Tutorial letter 101/3/2016

General Chemistry 1 B

CHE1502

Semesters 1 & 2

Department of Chemistry

IMPORTANT INFORMATION:

This tutorial letter contains important information about your module.

BAR CODE

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1 INTRODUCTION

Dear Student

We take great pleasure in welcoming you as a student of the module General Chemistry 1B. This module deals with introductory principles and fundamental aspects of Organic Chemistry. We trust that you will find this module both interesting and rewarding and that you will have a successful academic semester.

The CHE1502 module is a **semester module** and is offered during each of the January-June and July-December semesters.

Check your registration papers now to make sure for which semester you are registered. Call the lecturer if in doubt or check on myUNISA.

It is very important to start studying immediately and to do your assignments properly. This tutorial letter contains important information to facilitate your studies. Please read it carefully and keep it for future reference.

1.1 myUnisa

It is important that you have access to the internet. You can gain access to the university's online learning portal, **myUnisa**, at http://my.unisa.ac.za.

You must be registered on (http://my.unisa.ac.za) to be able to submit assignments online, complete the online assignment, gain access to the library functions and various learning resources, download study material, communicate with your lecturer and fellow students about your studies and the challenges you encounter, and participate in online discussion forums. myUnisa provides additional opportunities to take part in activities and discussions of relevance to your module topics, assignments, marks and examinations. It is important to access myUnisa on a regular basis.

1.2 Tutorial matter

A TUTORIAL LETTER IS OUR WAY OF COMMUNICATING WITH YOU ABOUT TEACHING, LEARNING AND ASSESSMENT.

You will receive a number of tutorial letters during the semester.

An **"INVENTORY FOR THE CURRENT ACADEMIC YEAR"**, which lists the tutorial matter for the 2016 academic year, will be distributed to each student.

The Department of DESPATCH will provide students with the following:

- Tutorial Letter 101 for the CHE1502 module
- Study guide for the CHE1502 module

- Tutorial Letter 301
- The solutions to the assignments which will be sent out after the relevant closing dates.

Tutorial Letter 101 contains the assignments and assessment criteria as well as instructions on the preparation and submission of the assignments. Furthermore, it also provides all the information with regards to the resources and certain general and administrative information for this module. This tutorial letter should be consulted when working through the study material, preparing the assignment(s), preparing for the examination and addressing questions to your lecturer.

R**ead all the tutorial letters** upon receipt during the semester **immediately and carefully**, as these always contain important and, sometimes, urgent information.

Additional tutorial letters will be forwarded to students during the semester, where applicable.

The system used for numbering tutorial letters is explained in the brochure: ***"my Studies***

***@ Unisa 2016*"**, included in the study package.

Some of the tutorial matter may not be available when you register. Tutorial matter that is not available when you register will be posted to you as soon as possible, but is also available on *my*Unisa.

PLEASE NOTE: Your lecturers cannot help you with missing study material.

You can view the study guides and tutorial letters for the modules for which you are registered on *myUnisa* (see 1.1. above). In general, solutions may also be available on this website sooner than you will receive them in the post. We therefore advise you to access the website from time to time if possible. Note that you need to register on myUnisa.

Take note that the brochure "**my Studies @ Unisa 2016**", which you have received with your study material, contains an A–Z guide of the most relevant study information.

2 PURPOSE OF AND OUTCOMES FOR THE MODULE

2.1 Purpose

The purpose of the CHE1502 module is to equip learners with basic insight into the fundamental concepts in organic chemistry as well as the nomenclature, nature and reactivity of hydrocarbons, alkyl halides and alcohols and ethers and their stereochemistry as well as the structure, properties and nomenclature of amines, ethers and carbonyl compounds (aldehydes, ketones, carboxylic acids and derivatives).

2.2 Outcomes

The Learning outcomes of the General Chemistry 1B module are to demonstrate an understanding of the terminology and basic aspects in introductory organic chemistry on topics such as fundamental concepts in organic chemistry; the structure, properties, nomenclature and

reactions of alkanes, alkenes, alkynes, alkyl halides, alcohols and ethers and the structure, properties, nomenclature and behaviour of amines, aldehydes, ketones, carboxylic acids and carboxylic acid derivatives.

Upon completion, the student should describe and apply

- the basic concepts related to molecules and ions to illustrate properties, behaviour and reactivity.
- the IUPAC nomenclature rules
- concepts, properties and chemical reactivity related to saturated hydrocarbons.
- the physical and chemical properties of unsaturated hydrocarbons (alkenes and alkynes).
- concepts related to various structural and stereoisomers.
- the physical and chemical properties of alcohols and ethers.
- the physical and chemical properties of alkyl halides.
- the physical and selected chemical properties of amines.
- the electronic structure, properties and reactivity of carbonyl and carboxyl compounds.

3 LECTURER(S) AND CONTACT DETAILS

3.1 Lecturer(s)

The name and contact details of the staff member responsible for tuition of the CHE1502 module are:

Prof C A Summers

Department of Chemistry

Tel No: 011 670 9306

E-mail: summeca@unisa.ac.za

Eureka Building

Office: K-M-042

Florida

1709

All queries that are related to the content of this module should be directed to your lecturer. E-mail is the preferred form of communication to use.

Students who encounter any difficulties with the content associated with the CHE1502 module should not hesitate to contact the lecturer concerned by **letter, telephone or personal visit** (**please make sure that your lecturer is free to help you by making an appointment well before the time**). Please have your study material with you when you contact the lecturer.

Please come to these appointments well prepared with specific questions that indicate your own efforts to have understood the basic concepts involved. Student numbers should always be listed on any communication

You are also free to write to me about any of the difficulties you encounter with your work for this module. If these difficulties concern exercises which you are unable to solve, you must send your attempts so I can see where you are going wrong, or what concepts you do not understand. Mail should be sent to:

Prof. CA Summers

Department of Chemistry

Private Bag x 6

Unisa (Florida Campus)

Florida

1710

South Africa

or

E-mail: summeca@unisa.ac.za

PLEASE NOTE: Letters to lecturers may not be enclosed with or inserted into assignments.

Enquiries relating to academic studies e.g. assignment marks, discussion classes and tutoring should also be directed to the lecturer responsible for this module.

3.2 Department

In the event that the lecturer is not available contact the department secretarial staff at:

Department of Chemistry
Corner of Christiaan de Wet & Pioneer Avenue
Eureka Building
Florida
1709

Office: K-M-042
Telephone: (011) 670 9318 / 9327
E-mail: chemistry@unisa.ac.za

N.B. You should **CONTACT YOUR LECTURER FIRST BEFORE** consulting another person/ office.

3.3 University

If you need to contact the University about matters not related to the content of this module, please consult the brochure, **"my Studies @ Unisa 2016"** that you received with your study material. This booklet contains information on how to contact the University (e.g. to whom you can write for different queries, important telephone and fax numbers, addresses and details of the times certain facilities are open). Student numbers should always be used when contacting the University.

General questions regarding registration may be directed to:

e-mail: Scientia@unisa.ac.za
tel: 012 441 5407
11 1 3037

4 MODULE-RELATED RESOURCES

4.1 Prescribed books

READ THIS ENTIRE SECTION CAREFULLY BEFORE BUYING THE PRESCRIBED BOOK

The prescribed book for CHE1502 module for 2016:

Organic Chemistry New Pearson International Edition, plus MasteringChemistry (R),

8 th Edition

Leroy G. Wade, *Whitman College*

August 2013, Valuepack

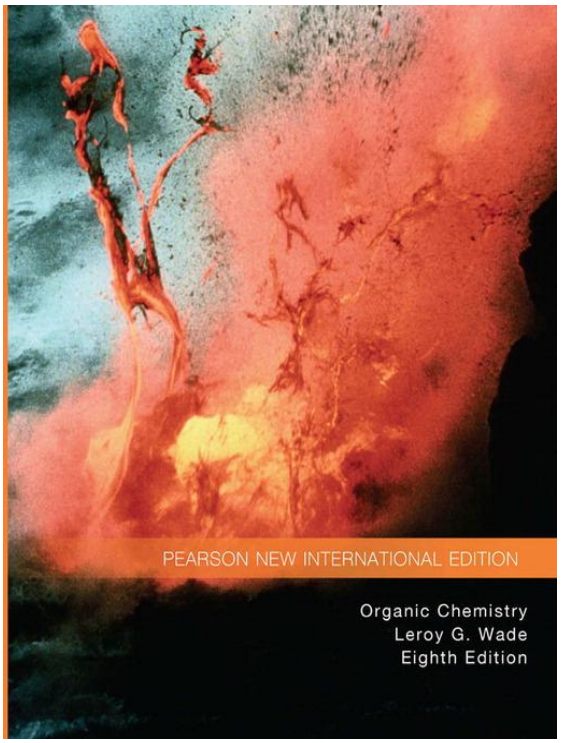
ISBN: **9781447963516**

Publisher: Pearson

IMPORTANT!!!

NB: Please ensure that you purchase the book **with MasteringChemistry® access**, as this is required to complete your assignments. The same edition is also sold without MasteringChemistry®, so please be extra careful that you do not purchase the wrong one.

Cover Page:



The UNISA chemistry pack can be purchased at the following bookshops: Van Schaiks, Protea, Juta, Armstrong and online at www.kalahari.com

The University does not provide copies of this book. Students are expected to obtain their own copies. As most of the study material for this module is included in this book, it is essential to have access to a copy.

Prescribed books can be obtained from the University's official booksellers. The list of official booksellers and their addresses can be found in the **"my Studies @ Unisa 2016"** brochure. If you have difficulty locating your book(s) at these booksellers, please contact the Prescribed Books Section at 012 429 4152 or e-mail vospresc@unisa.ac.za.

4.2 Recommended books

Students may consult any textbook titled, **Organic Chemistry**.

4.3 Electronic Reserves (e-Reserves)

There are no e-Reserves for this module

5 STUDENT SUPPORT SERVICES FOR THE MODULE

5.1 General support

For information on the various student support systems and services available at Unisa (e.g. student counseling, tutorial classes, language support), please consult the brochure, **"my Studies @ Unisa 2016"***.*

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5.2 E-Tutors

Please be informed that, with effect from 2013, Unisa offers online tutorials (e-tutoring) to students registered for modules at NQF level 5 and 6, in other words, for qualifying first year and second year modules.

Once you have been registered for a qualifying module, you will be allocated to a group of students with whom you will be interacting during the tuition period as well as an e-tutor who will be your tutorial facilitator. Thereafter, you will receive an sms informing you about your group, the name of your e-tutor and instructions on how to log onto myUnisa in order to receive further information on the e-tutoring process.

Online tutorials are conducted by qualified e-tutors who are appointed by Unisa and are offered free of charge. All you need to be able to participate in e-tutoring is a computer with internet connection. If you live close to a Unisa regional Centre or a Telecentre contracted with Unisa, please feel free to visit any of these to access the internet. E-tutoring takes place on myUnisa where you are expected to connect with other students in your allocated group. It is the role of the e-tutor to guide you through your study material during this interaction process. For you to get the most out of online tutoring, you need to participate in the online discussions that the e- tutor will be facilitating.

The University approved the Integrated Tutor Model (ITM) as a strategy for providing students with the support required for success and for enhancing their learning experience. Through this initiative, an e-tutor will be assigned to each student and activities with the e-tutor take place via the e-tutor link on the myUnisa site of this module.

There are modules which students have been found to repeatedly fail, these modules are allocated face-to-face tutors and tutorials for these modules take place at the Unisa regional centres. These tutorials are also offered free of charge, however, it is important for you to register at your nearest Unisa Regional Centre to secure attendance of these classes.

5.3 myUNISA

The myUnisa system is Unisa's online campus that will help you communicate with other students, your lecturers and the administrative departments of the University. You can quickly access resources and information at the University on the internet.

To go to the myUnisa website, start at the main Unisa website, http://www.unisa.ac.za and then click on the 'Login to myUnisa' link on the right-hand side of the screen. This should take you to the myUnisa website. You can also access myUnisa directly by typing in http://my.unisa.ac.za

You don't need to have internet at home to use myUnisa. You can use the computers free of charge at Unisa regional offices. You could even sign up for the e-mail alerts and have them routed to your cellphone, though if you are capable of that, you probably have Internet access already. On myUnisa, you will see two sites:

- The semester 1 main teaching site with the code **CHE1502-16-S1** and

  the tutoring site with the code **CHE1502-16-S1-[Group Number]S**.
- The semester 2 main teaching site with the code **CHE1502-16-S2** and

  the tutoring site with the code **CHE1502-16-S2-[Group Number]S**.

The main teaching site contains the main study material for the module. It is also the site from which I will communicate to you about various learning activities during the year, and from which I control the learning activities, including your tutorials. The tutorial site is hosted by your e-tutor and contains the tutorials and online assignments.

The module CHE1502 has an active discussion forum on myUNISA. Many resources are made available throughout the year, and these are not necessarily posted to students. We have found that students who use myUNISA regularly for this module perform much better than those who do not.

We recommend that you check in at myUNISA regularly for discussions, announcements and new resources. myUNISA is where the lecturer talks about the material, drop hints about what is and what is not important for exam purposes, set additional tasks to set you thinking more

5.2 Study Groups

Students are advised to form study groups with fellow students to discuss the content of the CHE1502 module as well as study and work together in preparation for the assignments and the examinations but each student should compile his or her own assignment answers.

5.3 Discussion Classes, Video Conference and Satellite Broadcast Sessions

The Department of Chemistry **may** schedule discussion classes, video conference and satellite broadcast sessions for the CHE1502 module during the 2016 academic year. Information about the dates, times and venues of the discussion classes, video conference and satellite broadcast sessions will be forwarded to each student in a separate tutorial letter / via myUnisa.

6 MODULE-SPECIFIC STUDY PLAN

Consult your ***my Studies*** **@** ***Unisa*** brochure for suggestions about general time management and planning skills.

Study plan

This is a semester module offered over about 15 weeks, and requires at least 120 hours of study time. This means that you will have to study at least 8 hours per week for this module.

A detailed study plan will be provided in Tutorial letter 102.

The use of molecular models is permissible (see paragraph 10 below). Molecular models are physical models that represent the orientation of and connectivity in molecules. These are useful tools for a better understanding of Organic Chemistry. Models show the nature and characteristics of the chemical bond linking atoms and are particularly useful to understand stereochemistry.

The Unisa Library has a limited number of molecular model sets available – consult the brochure, **"my Studies @ Unisa 2016",** for information on how to access the Library resources.

We may add additional information to assist you in your studies on the myUnisa website. Consult the *myUnisa* site for this module and look under 'Resources'.

You will be well on your way to success if you start studying early in the semester and resolve to do the assignment(s) properly before the specific dates below:

Semester 1

Assignment	**Due date**
01	1 March 2016
02	1 April 2016
03	29 April 2016

Semester 2

Assignment	**Due date**
01	12 August 2016
02	9 September 2016
03	7 October 2016

However, these objectives will be defeated if you do not study the relevant sections in the study resources prior to attempting the assignment and instead just page through the textbook until you find something similar and just write it down. These objectives will also be defeated if you copy from someone else or get someone else to do the assignment for you. You may seek assistance from others or discuss your studies with other students but thereafter each student must do his/her own assignment. Do not hesitate to contact the lecturer concerned if you have any problems.

6.1 Module Content.

(1) **Fundamental Concepts in Organic Chemistry:** Hybridization of carbon- sp^3, sp^2, sp; Bond polarity, dipole moment; Intermolecular forces – London dispersion forces, van der

Waals forces, dipole-dipole interaction and Hydrogen bonding; Polarity effects on solubility; Bond formation and bond breakage- Electron flow and homolytic and heterolytic; Lewis Acids and bases; Lewis structures and formal charges; Resonance structures and delocalization; Understanding the definition of electrophiles, nucleophiles and free radicals.

