AB}. Derive also, the frequency factor in mol/l dependence on the solvent .

b- For the following reaction :

$$[Co\ Br\ (NH_3)_5]^{+2} + OH^- \longrightarrow [Co\ (NH_3)_5\ OH\ ]^{+2} + Br^-$$

the rate constant of the reaction k is 91 min $^{-1}$ .L, when the concentration of

$[Co\ Br\ (NH_3)_5]^{+2}$ = 5x10^{-4} M presented as Br^- and OH^-= 7.5x10^{-4} M , **calculate :**

1. k_0 of the reaction .
2. the rate constant k of the reaction in 0.1 M NaCl .
3. the rate constant k of the reaction in EtOH solution [ξ =34.2 ,d_{AB} = 2.5Å],ξ of H_2O = 80 .
4. Compare between the rate constants k of the reaction in both H_2O ,EtOH solutions.

2- Write on the following :

i.The influence of pressure on the rate constant k of the reaction in solutions .

ii.Taft equation .

Prof. Sanaa Arab

IC ASSESSMENT UNIT

CHEM 641 -Kinetic Chemistry (2012 – 2013 2nd SEMESTER)

Final : EXAM Time : 120 min

Name: Number:

Useful information

Planck's const., $h = 6.626\times10^{-34}$ J.s
Avogadro's No., $N_{av} = 6.022\times10^{23}$ mol^{-1}
Boletzman constant $k = 1.38 \times 10^{-16}$ $erg.deg^{-1}$
Gas constant, $R = 0.082$ L atm K^{-1} mol^{-1} = 8.314 $JK^{-1}mol^{-1}$ = 1.987 $caldeg^{-1}$ mol^{-1}
kT/h = 10^{13}
Translational faunction $f_t = 10^8$
Rotlational faunction $f_r = 10$
Vibrational faunction $f_v = 1$

Question No.	Degree	Signature of Prof.
Question1		
Question 2		
Question 3		
Question 4		
Total		

Answer the following questions:

1- a. Write the differentiated and integrated forms equations for the first order reaction.

b . Derive the rate constant equation and $t_{1/2}$ for the second order reaction at initial concentration (a = b and a ≠ b).

2- a. Write Arrhenius low and compare its parameters with that obtained from :

i. Collision theory of the rate reactions .

ii. Absolute theory of the rate reactions .

b. Find E° and A from the drowning graph of the following data :

$K(10^{3})M^{-1}.sec^{-1}$	0.54	2.5	14	25	64
$T^{\circ}(K)$	599	629	666	683	700

c. Calculate the frequency factor for the following reaction :

$$A + B \leftrightarrow (AB) \rightarrow \text{Products}$$

on the basis that A and B are non - linear molecules each containing 3 atoms at $27^{\circ}C$. What is the value of ΔS in this case .

3-Discuss the following :

i. Proton transfer reactions.

ii. Substituent effects on organic substitution reactions.

iii. Hydrolysis of a) alkyl Or b) esters .

iv. The types of the activated complexes in electron transfer reactions (only the names give one example) .

4-a. Discuss the influence of the ionic strength on :

i. Ionic reactions .

ii. Dipolar reactions.

b. For the following reaction :

$$[Cr\ Cl\ (NH_3)_5]^{+2} + OH^- \longrightarrow [Cr\ (NH_3)_5\ OH\ ]^{+2} + Cl^-$$

the rate constant of the reaction k_0 is 89 min^{-1} .L, when the concentration of $[Cr\ Cl\ (NH_3)_5]^{+2}$ = $3x10^{-3}$ M presented as Br^- and OH^-= $3.5x10^{-3}$ M , calculate :

the rate constant k of the reaction in absence and presence 0.2 M NaCl .