(2) **Alkanes and cycloalkanes:** Structure and nomenclature; Physical properties; Reactions; Mechanism for the halogenation of alkanes; Structural isomers; Conformations (Newman and Sawhorse projections)

(3) **Alkyl Halides:** Structure and nomenclature; Physical properties; Classification as primary, secondary, or tertiary alkyl halides; Stereochemistry - 3-Dimensional representations of simple organic molecules, Chirality and R- and S-configurations; Selected nucleophilic substitution reactions; Selected elimination reactions

(4) **Alcohols:** Structure and nomenclature; Physical properties; Classification of alcohols as primary, secondary, or tertiary; Stereochemistry - 3-Dimensional representations of simple organic molecules, Chirality and R- and S-configurations; Selected Reactions of alcohols: oxidation and the formation of alkyl halides, ethers and alkenes

(5) **Ethers:** Structure and nomenclature; Physical and chemical properties

(6) **Amines:** Nomenclature, classification and structure; Properties; Reactivity / basicity

(7) **Alkenes:** Structure and nomenclature; Physical properties; Geometric isomerism (cis/trans and E/Z configurations); Reactions and mechanisms of hydrohalogenation, acid catalyzed hydration and halogenation of symmetrical and unsymmetrical alkenes and the application of Markovnikov's rule; Mechanism of hydrohalogenation of unsymmetrical alkenes in the presence of peroxides (anti-Markovnikov's addition); Hydrogenation of alkenes.

(8) **Alkynes:** Structure and nomenclature; Physical properties; Reactions and mechanisms of hydration, halogenation and hydrohalogenation of symmetrical and unsymmetrical alkynes (Markovnikov's rule); Hydrogenation of alkynes; Acidity / Reactivity of terminal alkynes.

(9) **Carbonyl compounds and derivatives:** Structure and nomenclature of ketones and aldehydes; Properties and reactivity of ketones and aldehydes.

(10) **Carboxylic acids and derivatives:** Structure and nomenclature carboxylic acids and carboxylic acid derivatives (esters and amides); Properties and reactivity of carboxylic acids and carboxylic acid derivatives.

6.2 Scope of the Assignments

Assignment 1 covers **Topics (1) - (5) above.**

Assignment 1 covers revision of **selected sections of Topics (2) - (4) in 6.1,** and **selected sections of Topics (7) - (8) of 6.1,** details described**.**

Assignment 2 covers **Topics (6) - (10) in 6.1.**

A detailed study plan is provided in Tutorial letter 102.

7 MODULE PRACTICAL WORK AND WORK-INTEGRATED LEARNING

There are **no practicals** for this module.

8 ASSESSMENT

The setting of assignment questions by UNISA staff and the completion of assignments by students form essential components of the tuition functions of the Open and Distance Learning (ODL) model of education at UNISA. **Students are instructed to study the relevant sections of the work outlined in the prescribed textbook before completion of the assignment questions.**

8.1 Assessment plan

Semester 1

Assignment	Due date	Weight	Type of Assignment	Remarks
01	1 March 2016	20%	MCQ	Compulsory
02	1 April 2016	40%	Online/Written	Important.
03	29 April 2016	40%	MCQ	Important.

If you are **registered for semester 1** you will write your **final examination in May/June 2016** and qualify for this by **doing the assignments for semester 1**.

Semester 2

Assignment	Due date	Weight	Type of Assignment	Remarks
01	12 August 2016	20%	MCQ	Compulsory
02	9 September 2016	40%	Online/Written	Important.
03	7 October 2016	40%	MCQ	Important.

If you are **registered for semester 2** you will write your **final examination in October/ November 2016** and qualify for this by **doing the assignments for semester 2**.

Corrected assignments will not be returned to students. Therefore, it is advisable to make a copy of the completed assignment mark reading sheet before submitting it.A Tutorial letter containing the answers to the assignment will be posted to all students registered for this module after each assignment has been marked. The tutorial letter number will be 201, 202, etc.

Student Assessment Criteria

Within a given semester:

You need a final mark of **50%** in order **to pass** the subject with a **subminimum of 40%** on your examination mark.

The year mark and the examination mark will contribute towards your final mark as follows;

Type of assessment	Contribution to the final mark
Formative (Assignments)	20%
Summative (The final exam)	80%
Final mark	**100%**

The **Year Mark for the CHE1502 module** will be compiled as:

20% of the marks obtained for the assignment 1 plus 40% of the marks obtained for the assignment 2 plus 40% of the marks obtained for the assignment 3.

Year Mark = (0.2 x Assignment 1 Mark) + (0.4 x Assignment 2 Mark) +

(0.4 x Assignment 3 Mark)

A mark of zero will be allocated for assignments not submitted by the student.

NB. If a student obtains **40% or LESS THAN 40% IN THE EXAMINATION**, then the **YEAR MARK IS NOT TAKEN INTO ACCOUNT when the FINAL MARK IS CALCULATED** i.e. the **EXAMINATION MARK** counts **100%** towards your **FINAL MARK**.

If you qualify for a **SUPPLEMENTARY EXAM**, the **EXAMINATION MARK** counts **100%** towards your **FINAL MARK**.

Admission to the Examinations

Please note that **LECTURERS** are **NOT RESPONSIBLE** for **EXAMINATION ADMISSION**.

You will be admitted to the examination if and only if Assignment 1 reaches the Assignment Section by:

1 March 2016 if you are registered for Semester 1, or

12 August 2016 if you are registered for Semester 2

Assignment 1 is a compulsory assignment and each student registered for the CHE1502 module MUST SUBMIT THIS ASSIGNMENT.

Within a given semester, a registered student for the CHE1502 module who **submits assignment 1 before the respective due date** for the assignment **automatically qualifies to write the examination** during the specified examination period within the particular semester.

Students who are REPEATING THE MODULE must also **submit ASSIGNMENT 1** in order to be granted admission to the examination.

8.2 General assignment numbers

Assignments are numbered consecutively per module, starting from 01.

8.2.1 Unique assignment numbers

The **unique number** linked to a specific assignment with multiple choice questions must be entered on the optical mark reading sheet or the cover assignment page when the assignments are completed by each student. The unique number for each assignment is given in 8.2.2 below.

8.2.2 Due dates for assignments

The due dates for the assignments for the CHE1502 module are:

SEMESTER 1: January-June 2016:

Assignment Nr.	01	02	03
Type	Multiple choice	Online /Written	Multiple choice
Unique Number.	838537	756667	797877
Due date	1 March 2016	1 April 2016	29 April 2016
	Compulsory	Important	Important

SEMESTER 2: July-December 2016:

Assignment Nr.	01	02	03
Type	Multiple choice	Online/ Written	Multiple choice
Unique Number.	655504	787015	670504
Due date	12 August 2016	9 September 2016	7 October 2016
	Compulsory	Important	Important

Remember:

- Assignment 01 is compulsory and counts towards your year mark.
- Assignment 02 is not compulsory, but is important and counts heavily towards your year mark.
- Assignment 03 is not compulsory, but is important and counts heavily towards your year mark.

THE CLOSING DATES FOR THE ASSIGNMENTS ARE FIXED - No extensions can be granted since the assignments carry a year mark, and the solutions to the assignments are posted immediately after the closing dates. Assignments reaching us after the closing dates will contribute 0% towards the year-mark.

8.3 Submission of assignments

The format of the CHE1502 assignments involves **multiple choice questions, written questions AND online questions (via MasteringChemistry)**. There are **two multiple choice assignments and one assignment containing written and online questions per semester** for the CHE1502 module.

The format of the CHE1502 assignments is:

- **Multiple choice questions** (Assignment 1 and 3). Each question in the multiple choice assignment is allocated one mark and each multiple choice assignment consists of **30 multiple choice questions.** The answers to each multiple choice question must be entered on **optical mark reading sheets** which are provided as part of the study material.
- **Assignment 2**

  Part A: questions that must be done online on the MasteringChemistry website.

  Part B: written questions that must be done as a self assessment assignment.

Completed multiple choice assignments can be submitted via the postal service to the formal university address **or** Mobile MCQ submission **or** electronically via ***my*Unisa** learning management system of UNISA.

Completed assignments must reach the University on or before the due dates. A mark of zero will be allocated for assignments submitted by the student after the due date for submission of assignments.

Details for the completion and submission of assignments are given in the brochure:**" my Studies @ Unisa",** included in the study package.

Please make a copy of your assignment before you submit!

Assignments by post Make sure that you complete the assignment cover. If the subject or assignment number is incorrect your assignment cannot be noted as received. Each assignment must have a separate cover with its unique number. Submit one assignment per envelope. All regional offices have Unisa post boxes. Only use the SA postal services if you cannot get to a regional office.
Assignments should be addressed to: The Registrar, PO Box 392, UNISA, 0003

To submit via *myUnisa*. You can scan your optical mark reading sheet to be submitted electronically. Don't scan the assignment cover as the system will create a cover for you when you upload the assignment. Your assignment must be combined in one document. Only one document can be uploaded per assignment.

Steps for submission of an assignment via *my*Unisa:

- Go to *my*Unisa.
- Log in with your student number and password.
- Select the module.
- Click on assignments in the menu on the left-hand side of the screen.
- Click on the assignment number you wish to submit.
- Follow the instructions.

Plagiarism:

Please note: Although students may work together when preparing for the assignments, each student must write and submit his or her own individual assignment. In other words, **each student must submit his/her own ideas in their own words.** It is **unacceptable for students to submit identical assignments** on the basis **that they worked together.** That is **copying (a form of plagiarism)** and these **assignments will NOT be marked.** Furthermore, **you may be penalised or subjected to disciplinary proceedings by the University.**

8.4 Commentaries and Feedback on Assignments

You will automatically receive the answers for multiple-choice questions online. Commentaries on assignments will be sent to all students registered for this module in a follow-up tutorial letter, and not only to those students who submitted the assignments. The tutorial letter number will be 201, 202, etc. We strongly suggest that you scan myUnisa weekly for new tutorial letters.

As soon as you have received the commentaries, please check your answers. The assignments and the commentaries on these assignments constitute an important part of your learning and should help you to be better prepared for the examination.

There is no feedback to the tasks done on the MasteringChemistry site. However, you will also have detailed feedback and will be able to reflect on the assignments in discussions, question and answer sessions with tutors during tutorials.

8.5 Assignments

The assignment questions for **Semester 1 are contained in Addendum A.**
Assignment 1: pages 21–38
Assignment 2: pages 39-42
Assignment 3: pages 42-57

The assignment questions for **Semester 2 are contained in Addendum B**.
Assignment 1: pages 58–76
Assignment 2: pages 76-79
Assignment 3: pages 80–95

9 OTHER ASSESSMENT METHODS

There are no other assessment methods for this module.

10 EXAMINATION

For general information and requirements about the examinations, see the brochure: ***"my Studies @ Unisa"***.

Examination admission

Submission of the first assignment **before 1 March (Semester 1)** or **12 August (Semester 2**) will confirm your registration for that semester and provides you with admission to the examination.

NB: Please note that if you do not submit this assignment on time you will NOT be allowed to write the examination. There will be NO extensions given and NO exceptions made.

A sub-minimum of 40%
The university requires that a sub-minimum of 40% must be achieved in the examination to pass the module.

Written Examinations

The official examination for the CHE1502 module will be a **one 2-hour examination** to be written during the May-June and October/November periods for the first and second semester, respectively.

If you are not successful in the May/June or October/November exam (i.e. if you have less than 50%) you may write the supplementary exam in October/November or May/June respectively, **provided** that you obtained at least 40% for the previous exam.

This means that if you are registered for the first semester, you will write the examination in May/June 2016 and the supplementary examination will be written in October/November 2016. If you are registered for the second semester you will write the examination in October/ November 2016 and the supplementary examination will be written in May/June 2017.

Students who qualify to write the supplementary examination do not receive additional study material from Unisa. The subject content may change from one academic year to another. It is therefore your responsibility as a student to contact the responsible lecturer for guidance regarding the syllabus, examination and related information of the module. Also, consult the CHE1502 module site on myUnisa for the semester that you qualified a supplementary examination. Additional information will be posted by your lecturer to assist you with your preparation for the supplementary examination.

During the relevant semester, the Examination Section will provide you with information and notifications regarding the examination in general, examination venues, examination dates (including supplementary examination) and examination times.

Examination Paper

The **format of the examination paper** will be **multiple choice questions and written questions**. No periodic table is provided in the examination. The use of molecular models is permitted in the examination.

The **pass mark and subminimum requirement** are given in the brochure, **"*my Studies* @ *Unisa*"**.

11 FREQUENTLY ASKED QUESTIONS

The "*my Studies @ Unisa"* brochure contains an A-Z guide of the most relevant study information.

12 SOURCES CONSULTED

In the compilation of the tutorial letter, the following sources were consulted:

(1) L.G. Wade Jr., **"Organic Chemistry**", **8th edn.**, Prentice Hall Inc., Engelwood

Cliffs, New Jersey (U.S.A.)

(2) McMurry, J., **Organic Chemistry**, **6th edn.**, Brooks-Cole Publishing Company London 2004.

(3) Instructor's resources, Pearson.

13 CONCLUSION

Chemistry is not an easy subject but with regular study students can be successful. Remember, you are important to us and therefore, your lecturer is very willing and available to assist you with your course content related problems. Please feel free to contact me at any time. Best wishes.

14 ADDENDUM

ADDENDUM A: FIRST SEMESTER ASSIGNMENTS

- You are not required to memorize the actual **values of specific properties** of compounds.

- Questions which involve the **comparison of physical properties** such as boiling point, melting point, solubility etc. or the **comparison of chemical properties** such as **acidity, basicity, etc. do not require the knowledge of the actual values** related to these properties.

- You have to USE FACTORS such as **chemical structure, bonding, steric factors, etc**. to **predict trends in the property** or **compare properties – DO NOT USE ACTUAL VALUES THAT CAN BE FOUND IN TABLES IN THE TEXTBOOK**.

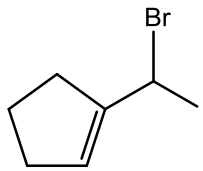
ONLY FOR SEMESTER 1 STUDENTS
ASSIGNMENT 1
DUE DATE: 1 March 2016
UNIQUE NUMBER: 838537

This assignment is a multiple choice assignment based on Section 6.1.

Please note that it is compulsory to return this assignment, as failure to do so will automatically prevent you from writing your examination at the end of your course. No late submissions will be accepted.

This assignment contributes 20% to your year mark.

1. Based on the structure of the following compound, which statement is INCORRECT?



(1) It contains a σ molecular orbital formed by the overlap of two carbon sp^3 hybrid orbitals.

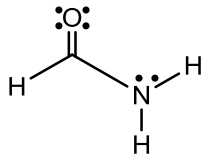
(2) It contains a σ molecular orbital formed by the overlap of one carbon sp^2 hybrid orbitals and one hydrogen sp^3 hybrid orbital .

(3) It contains a π molecular orbital formed by the overlap of two carbon p atomic orbitals.

(4) It contains a polar bond.

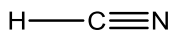
2. Which of the following DOES NOT represent the **appropriate hybridization state of the carbon atoms** in the structures shown below?

(1)



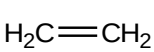
; sp^3 hybridized

(2)



; sp hybridized

(3)



; sp^2 hybridized

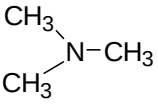
(4)

; sp^3 hybridized

3. Which of the following pairs of compounds are constitutional isomers?

(1) $ClCH_2CH_2CH_3$ and $CH_3CH_2CH_2Cl$

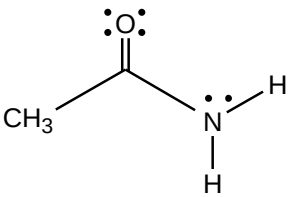
(2)

$CH_3CH_2CH_2NH_2$ and 

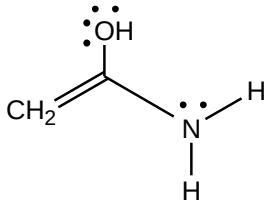
(3) $CH_3CH_2CH_2CH_3$ and $(CH_3)_2CHCH_2CH_3$

(4) $CH_3CH_2OCH_2CH_3$ and $CH_3CH_2CH_2OH$

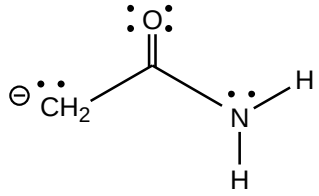
4. Which of the following structures is another resonance form of the following organic molecule?