Good Luck

Prof. Sanaa Arab

Power Points and PDF (Examples)

Basic Principles of Chemical Kinetics

1.1 Symbols, terminology and abbreviations

This book follows as far as possible the recommendations of the International Union of Biochemistry and Molecular Biology. However, as these allow some latitude and in any International Union of Biochemistry (1982) "Symbolism and terminology in enzyme kinetics" European Journal of Biochemistry **128**, 281–291 case do not cover all of the cases that we shall need, it isuseful to begin by noting some points that apply generally in the book. First of all, it is important to recognize that a chemical substance and its concentration are two different entities and need to be represented by different symbols. Therecommendations allow square brackets around the chemical name to be used without definition for its concentration, so[glucose] is the concentration of glucose, [A] is the concentration of a substance A, and so on.

1.2 Order of a reaction

1.2.1 Order and molecularity

First-order kinetics , Second-order kinetics , Third-order kinetics.

Determination of the order of a reaction

Chemical Kinetics

Reaction Mechanisms

• Reactions may occur all at once orthrough several discrete steps.

• Each of these processes is known as an

elementary reaction or elementaryprocess.

1 Fundamentals of Chemical Kinetics

1.1 Concentrations

1.2 Reaction rates

1.3 Rate laws

1.3.1 Examples

1.4 Simple rate laws and reaction order

2 Integration of simple rate laws

2.1 First order reactions

2.1.2 Half life and time constant

2.2 Pseudo-first-order reactions

2.3 Reactions second order in a single reactant

3 Determination of rate laws.

4 Bimolecular Reactions & Collision Theory.

5Transition State Theory

6Organic Substitution reactions : SN1 & SN2

7 Reactions of Alkyl Halides

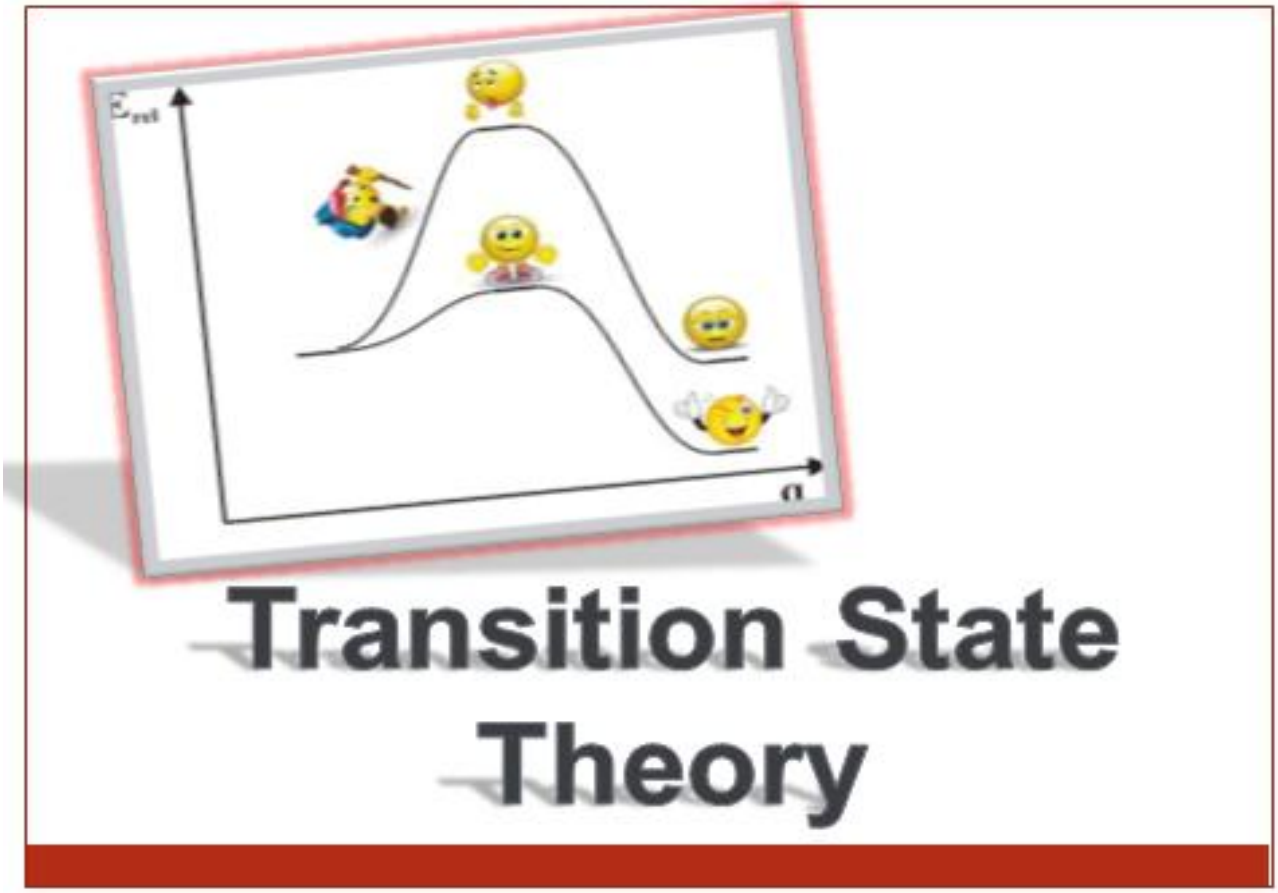
PART IV

EXAMPLES OF STUDENT LEARNING

Examples of student work. (Included good, average, and poor examples)

Graded work, *i.e.* exams, homework, quizzes
Students' lab books or other workbooks
Students' papers, essays, and other creative work
Final grade roster and grade distribution
Examples of instructor's written feedback of student's work, (optional)
Scores on standardized or other tests, before and after instruction, (optional)
Course evaluation, self evaluation or students comments (optional)

Creative work(power points examples)



The theory of the rates of chemical reactions therefore resolves itself into two parts:

- Calculation of concentrations of activated molecules
- Calculation of the rates of reaction of the activated molecules

The equilibrium constant for the formation of an activated complex X‡

$$A + B \rightarrow X^{\neq}$$

$$K^{\neq} = \frac{K_1}{K_{-1}} = \left(\frac{[X^{\neq}]}{[A][B]}\right)eq = \frac{Q_x^{\neq}}{Q_A Q_B} e^{-Eo/RT}$$

Where:
Q: Partition functions of the molecules A,B and X‡
E_o: Activation energy

Organic Substitution reactions : SN_1 & SN_2

Prof. Sanaa Taher Arab

By: Maha Saud AL-subyi.
Chemistry Department, Faculty of Sciences for girls, King Abdul-Aziz University. Jeddah – KSA

Organic Substitution reactions

- A number of organic reactions belong to the known as substitution , being of the type

$$X + Y–Z \qquad X–Y + Z$$

- In solution such reactions generally occur by a heterolytic type of mechanism ; the bond that is broken does not give rise to two free radicals , but it breaks with a separation of charges . Suppose , for example, that X is a negative ion or the negative end of a dipolar molecule . When it attacks the molecule Y–Z it induces a shift of electro density is shifted to Y . If X is a neutral molecule the activated complex can be represented as ...

$$X^{\delta+} \ldots Y \ldots Z^{\delta-}$$

- While if it is negative ion the complex will be

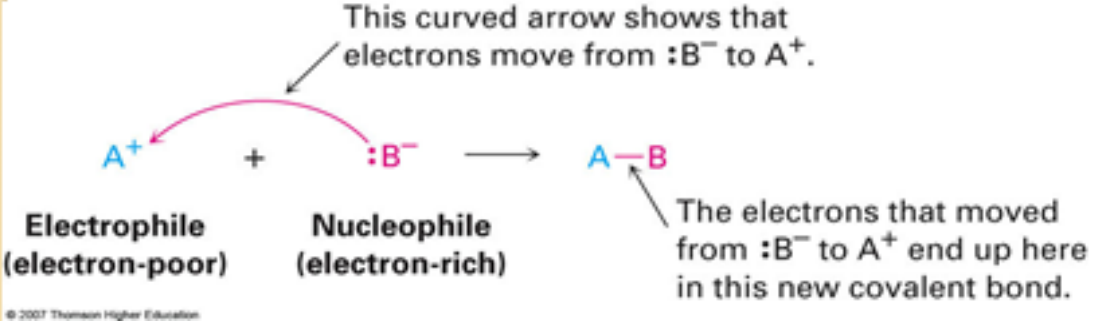
$$X^{\delta-} \ldots Y \ldots Z^{\delta-}$$

- In both cases the charge residing on Y will be small , and may be rather positive or negative . The products of reaction are the negative ion Z^- and the species X–Y .