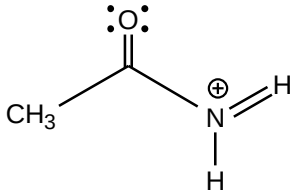
(1)



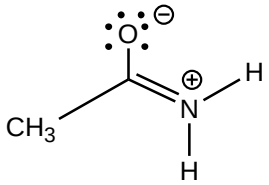
(2)



(3)



(4)



5. Arrange the following in order of increasing Bronsted basicity (weakest first):

1. NH_3 2. ^{-}OH 3. Cl 4. H_2O

(1) 1<2<3<4

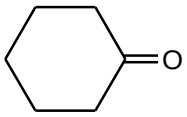
(2) 4<1<3<2

(3) 3 <4< 1<2

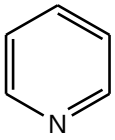
(4) 4<1<2<3

6. Which of the following compounds is NOT a Lewis base

(1)



(2)



(3)

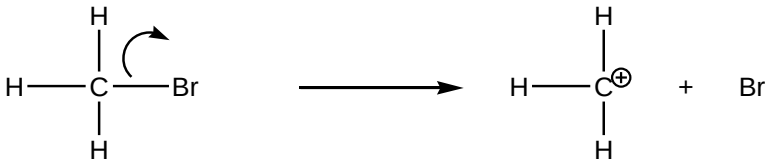
BCl_3

(4)

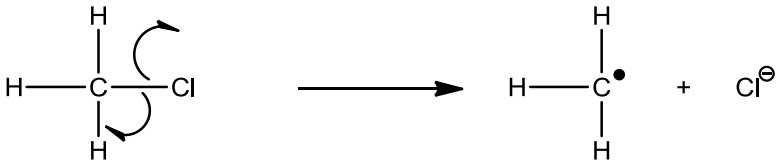
CH_3OH

7. Identify the CORRECT process of bond breaking below:

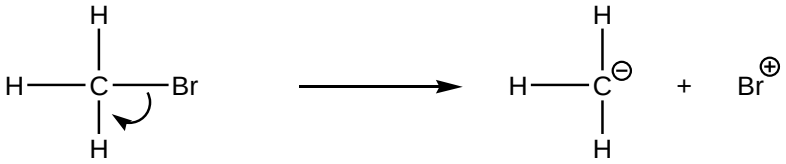
(1)



(2)



(3)



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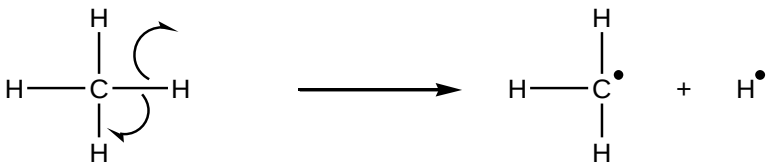
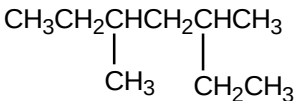


8. Name the following compound according to the IUPAC rules.



(1) 5-ethyl-3-methylhexane

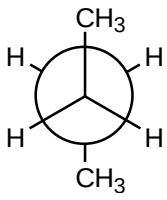
(2) 3,5-dimethylnonane

(3) 2-ethyl-4-methylhexane

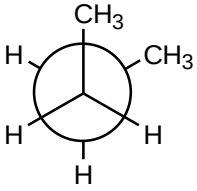
(4) 3,5-dimethylheptane

9. Which of the following pairs of drawings represent the identical conformations of the same compound?

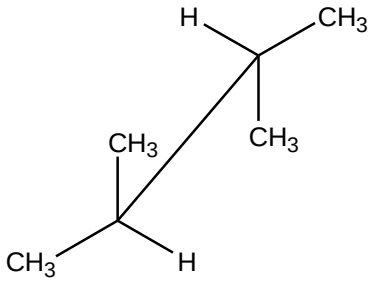
(1)



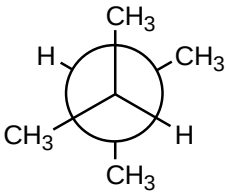
and



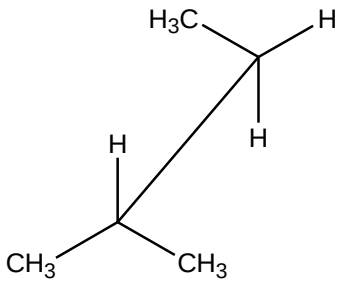
(2)



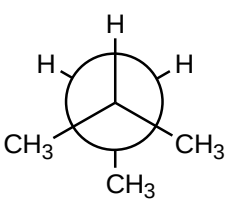
and



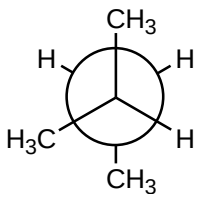
(3)



and



(4)



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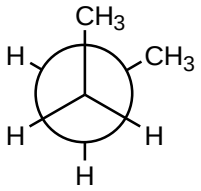
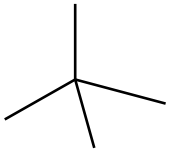
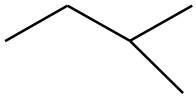


10. Which of the following molecules has the MOST 1^{o} hydrogens?

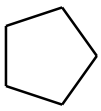
(1)



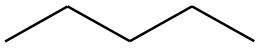
(2)



(3)



(4)



11. The reaction of chlorine with butane in the presence of light gives primarily 2-chlorobutane and not 1- chlorobutane as the reaction product because:

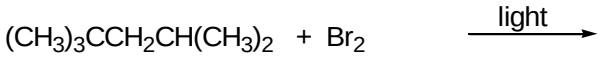
(1) butane easily forms free radicals

(2) secondary free radicals are more stable than primary free radicals

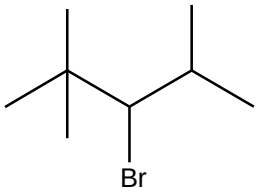
(3) chlorine reacts faster with butane than any other alkane

(4) chlorine forms reactive free radicals.

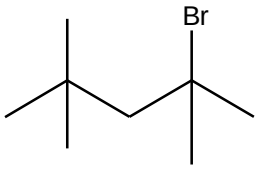
12. What is the major monosubstituted organic product formed in the following reaction:



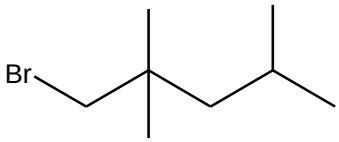
(1)



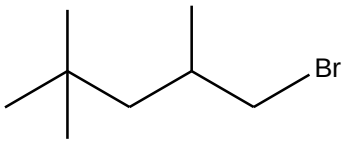
(2)



(3)



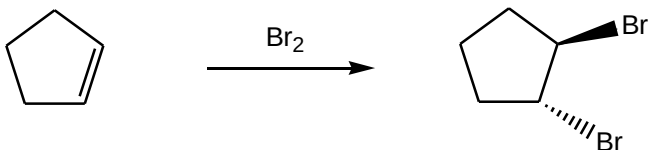
(4)



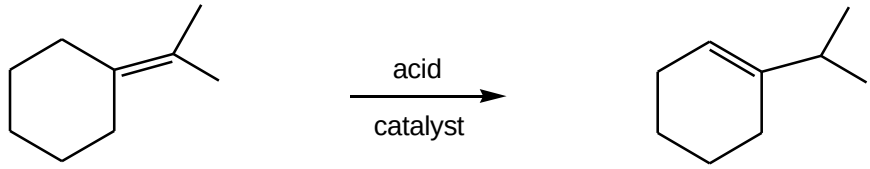
13. Identify the substitution reaction below

(1)

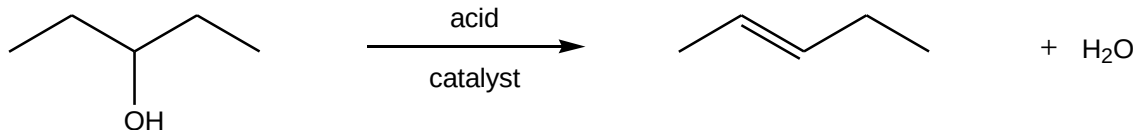
(2)



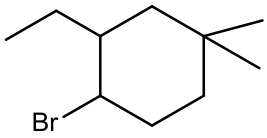
(3)



(4)



14. Name the following compound according to the IUPAC rules.



(1) 1-bromo-2-ethyl-4,4-dimethylcyclohexane

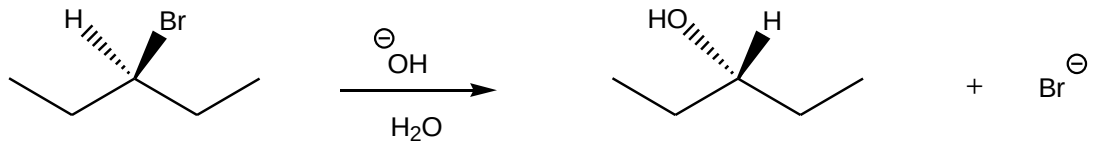
(2) cyclo-4-bromo-2-ethyl-1,1-dimethylhexane

(3) 4,4-dimethyl-1-bromo-2-ethylcyclohexane

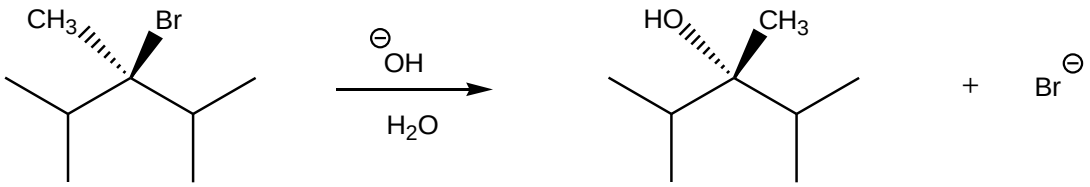
(4) 4-bromo-5-ethyl-1,1-dimethylcyclohexane

15. Consider the following nucleophilic substitution reactions. Which reaction will take place THE FASTEST?

(1)

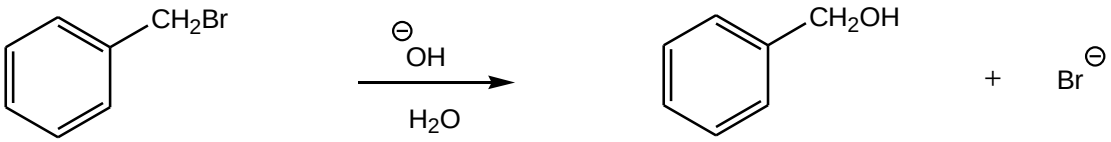


(2)



(3)

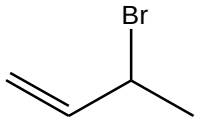
(4)



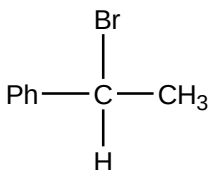
16. Alkyl halides may undergo nucleophilic substitution reaction according to the following reaction:

Which compound produces the LEAST STABLE REACTION INTERMEDIATE under these conditions?

(1)



(2)



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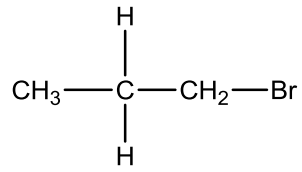
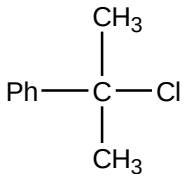
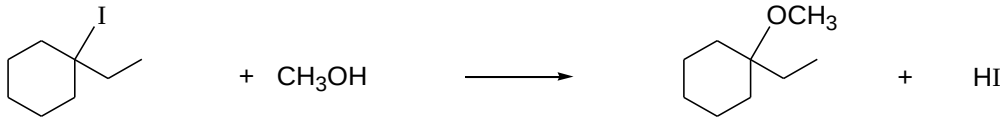


(4)

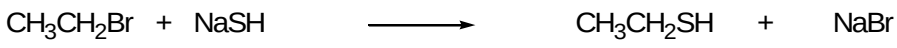


17. Which of the following reactions DOES NOT proceed via an S_N2 reaction mechanism?

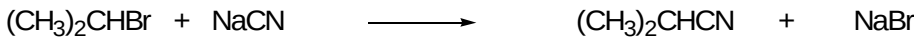
(1)



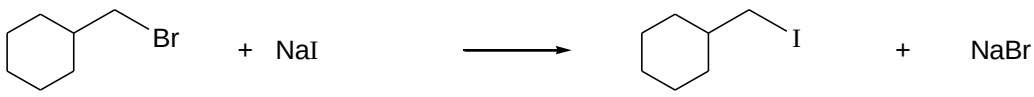
(2)



(3)



(4)



18. Which of the compounds is MOST likely to react as a nucleophile in an S_N2-type reaction?

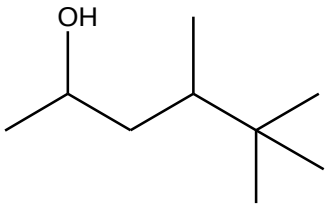
(1) H_2O

(2) CH_3Cl

(3) CH_3COOH^-

(4) PhS^-

19. Name the following compound according to the IUPAC rules.



(1) 2,2,3-trimethylhexan-5-ol

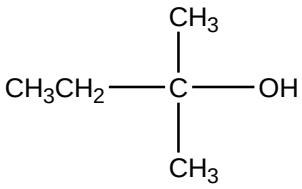
(2) 4,5,5-trimethylhexan-2-ol

(3) 1,1,1,2-tetramethylpentan-4-ol

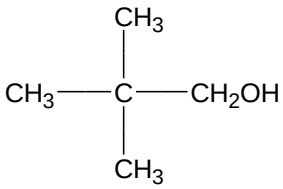
(4) 4,5,5,5-tetramethylpentan-2-ol

20. Which of the following molecules is classified as a tertiary alcohol?

(1)



(2)



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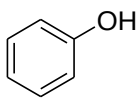

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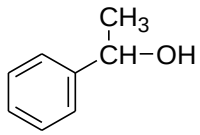
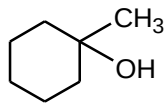
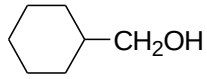


21. Alcohols undergo dehydration in the presence of a strong acid. Which of the following alcohols undergoes dehydration at the FASTEST rate?

(1)



(2)



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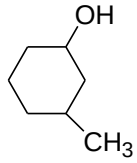

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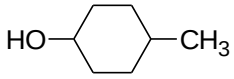
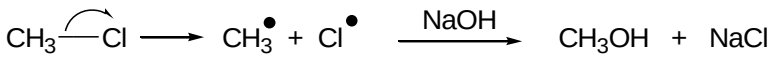
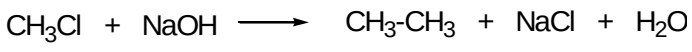


22. Which of the following indicates the CORRECT mechanism for a nucleophilic substitution reaction?

(1)



(2)



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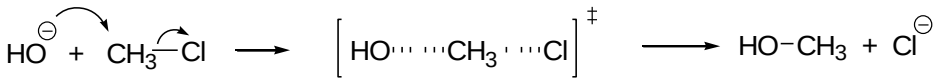

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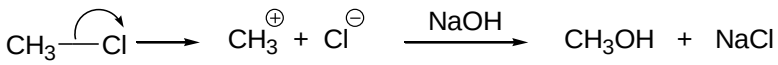
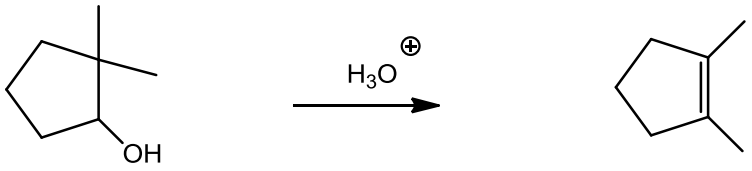
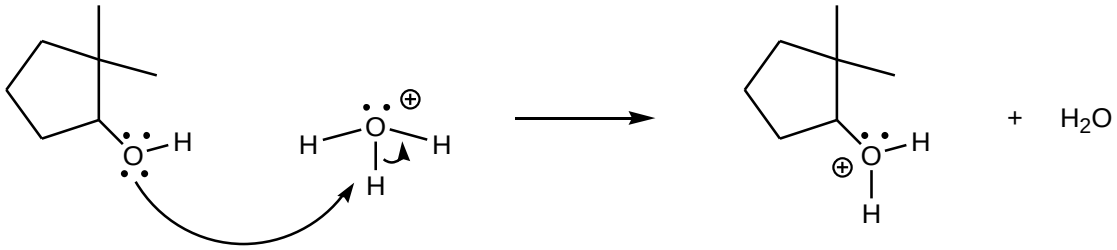


23. Consider the following reaction:

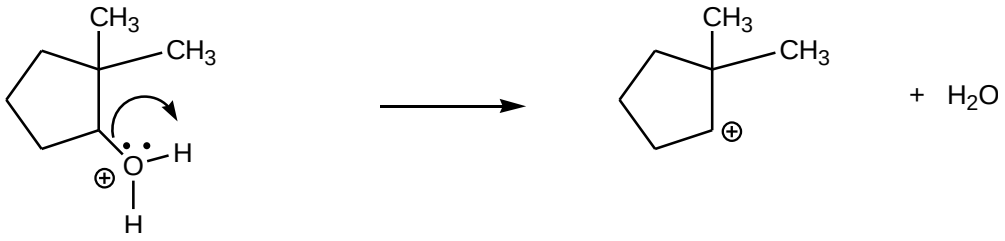


Which step is LEAST LIKELY to occur in the reaction mechanism?

(1)



(2)



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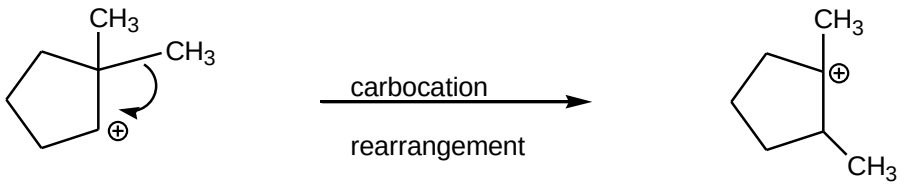
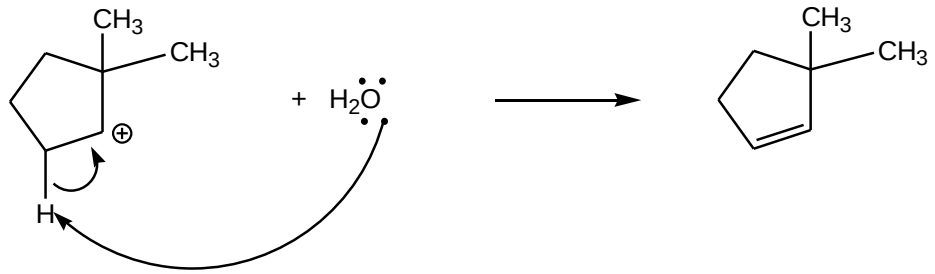
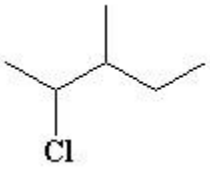


(4)

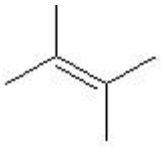


24. Which of the following has the highest boiling point?

(1)



(2)



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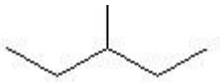


(4)

25. Which of the following molecules has a chiral (asymmetric) carbon atom?

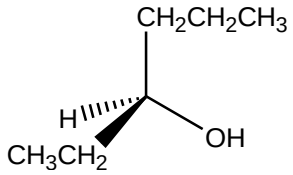
(1) 3-Bromopentane

(2) 2-butanol

(3) cyclopentanol

(4) 2-Methylpropane

26. The absolute configuration of a chiral carbon is defined as R- or S- according to the Cahn-Ingold-Prelog rules. What is the name for the following compound?



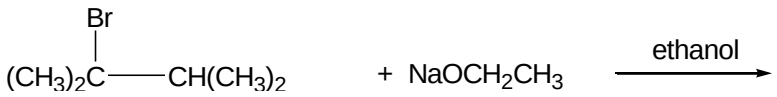
(1) (R)-hexan-3-ol

(2) (S)-hexan-3-ol

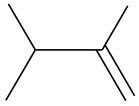
(3) (S)-1-ethylbutan-1-ol

(4) (R)-hexan-4-ol

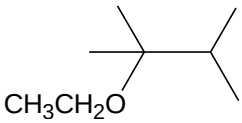
27. What is the major organic product formed in the following reaction?



(1)



(2)



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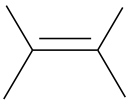

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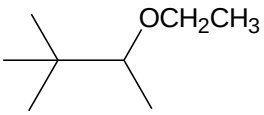
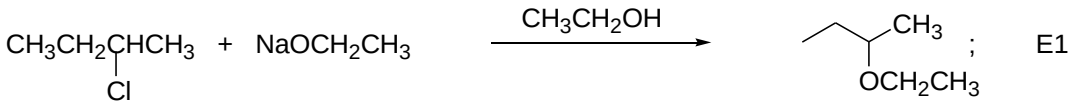
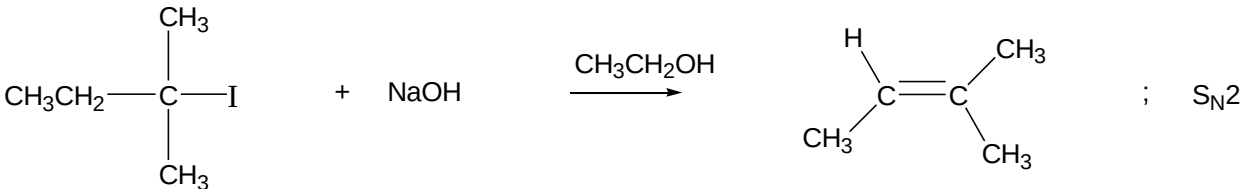


28. Which of the following reactions is CORRECT as indicated by the major products formed and the mechanism for the reaction?

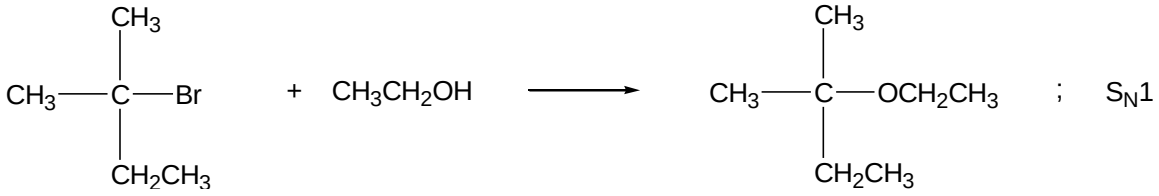
(1)



(2)



(3)



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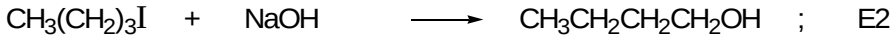
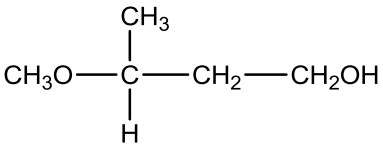


29. Name the following compound according to the IUPAC nomenclature:



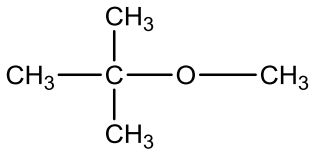
(1) 3-methoxybutan-1-ol

(2) 1,3-dioxy-3-methylbutane

(3) methyl-4-hydroxybutyl ether

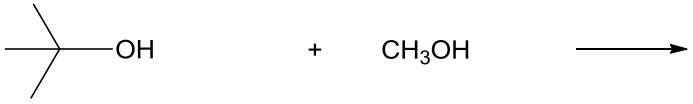
(4) 2-methoxybutan-4-ol

30. Which reaction is the most appropriate to prepare the following compound?

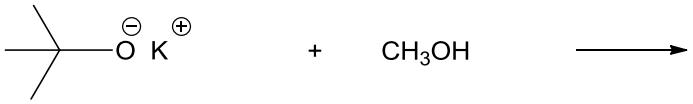


(1)

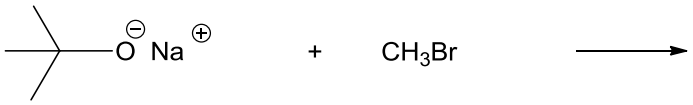
(2)



(3)



(4)



TOTAL [30]

ONLY FOR SEMESTER 1 STUDENTS
ASSIGNMENT 2
Due Date: 1 April 2016
Unique number: 756667

The assignment consists of two parts:

PART A: consists of online tasks based on Section 6.2.
PART B: consists of written questions

Please note that it is important to complete this assignment.
This assignment contributes 40% to your year mark.

PART A must be completed online on the MasteringChemistry® site.

PART B : written questions- a self-assessment assignment

PART A:
IMPORTANT:

You will need two codes to access to MasteringChemistry and to do the assignment. The first code is the **access code**, which you got when you bought the textbook, and the second is the **course code**, which is given below:

To access MasteringChemistry, you must use the **access code** that came with the textbook that you bought.

Once you have the access code and have finished registering for MasteringChemistry and already have access to MasteringChemistry, then, you need to locate the course by entering the **course code**: **CHE1502S12016**

Any changes to the above will be announced on myUnisa, so it is important to check for announcements regularly.

Once the due date for assignment 2 has passed, your mark on MasteringChemistry® will be automatically transferred to the Unisa assignment system.

You may complete the online tasks at your own pace, provided that you have completed all tasks by the due date. Your final mark for assignment 2 will be determined by your performance on the tasks that you have done on MasteringChemistry®.

THE DETAILS OF THIS ASSIGNMENT CAN BE FOUND ON myUnisa. (Go to the CHE1502 announcements)

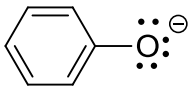
IF YOU HAVE ANY QUESTIONS REGARDING THIS ASSIGNMENT, PLEASE POST YOUR QUESTIONS ON THE myUnisa CHE1502 DISCUSSION FORUM IN THE FORUM CALLED ASSIGNMENT 2.

PART B QUESTIONS

1. Draw the Lewis structure for a molecule with molecular formula CH_2O_2.

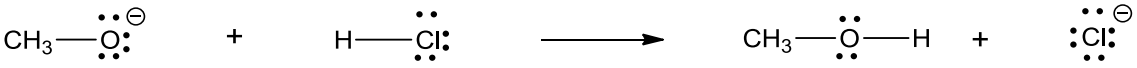
(2)

2. Draw the important resonance forms to show the delocalization of charges in the following structure. Indicate the movement of electrons with curved arrows.



6)

3. In the reaction below, label the reactants as Lewis bases (nucleophiles) or Lewis acids (electrophiles). Use curved arrows to show the movement of electron pairs in the reactions. Draw any nonbonding electrons (NOT ILLUSTRATED IN THE REACTION) to show how they participate in the reactions.



(4)

4. Draw the structural formulas of four alkanes which are structural (constitutional) isomers having a molecular formula of C_6H_{14}. Provide the IUPAC name for each compound.

(16)

5. Consider the compound with the proposed name: 4-methylhept-5-ol-2-yn

(a) Draw the structure of the compound that is consistent with the proposed name given above.

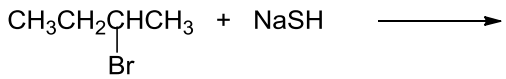
(2)

(b) Explain what is wrong with the name provided (state each violation of the IUPAC nomenclature rules and give the correct IUPAC name for the compound.

(4)

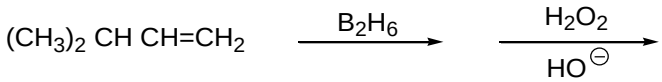
6. Draw the structures for MAJOR product of each reaction/ reaction sequence shown below:

(a)

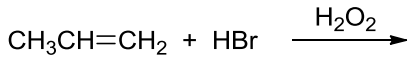


(b) The acid catalyzed hydration of 2-methyl-2-butene?

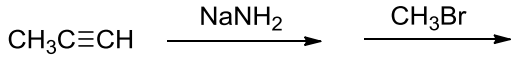
(c)



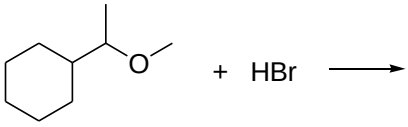
(d)



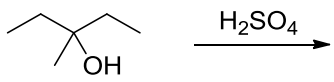
(e)



(f)



(g)



7 x (2) = (14)

7. Give the detailed reaction mechanism for the reactions shown in:

(i) Question 6 (a) (3)

(ii) Question 6 (b) (4)

(iii) Question 6(d) (4)

(iv) Question 6 (e) (4)

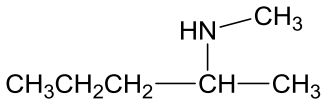
8. Draw the Newman projections for the different conformations of $CH_3CH_2CH_2CH_3$ by viewing along the bond connecting C-2and C-3. Label the conformations.

(6)

ONLY FOR SEMESTER 1 STUDENTS
ASSIGNMENT 3
Due Date: 29 April 2016
Unique number: 797877

This assignment is a multiple choice assignment based on section 6.3.
Please note that it is important to return this assignment.
This assignment contributes 40% to your year mark.

1. Name the following compound according to the IUPAC rules.



(1) 2-nitromethylpentane

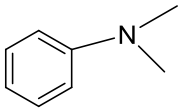
(2) N-methylpentan-4-amine

(3) N-methylpentan-2-amine

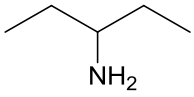
(4) 2-methylaminopentane

2. Which of the following compounds is a secondary amine?

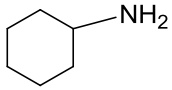
(1)



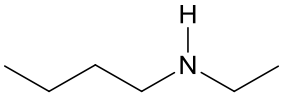
(2)



(3)



(4)



3. Arrange the following in order of increasing basicity (weakest first)

I $CH_3CH_2NH_2$ II $(CH_3CH_2)_3N$ III $(CH_3CH_2)_2NH$ IV $(CH_3CHCH_3)_3N$

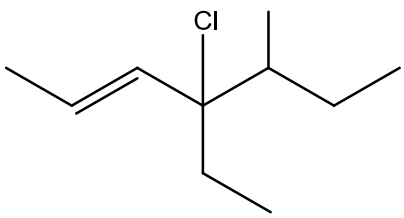
(1) IV<II<III<I

(2) II<III<I<IV

(3) I<III<II<IV

(4) IV<III<I<II

4. Name the following compound according to the IUPAC rules.



(1) 3-chloro-2,3-diethyl-1,4-hex-4-ene

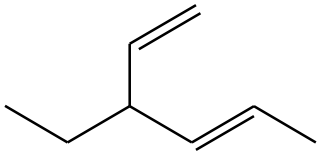
(2) 4-chloro-4-ethyl-5-methylhept-2-ene

(3) 4-chloro-4-ethyl-3-methylhept-5-ene

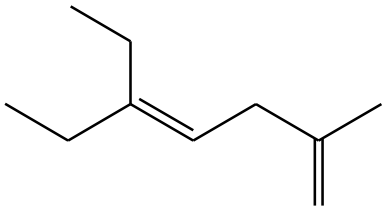
(4) 4-chloro-4,5-diethylhex-2-ene

5. Which of the following structures contains ONLY *trans* double bonds?

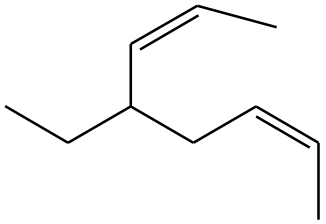
(1)



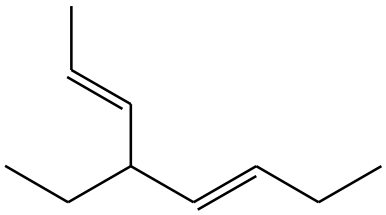
(2)



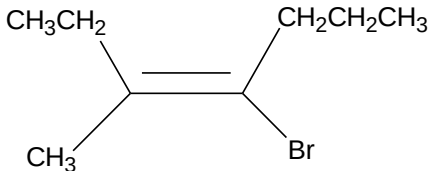
(3)



(4)



6. Name the following compound according to the IUPAC rules.



(1) (E)-4-bromo-3-methylhept-3-ene

(2) **(**E)-3-bromo-2-ethylhex-2-ene

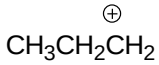
(3) *cis*-4-bromo-3-methylhept-3-ene

(4) (Z)-4-bromo-5-methylhept-4-ene

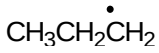
7. Which of the following intermediates is formed during the reaction of propene with HBr in the presence of H_2O_2?