ORGANIC SUBSTITUTION REACTIONS

Generalized Polar Reactions

- An electrophile, an electron-poor species, combines with a nucleophile, an electron-rich species
- An electrophile is a Lewis acid
- A nucleophile is a Lewis base
- The combination is indicate with a curved arrow from nucleophile to electrophile



Elementary Reaction

- Elementary Reaction : It is the chemical reaction that occur in a single stage .
- Example : $H_2 + I_2 = 2\,HI$

This reaction almost occurs by the collisions between a hydrogen molecule and an iodine molecule , to give a complex which dissociates directly into two molecules of hydrogen iodide . Such a process is spoken of as an elementary reaction .

- The reaction between hydrogen and bromine , on the other hand , occurs not directly but in a number of stages , such as ..

(1) $Br2 \longrightarrow 2\,Br$

(2) $Br + H2 \longrightarrow HBr + H$

HYDROLYSES OF ALKYL HALIDES

Prof. Sanaa Taher Arab

By: Maha Saud AL-subyi.
Chemistry Department, Faculty of Sciences for girls, King Abdul-Aziz University, Jeddah – KSA

HYDROLYSES OF ALKYL HALIDES

- The hydrolyses of alkyl halides-RX- represent the simplest group of organic substitution reactions.
- Hydrolyses may occur by reaction with a water molecule or a hydroxide ion, both of which are nucleophilic reagants; there is therefor the possibility of both SN1 and SN2 reactions.

00009132 سناء ط. سعيد عرب
الفصل الدراسي الثاني 2013
May 25, 2013 07:48 AM

تقرير تفصيلي لمكونات درجة اعمال السنة

خصائص المقررات	
اسم المقرر:	الكيمياءالحركية
المقرر:	CHEM 641 - FA
CRN(الرقم المرجعي للمقرر)	30340
الطلاب المسجلون:	2

م	الرقم الجامعي	الاسم	Exam الامتحان الاول 1 (20)	Exam الامتحان 2 الثاني (20)	Activities- النشاط (20)	Total المجموع (60)
1	1200727	دلال ابراهيم محسن المسعودي	17	18.5	19	54.5
2	1200747	مها سعود محمد السبيعي	17.5	18	19.5	55

00009132 سناء ط. سعيد عرب
الفصل الدراسي الثاني 2013
May 25, 2013 07:48 AM

تقرير تفصيلي لمكونات الدرجة النهائية

م	الرقم الجامعي	الاسم	Total المجموع (60)	الامتحان النهائي (40)	المجموع الكلي (100)
1	1200727	دلال ابراهيم محسن المسعودي	54.5	36.5	91
2	1200747	مها سعود محمد السبيعي	55	35	90

PART V

INSTRUCTOR REFLECTION (optional)

1. This course is to continue the previous course in kinetics chemistry (344) , which is important in explaining the mechanism of chemical reactions.
2. Kinetics chemistry is the branch of chemistry which is followed the reaction from the beginning to the end of the reaction to give options to describe the reaction way .
3. The students were exceptionally diligent and hard working. They show good ability and hardworking during the course study . They were deep perspective for getting answers for scientific questions. The student were characterized by accuracy and honesty. They were very good at working with each other.
4. The obtained results of the students were **EXCELLENT**, their respond was very good .

Part V. Instructor Reflections on the Course

- Instructor feedback and reflections
- Propose future improvement and enhancement
- Evaluate student competency and reflect on their course evaluation for improvements to the course
- Conceptual map of relationships among the content, objective, and assessment
- Recent trends and new approaches to teach the course.

COURSE PORTFOLIO

CHECKLIST

- ✓ **TITLE PAGE**
- ✓ **COURSE SYLLABUS**
- ✓ **COURSE RELATED MATERIAL**
- ✓ **EXAMPLES OF EXTENT OF STUDENTLEARNING**
- ✓ **INSTRUCTOR REFLECTION ON THE COURSE**