(1)

(2)

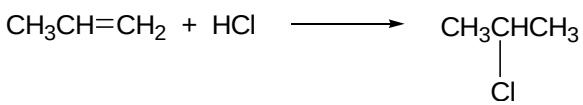


(3)



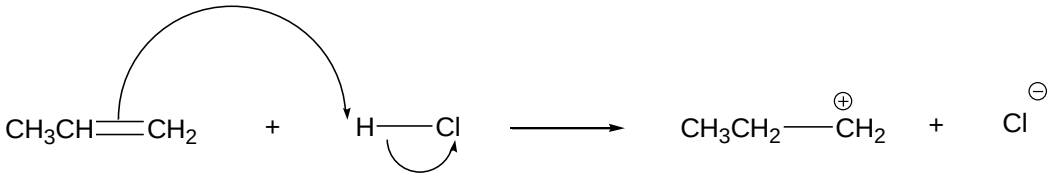
(4)

8. Consider the following reaction:

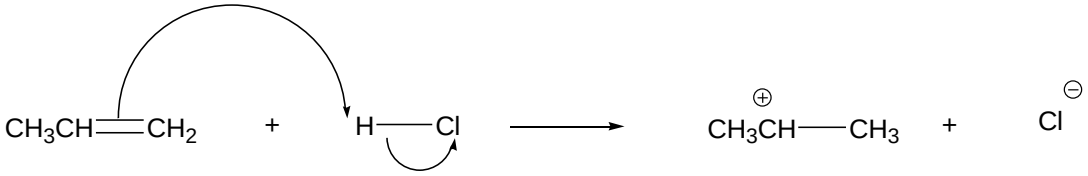


The correct step in the reaction mechanism is:

(1)

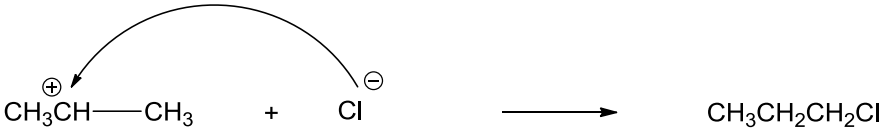


(2)

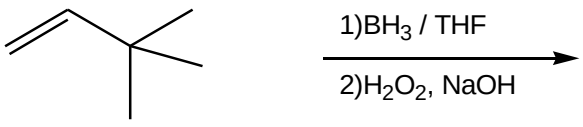


(3)

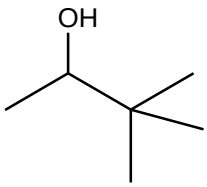
(4)



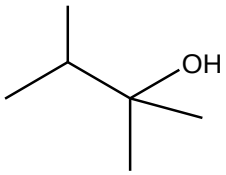
9. What is the major organic product formed in the following reaction?



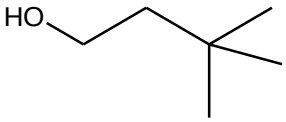
(1)



(2)

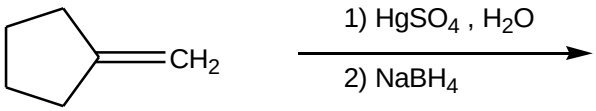


(3)

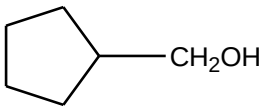


(4)

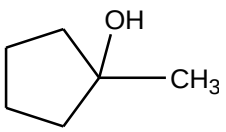
10. What is the major organic product formed in the following reaction?



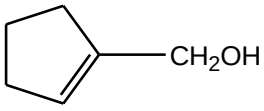
(1)



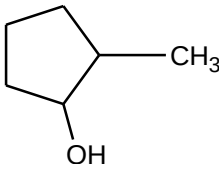
(2)



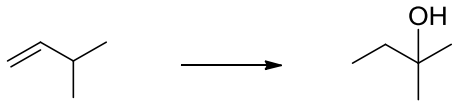
(3)



(4)



11. Which of the following reaction conditions will be the best method to achieve the following conversion?



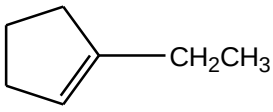
(1) Hg^{+2}/H_2O, then $NaBH_4$

(2) $NaBH_4$, then KOH

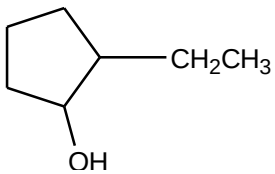
(3) B_2H_6, then H_2O_2 | NaOH

(4) H_2SO_4 | H_2O

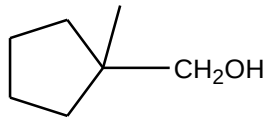
12. Which of the following alcohols is produced by the acid catalyzed hydration of the following compound?



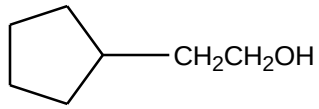
(1)



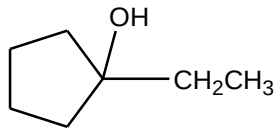
(2)



(3)

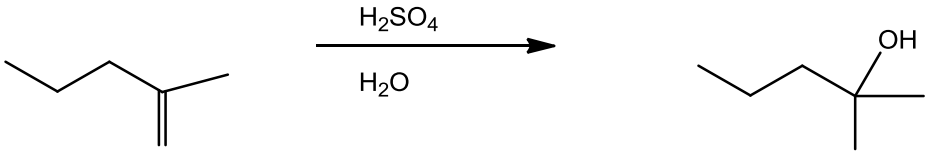


(4)

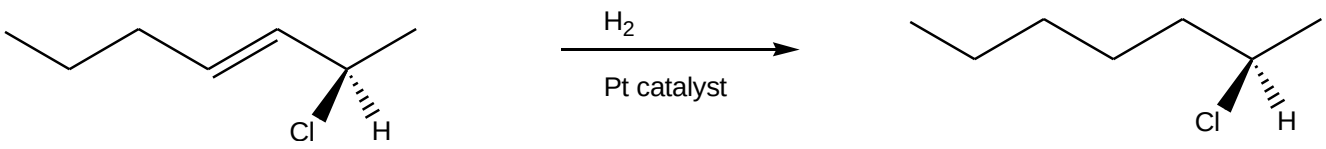


13. Which of the following reactions does NOT produce the product as shown?

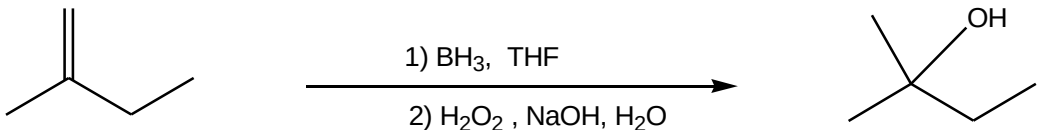
(1)



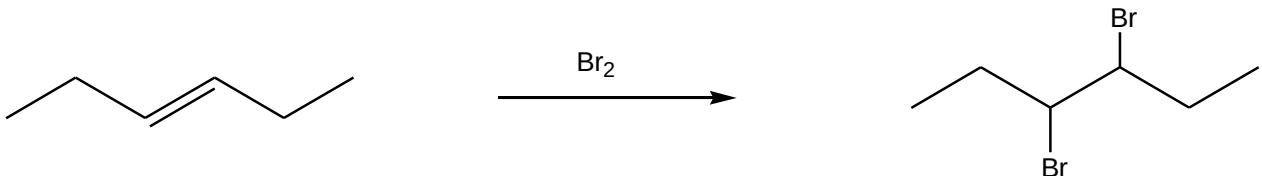
(2)



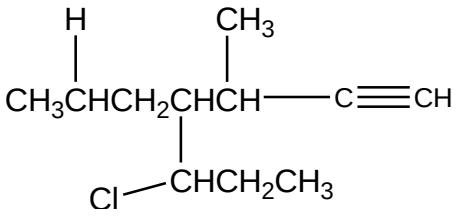
(3)



(4)



14. Name the following compound according to the IUPAC rules.



(1) 3-chloro-5-methyl-4-propylhept-6-yne

(2) 4-(1-chloropropyl)-5-methylhept-1-yne

(3) 5-chloro-3-methyl-4-propylhept-1-yne

(4) 3-methyl-4-(1-chloropropane)hept-1-yne

15. Among the compounds water, but-1-yne, but-2-yne, and ethane, which are stronger acids than ammonia?

(1) but-1-yne and ethane

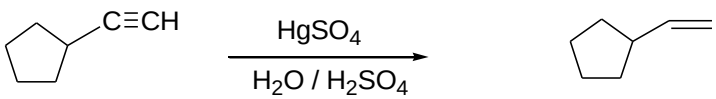
(2) water and but-1-yne

(3) water and ethane

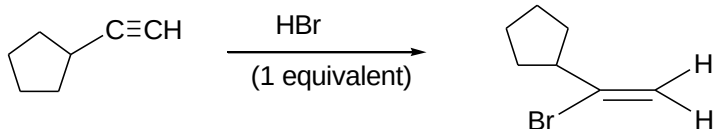
(4) but-1-yne and but-2-yne

16. Which of the following reactions yield the final product as shown?

(1)



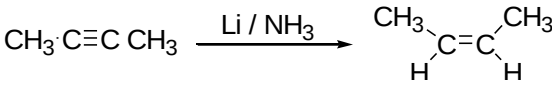
(2)



(3)

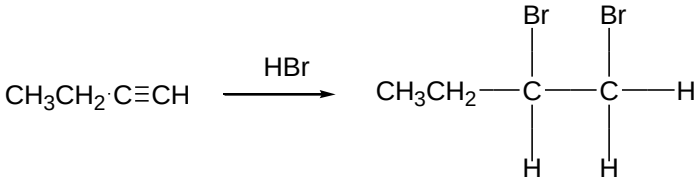
3-Heptyne + excess hydrogen + Pt catalyst → (*Z*)-2-heptene

(4)

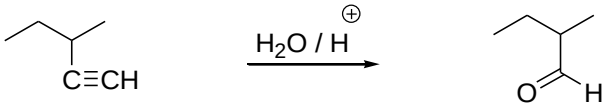


17. Alkynes undergo addition reactions because they contain weak π bonds. Which of the following reactions will take place?

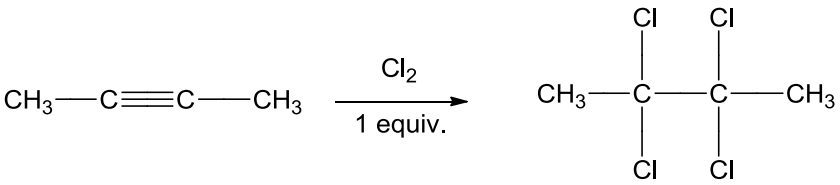
(1)



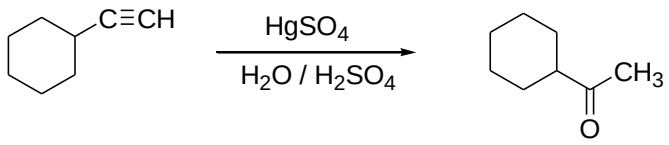
(2)



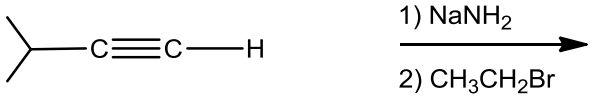
(3)



(4)

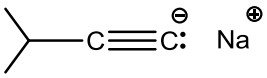


Consider the following reaction sequence TO ANSWER questions 18 and 19 below:

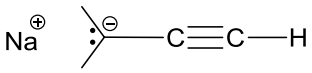


18. What is the structure of the major organic species formed in STEP 1?

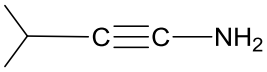
(1)



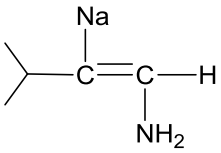
(2)



(3)

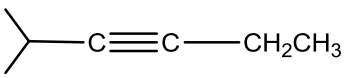


(4)

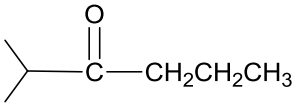


19. What is the structure of the major organic product in the reaction sequence?

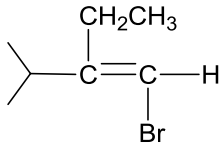
(1)



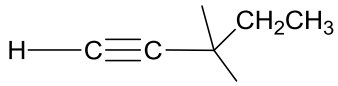
(2)



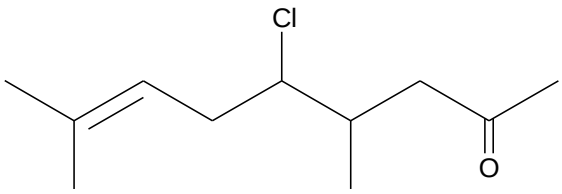
(3)



(4)



20. Name the following compound according to the IUPAC rules:



(1) 4-chloro-1,1,5-trimethyloct-1-en-7-one

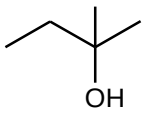
(2) 5-chloro-2,6-dimethylnon-2-en-8-one

(3) 5-chloro-4,8-dimethylnon-7-en-2-one

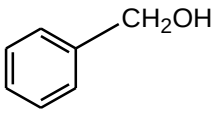
(4) 5-chloro-4-methyl-6-isobutenylhexan-2-one

21. Which of the following alcohols is NOT oxidized to a ketone by chromic acid?

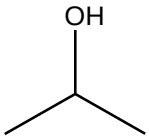
(1)



(2)



(3)

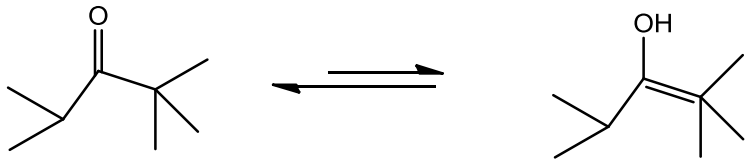


(4)

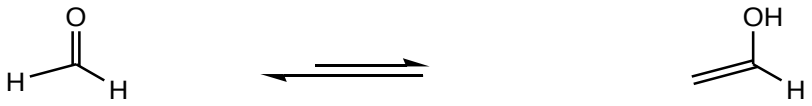
CH_3CH_2OH

22. Which of the following represents keto-enol tautomerIsm?

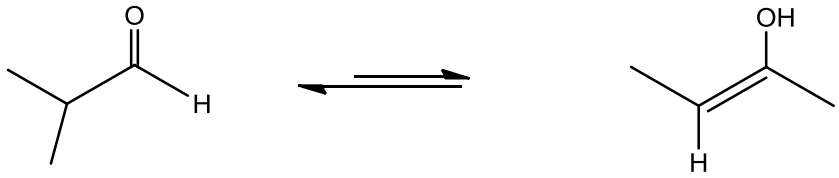
(1)



(2)



(3)



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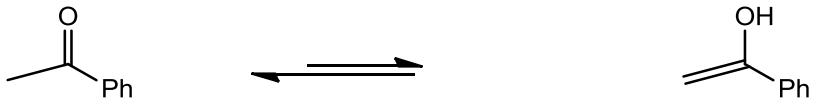


23. Which of the following represents the correct ranking in terms of increasing solubility in water?

(1) 1-propanol < 1-butene < propanal

(2) 1-butene < propanal < 1-propanol

(3) 1-butene <1-propanol = propanal

(4) 1-butene < 1-propanol < propanal

24. Rank the following compounds in order of their tendency to undergo nucleophilic addition reaction (i.e, start with the compound that reacts the slowest with a nucleophile):

I $CH_3COCH_2CH_3$ II H_2CO III Cl_3CCHO IV CH_3CH_2CHO.

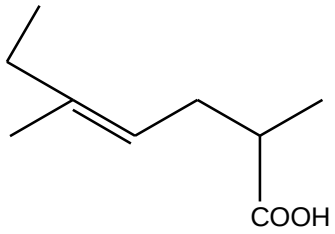
(1) II < III < I < IV

(2) I < IV < II < III

(3) III < I < IV < II

(4) I < II < III < IV

25. Name the following compound according to the IUPAC rules.



(1) 5-ethyl-2-methylhex-4-enoic acid

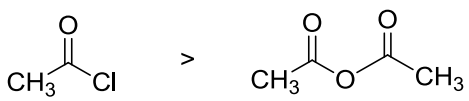
(2) 6-carboxy-3-methylhept-3-ene

(3) 2,5-dimethylhept-4-enoic acid

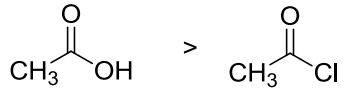
(4) 2-ethyl-5-methylhex-2-enoic acid

26. The order of reactivity of carboxylic acids and their derivatives with nucleophiles is:

(1)



(2)



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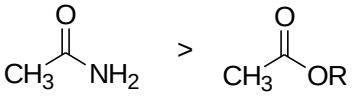

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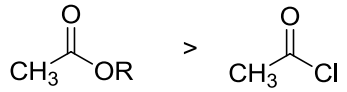


27. Which of the following compounds is the strongest acid?

(1)

CH_3OCH_2COOH

(2)

$(CH_3)_2CHCOOH$

(3)

$NO_2\text{-}CH_2COOH$

(4)

CH_3CH_2COOH

28. Amides are less basic than amines because:

(1) the nitrogen does not have a lone pair of electrons.

(2) the carbonyl group donates electrons by resonance.

(3) the nitrogen has a full positive charge.

(4) the carbonyl group withdraws electrons by resonance.

29. Select the correct option: When the carbonyl group of a neutral ketone is protonated,

(1) the resulting species has a positive charge

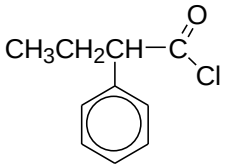
(2) the resulting species is activated toward nucleophilic attack

(3) the resulting species becomes more electrophilic

(4) all of the above

30. What is the correct structure of 2-phenylbutanoyl chloride?

(1)



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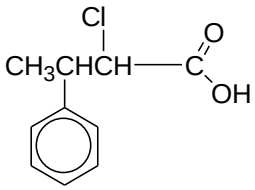

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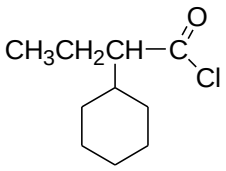

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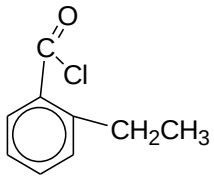


TOTAL [30]

ADDENDUM B: SECOND SEMESTER ASSIGNMENTS

NB.

- You are not required to memorize the actual **values of specific properties** of compounds.
- Questions which involve the **comparison of physical properties** such as boiling point, melting point, solubility etc. or the **comparison of chemical properties** such as **acidity, basicity, etc. do not require the knowledge of the actual values** related to these properties.
- You have to USE FACTORS such as **chemical structure, bonding, steric factors, etc**. to **predict trends in the property** or **compare properties – do not use actual values that can be found in tables in the textbook**.

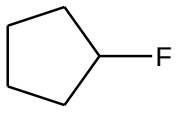
ONLY FOR SEMESTER 2 STUDENTS
ASSIGNMENT 1
Due Date: 12 August 2016
Unique number: 655504

This assignment is a multiple choice assignment based on section 6.1.

Please note that it is compulsory to return this assignment, as failure to do so will automatically prevent you from writing your examination at the end of your course. No late submissions will be accepted.

This assignment contributes 20% to your year mark.

1. What type of bonding is most important in the following compound?



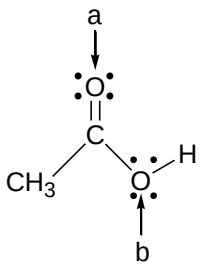
(1) ionic

(2) hydrogen

(3) non-polar covalent

(4) polar covalent

2. The hybridization states of the oxygen atoms in the molecule shown below are:



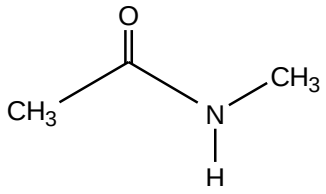
(1) a = sp^3; b = sp^3

(2) a = sp^3; b = sp^2

(3) a = sp^2; b = sp^2

(4) a = sp^2; b = sp^3

3. Based on the structure of the following compound, which statement is INCORRECT?



(1) the sigma bond of the carbonyl is formed from the overlap of a sp^2 hybrid orbital of carbon and a sp^2 hybrid orbital of oxygen

(2) the carbon –oxygen bond is non-polar

(3) the value for the H-N-CH_3 bond angle is 120 degrees

(4) there is a non-bonding electron pair on nitrogen

4. Identify the INCORRECT statement below:

(1) A radical reaction is a process involving symmetrical bond breaking and bond making.

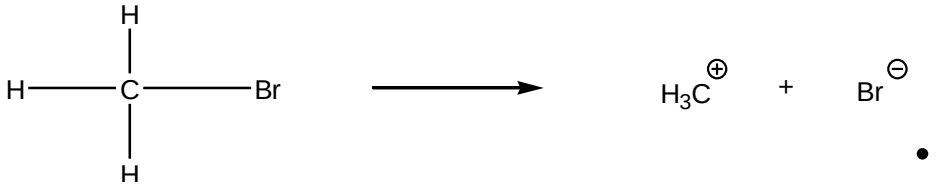
(2) An electrophile is a species which have an electron rich site that can form a bond with an electron poor site.

(3) Heterolytic bond breakage occurs when both bonding electrons remain with one product fragment.

(4) Homolytic bond breakage occurs when one bonding electron remains with each product fragment.

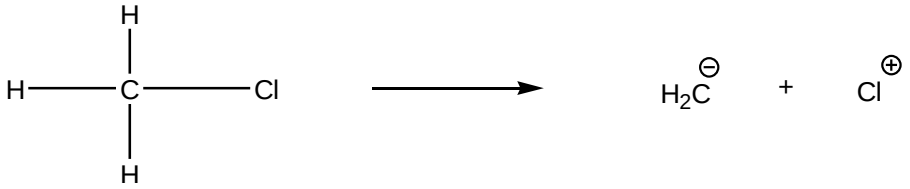
5. Which of the following reactions is a correct example of heterolysis?

(1)



(2) $CH_3\text{-}CH_3 \rightarrow CH_3^+ + CH_3^\bullet$

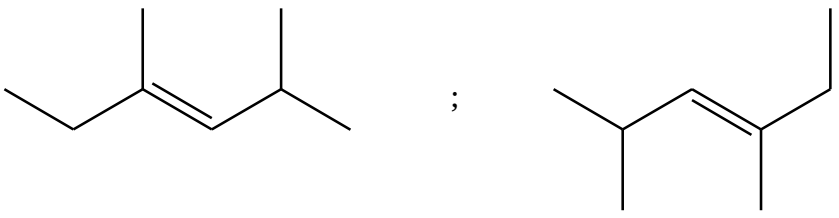
(3)



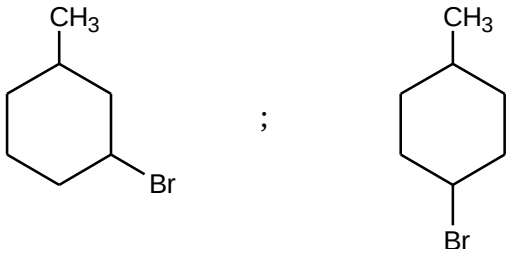
(4) $CH_3\text{-}CH_3 \rightarrow CH_3^\bullet + CH_3$

6. Which of the following pairs of compounds are constitutional isomers?

(1)



(2)

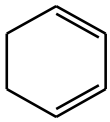


(3)

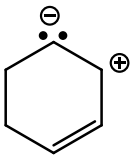
$CH_3CH_2OCH_2CH_3$ and $CH_3CH_2CH_2OH$

(4)

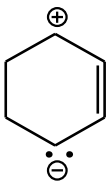
7. Which of the following is NOT a proper resonance form of the following molecule?



(1)



(2)



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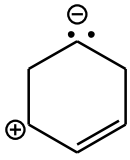

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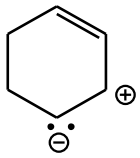
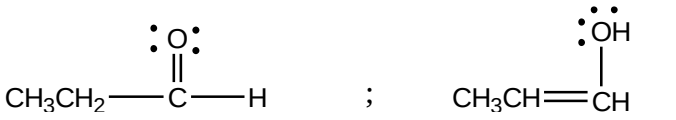
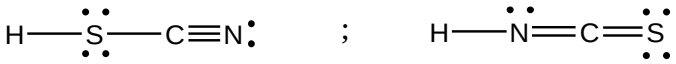


8. Which of the following choices represent a pair of acceptable resonance forms?

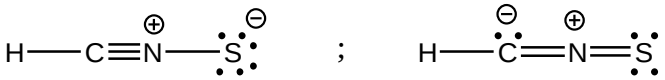
(1)



(2)



(3)

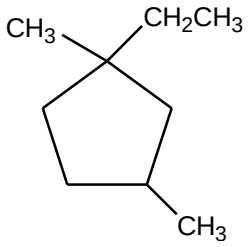


(4)

9. Which of the following species can best be described as both nucleophilic and strongly basic?

(1) alkanes
(2) carbocations
(3) free radicals
(4) carbanions

10. What is the IUPAC name of the molecule shown below?



(1) 3-ethyl-1,3-dimethylcyclopentane

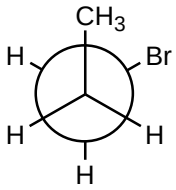
(2) 1-ethyl-1,3-dimethylcyclopentane

(3) 2-(3-methylcyclopentyl)propane

(4) 1,3-dimethyl-1-ethylcyclopentane

11. Which of the following structures represents the most stable conformation of 1-bromopropane?

(1)



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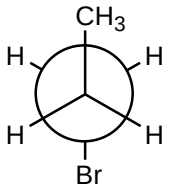
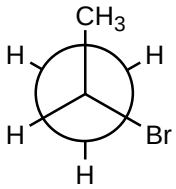


(3)



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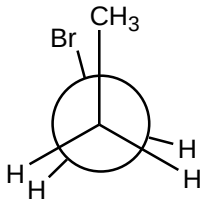
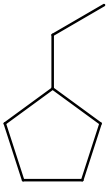
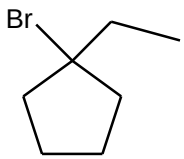


12. What is the major monobrominated product formed when the following compound is subjected to free radical bromination?



(1)



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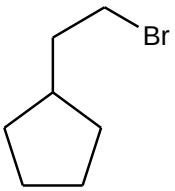

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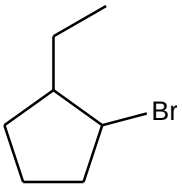

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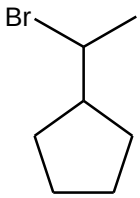
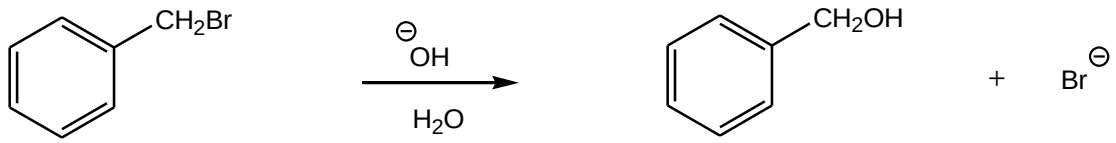


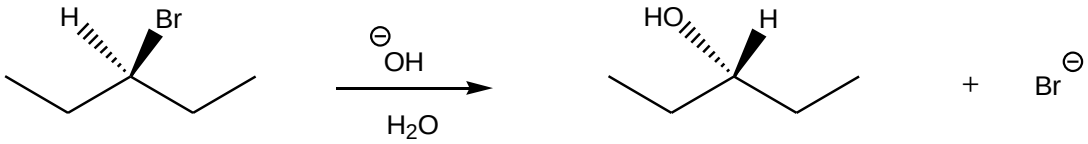
13. Which of the following nucleophilic substitution reactions will NOT TAKE PLACE?

(1)



(2)

(3)



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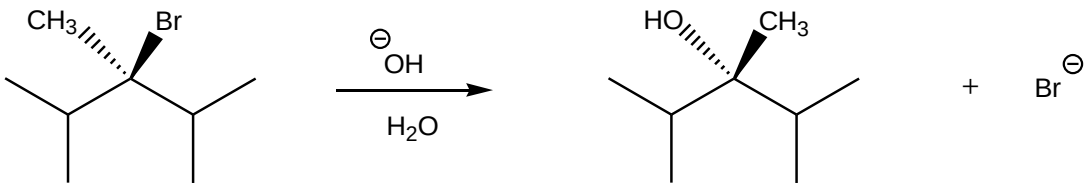


14. Which of the following species will reacts the fastest with $CH_3CH_2CH_2$-I in a nucleophilic substitution reaction?

(1)

$(CH_3)_3CO^{\ominus}$

(2)

H_2O

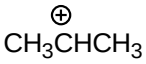
(3)

$HO^{\ominus}$

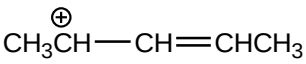
(4)

$CH_3CO_2^{\ominus}$

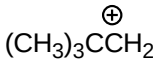
15. Rank the following carbocations in order of increasing stability (least → most):



A



B

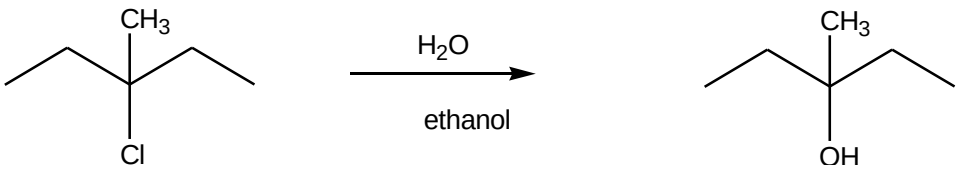


C

Which of the following ranking order represents the order of increasing stability of the carbocations?

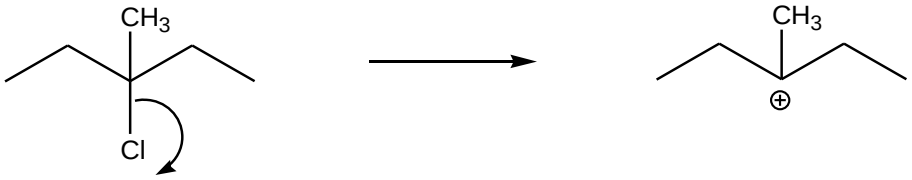
(1) A < B < C
(2) B < C < A
(3) B < A < C
(4) C < A < B

16. Consider the following reaction:

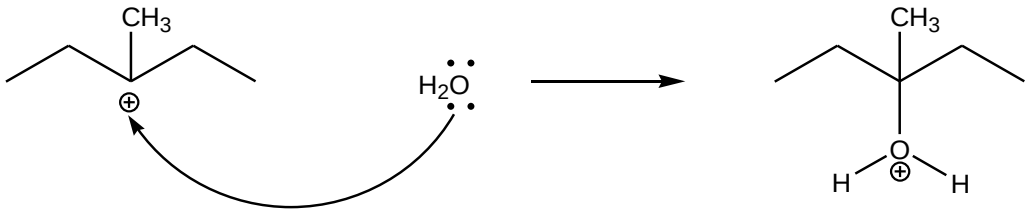


Which of the following is NOT PART of the mechanism of the reaction?

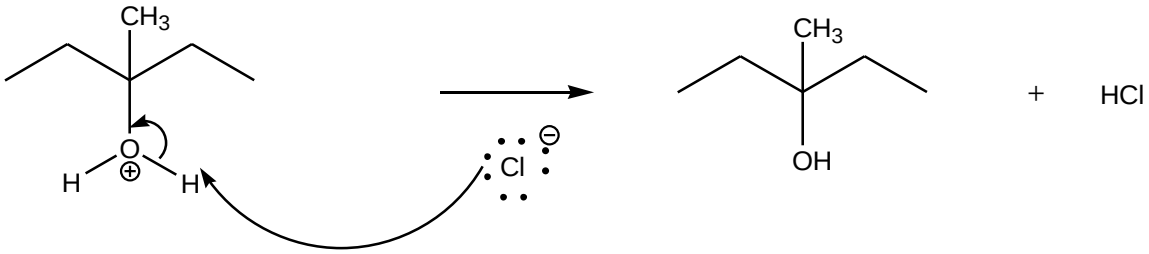
(1)



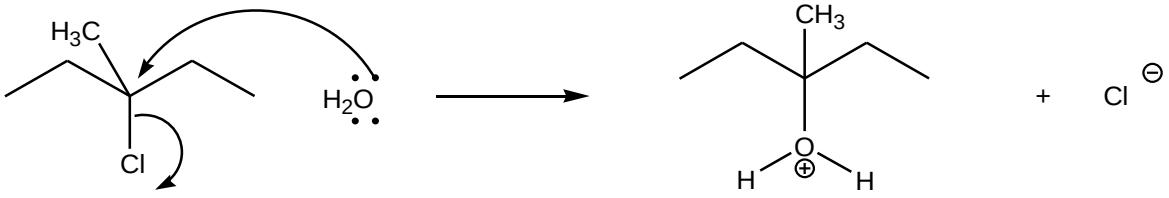
(2)



(3)

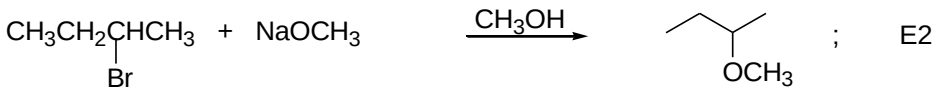


(4)



17. Which of the following reactions is CORRECT as indicated by the major products formed and the mechanism for the reaction?

(1)



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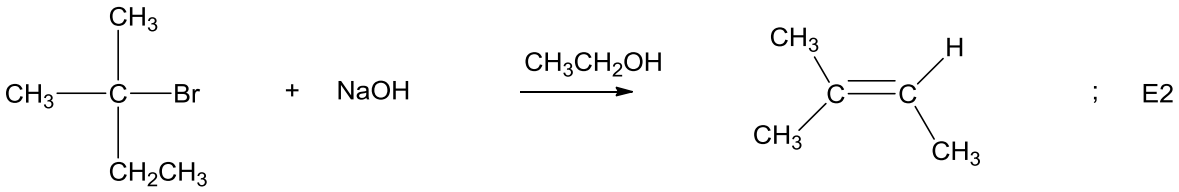

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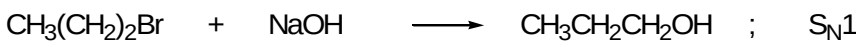

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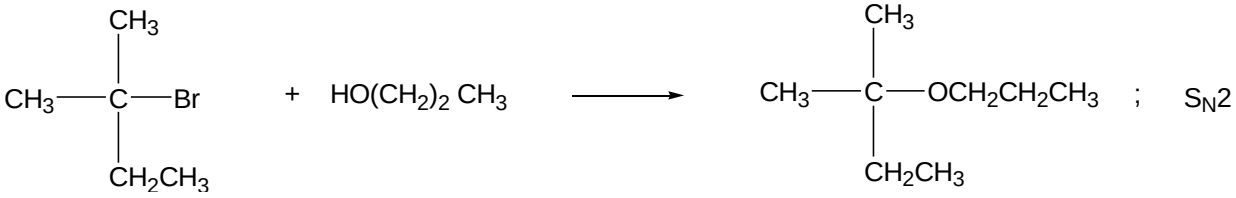
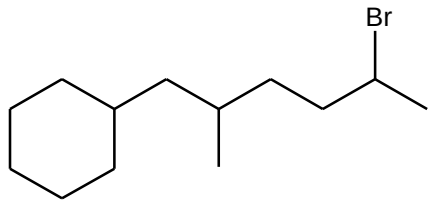


18. What is the IUPAC name of the molecule shown below?



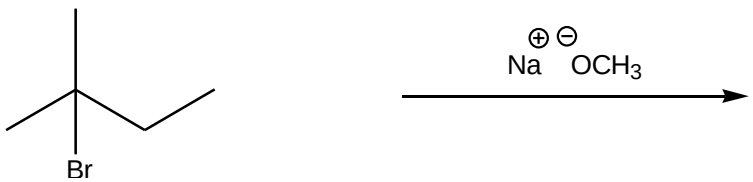
(1) 6-bromo-1-cyclohexyl-2,5-dimethylhexane

(2) 5-bromo-1-cyclohexyl-2-methylhexane

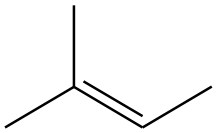
(3) 2-bromo-6-cyclopentyl-5-methylhexane

(4) 1-bromo-5-cyclopentyl-1,4-dimethylpentane

19. What is the major product formed in the following reaction?



(1)



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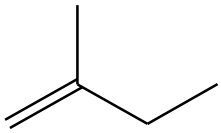

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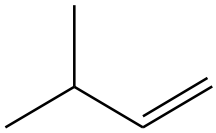

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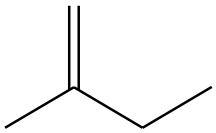
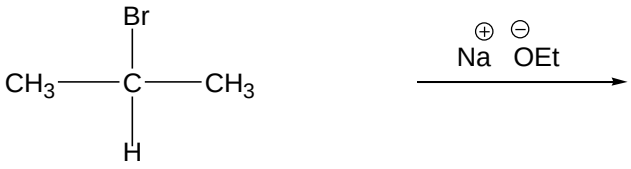
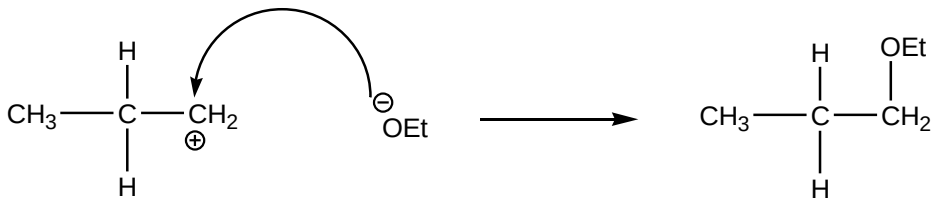


20. Which of the following steps is applicable in the mechanism of the following reaction?



(1)



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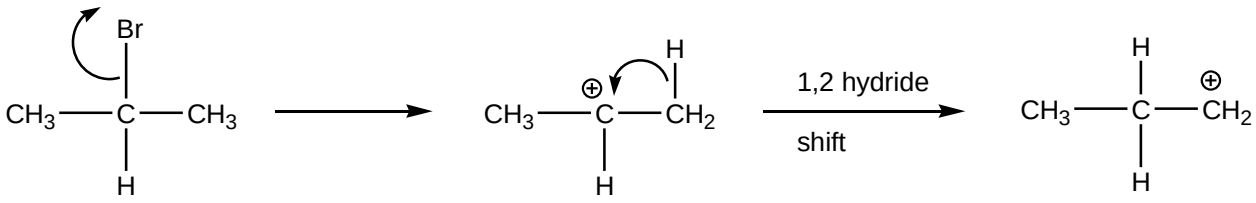

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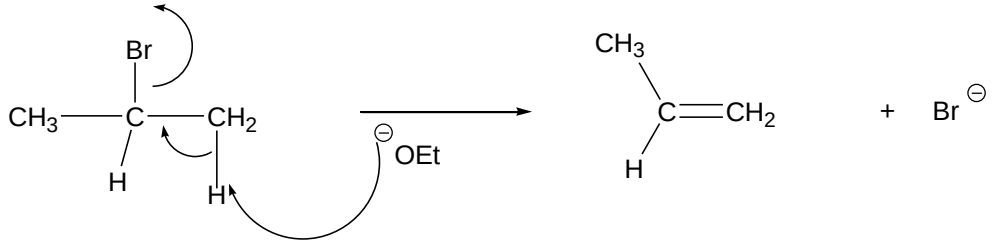

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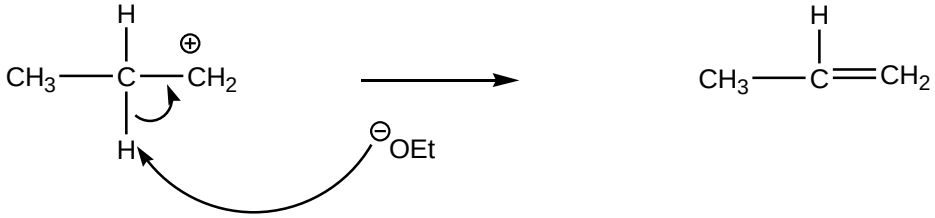
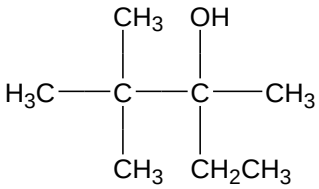


21. What is the IUPAC name of the following compound?



(1) 2-ethyl-2-tertbutylethan-1-ol

(2) 2-ethyl-3,3-dimethylbutan-2-ol

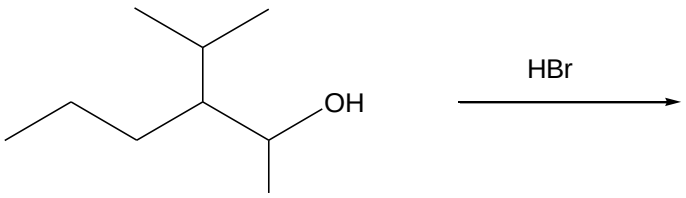
(3) 2,2,3-trimethylpentan-3-ol

(4) 1,1,1-trimethyl-2-butanol

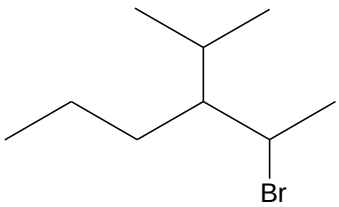
22. Phenol, PhOH, is a stronger acid than ethanol, CH_3CH_2OH. Which of the following statements is INCORRECT?

(1) The phenoxide ion is resonance stabilised by the aromatic ring.
(2) The ethoxide ion has no resonance stabilisation.
(3) Phenol has a lower pKa value than ethanol.
(4) In the reaction with NaOH as base, ethanol will be deprotonated to a greater extent than phenol.

23. Carbocations have the ability to undergo rearrangement. What is the major organic product formed in the following reaction?



(1)



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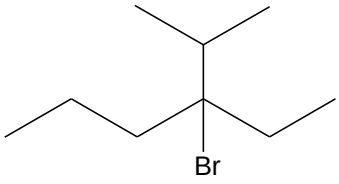

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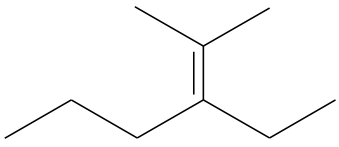

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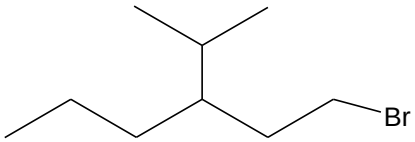
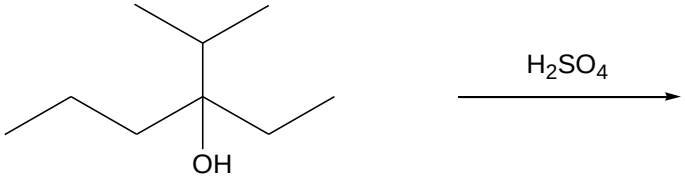
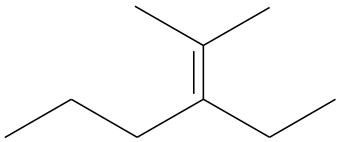


24. Alcohols can undergo dehydration reactions. What is the major organic product formed in the following reaction?



(1)



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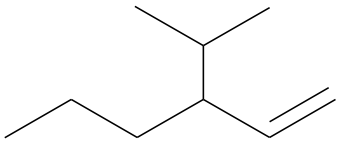

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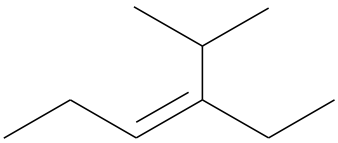

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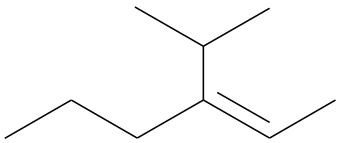


25. Which of the following molecules DOES NOT have a chiral (asymmetric) carbon atom?

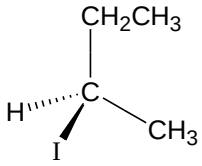
(1) 2-bromopentane

(2) 2-Methylbutane

(3) 2-butanol

(4) 3-methoxyhexane

26. The absolute configuration of a chiral carbon is defined as R- or S- according to the Cahn-Ingold-Prelog rules. What is the name for the following compound?



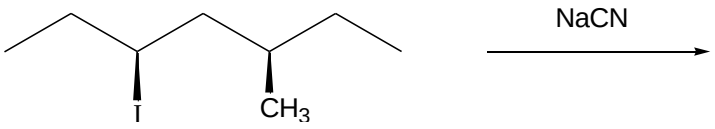
(1) (S)-3-iodobutane

(2) (S)-2-iodobutane

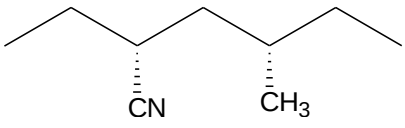
(3) (R)-3-iodobutane

(4) (R)-2-iodobutane

27. What is the major product of the following reaction?



(1)



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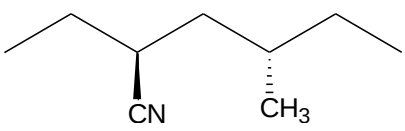

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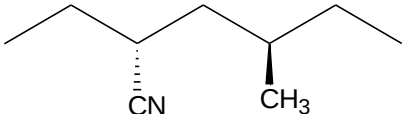

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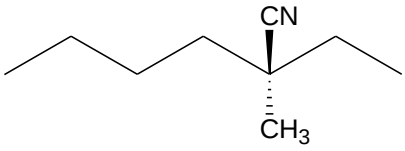
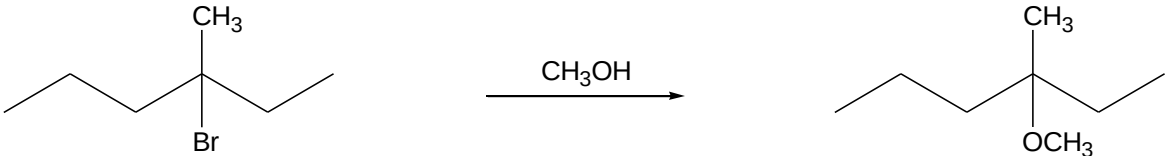


28. Which of the following reactions will NOT take place?

(1)



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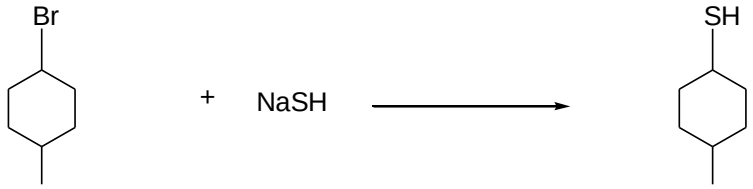

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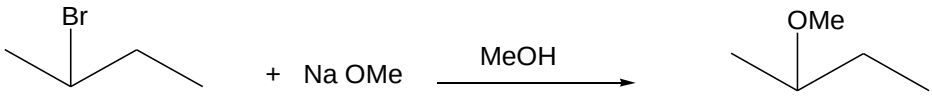

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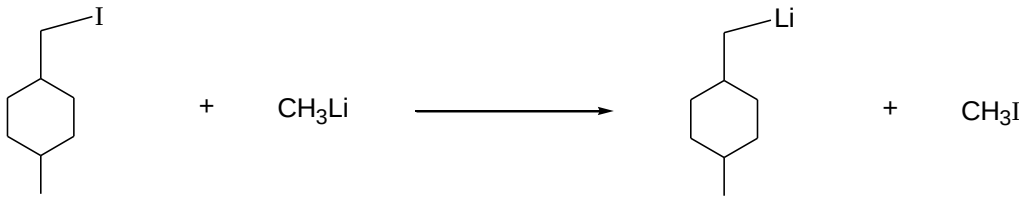
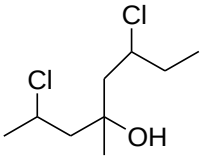


29. What is the IUPAC name for the following compound?



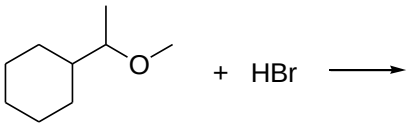
(1) 3,7-dichloro-5-methyloctan-5-ol

(2) 2,6-dichloro-6-ethyl-4-methylhexan-4-ol

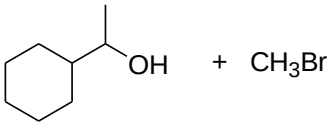
(3) 2,6-dichloro-4-methyloctan-4-ol

(4) 4-hydroxy-4-methyl-2,6-octyldichloride

30. What are the major products formed in the following reaction?



(1)



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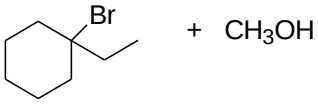

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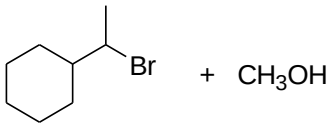

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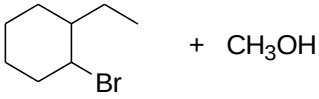


TOTAL [30]

ONLY FOR SEMESTER 2 STUDENTS
ASSIGNMENT 2
Due Date: 9 September 2016
Unique number: 787015

The assignment is an online assignment based on Section 6.2.

The assignment consists of two parts:
PART A: consists of online tasks based on Section 6.2.
PART B: consists of written questions

Please note that it is important to return this assignment.

This assignment contributes 40% to your year mark.

PART A must be completed online on the MasteringChemistry® site.

PART B : written questions- a self-assessment assignment

PART A:

IMPORTANT:

You will need two codes to access to MasteringChemistry and to do the assignment. The first code is the **access code**, which you got when you bought the textbook, and the second is the

course code, which is given below:

To access MasteringChemistry, you must use the **access code** that came with the textbook that you bought.

Once you have the access code and have finished registering for MasteringChemistry and already have access to MasteringChemistry, then, you need to locate the course by entering the **course code**: **CHE1502S22016**

Any changes to the above will be announced on myUnisa, so it is important to check for announcements regularly.

Once the due date for assignment 2 has passed, your mark on MasteringChemistry® will be automatically transferred to the Unisa assignment system.

You may complete the online tasks at your own pace, provided that you have completed all tasks by the due date. Your final mark for assignment 2 will be determined by your performance on the tasks that you have done on MasteringChemistry®.

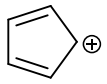
THE DETAILS OF THIS ASSIGNMENT CAN BE FOUND ON myUnisa. (Go to the CHE1502 announcements)

IF YOU HAVE ANY QUESTIONS REGARDING THIS ASSIGNMENT, PLEASE POST YOUR QUESTIONS ON THE myUnisa CHE1502 DISCUSSION FORUM IN THE FORUM CALLED ASSIGNMENT 2.

PART B: QUESTIONS

1. Draw a correct Lewis structure for boric acid, $B(OH)_3$

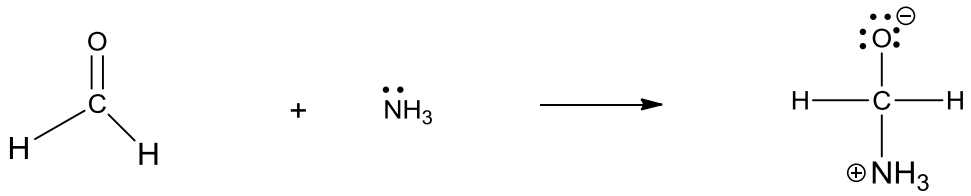
2. Draw the important resonance forms to show the delocalization of charges in the following structure. Indicate the movement of electrons with curved arrows.



(4)

3. In the reaction below, label the reactants as Lewis bases (nucleophiles) or Lewis acids

(electrophiles). Use curved arrows to show the movement of electron pairs in the reactions. Draw any nonbonding electrons (NOT ILLUSTRATED IN THE REACTION) to show how they participate in the reactions.



(4)

4. Draw the structural formulas of four hydrocarbon compounds which are structural (constitutional) isomers having a molecular formula of C_6H_{12}. Provide the IUPAC name for each compound.

(16)

5. Consider the compound with the proposed name: 2-methyl-1-1, dibromopent-3-ene

(a) Draw the structure of the compound that is consistent with the proposed name given above.

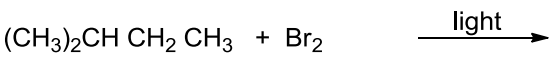
(2)

(b) Explain what is wrong with the name provided (state each violation of the IUPAC nomenclature rules and give the correct IUPAC name for the compound.

(4)

6. Draw the structures for MAJOR product of each reaction/ reaction sequence shown below:

(a)



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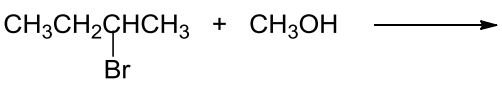

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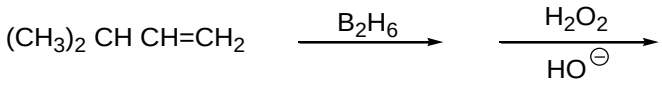
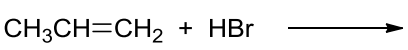
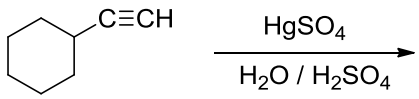


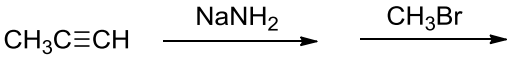
(d)



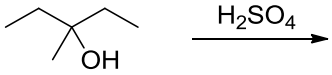
(e)



(f)



(g)



7 x (2) = (14)

8

7. Give the detailed reaction mechanism for the reactions shown in:

(i) Question 6(a) (4)

(ii) Question 6(b) (4)

(iii) Question 6(d) (4)

(iv) Question 6(g) (4)

(v) Question 8 (k) (3)

8. Draw the different Newman projections for the molecule, CH_2ClCH_2Br. Identify the most stable and least stable conformation.

(6)

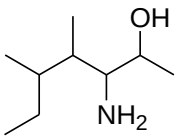
ONLY FOR SEMESTER 2 STUDENTS
ASSIGNMENT 3
Due Date: 7 October 2016
Unique number: 670504

This assignment is a multiple choice assignment based on section 6.3.

Please note that it is important to return this assignment No late submissions will be accepted.

This assignment contributes 40% to your year mark.

1. Name the following compound according to the IUPAC rules.



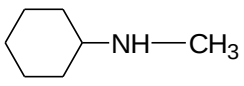
(1) 3-amino-5-ethyl-2-hydroxy-4-methylhexane

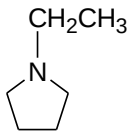
(2) 3-amino-4,5-dimethylheptan-2-ol

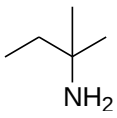
(3) 2-hydroxy-4,5-dimethyl-3-heptyl amine

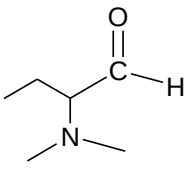
(4) 4-amino-2-ethyl-5-hydroxy-3-methylhexane

2. Which of the following compounds are classified as tertiary amines?

I. 

II. 

III. 

IV. 

(1) I only

(2) III only

(3) II and IV

(4) I and III

3. Which of the following amines is MOST soluble in water?

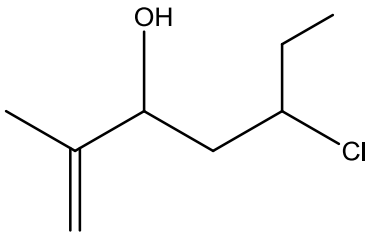
(1) ethylamine

(2) $PhNH_2$

(3) $(CH_3CH_2CH_2)_2NH$

(4) $(CH_3)_3N$

4. What is the IUPAC name of the following compound?



(1) 5-chloro-5-ethyl-2-methylhex-1-en-3-ol

(2) 3-chloro-5-hydroxy-6-methylhept-6-ene

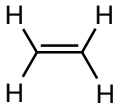
(3) 5-chloro-2-methyleneheptan-3-ol

(4) 5-chloro-5-ethyl-2-methylpent-1-en-3-ol

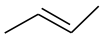
5. Which of the following alkenes will produce the MOSTSTABLE INTERMEDIATE in a reaction with HBr?

(1) 

(2)



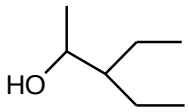
(3)



(4)

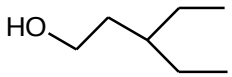
6. Which of the following alcohols is produced by the acid catalyzed hydration of $CH_3CH=C(CH_2CH_3)_2$?

(1)

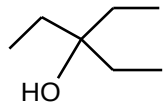


(2)

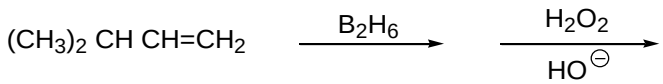
(3)



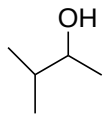
(4)



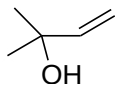
7. What is the major organic product formed in the following reaction?



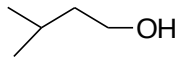
(1)



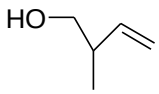
(2)



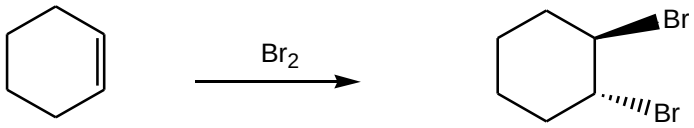
(3)



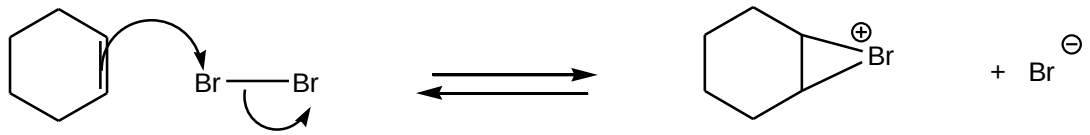
(4)



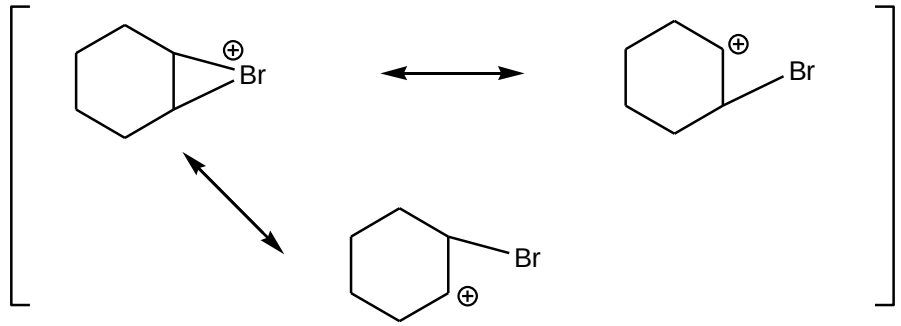
8. Alkenes undergo addition reactions in the presence of bromine. Which of the following steps is NOT applicable in the mechanism of the following reaction?



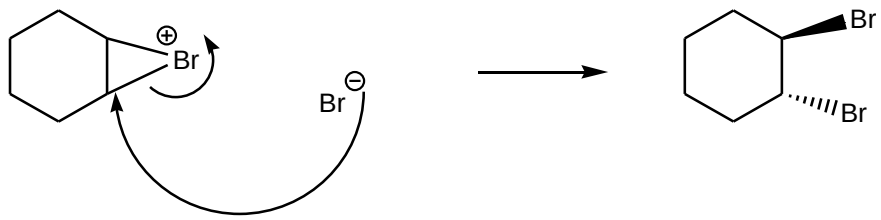
(1)



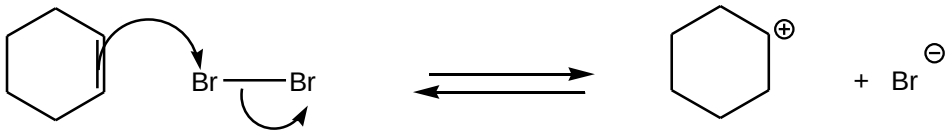
(2)



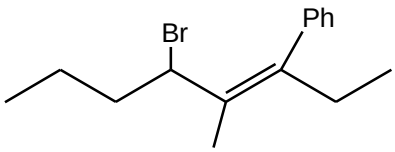
(3)



(4)



. Name the following compound according to the IUPAC rules.



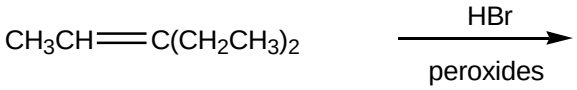
(1) (E)-3-bromo-1-ethyl-2-methyl-1-phenylhex-1-ene

(2) (E)-5-bromo-4-methyl-3-phenyloct-3-ene

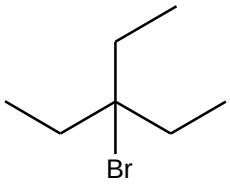
(3) (Z)- 3-bromo-1-ethyl-2-methyl-1-phenylhex-1-ene

(4) (Z)-5-bromo-4-methyl-3-phenyloct-3-ene

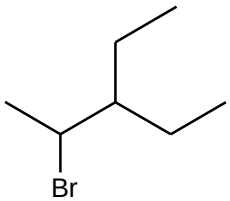
10. Alkenes react with hydrogen halides to give alkyl halides as products. What is the major organic product formed in the following reaction?



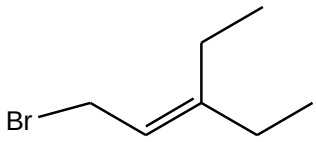
(1)



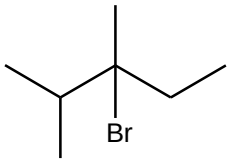
(2)



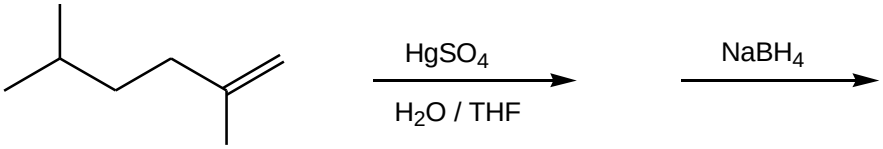
(3)



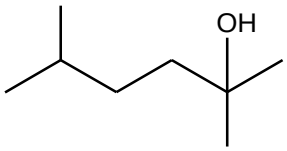
(4)



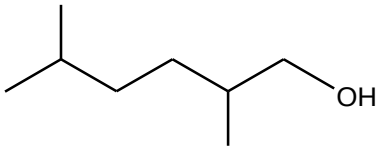
11. What is the major organic product formed in the following reaction?



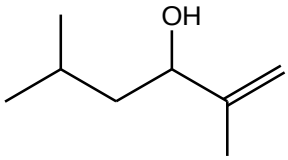
(1)



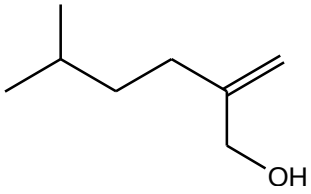
(2)



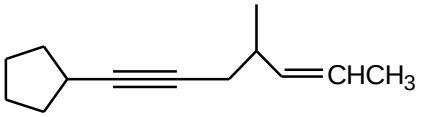
(3)



(4)



12. What is the IUPAC name of the following compound?



(1) 1-cyclopentyl-4-methylhept-5-en-1-yne

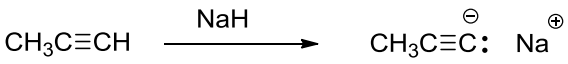
(2) 7-cyclopentyl-4-methylhept-2-en-6-yne

(3) 1-cyclopentyl-4-methylhept-5-en-1-yne

(4) 4-methyl- 7-cyclopentylhept-2-en-6-yne

13. Terminal alkynes are very weak acids and only react with very strong bases. Which of the following reactions will **NOT** take place?

(1)



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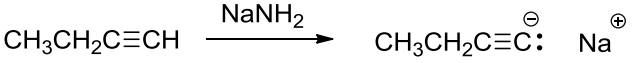
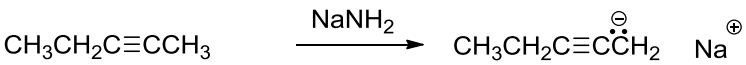


(3)



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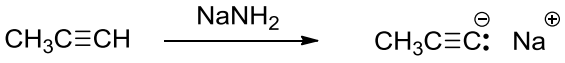
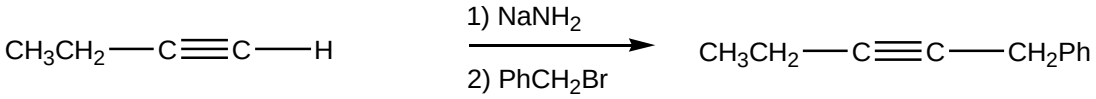
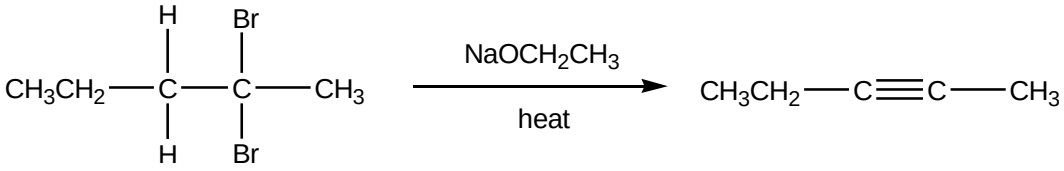


14. Which of the following reactions will NOT produce the final product as shown?

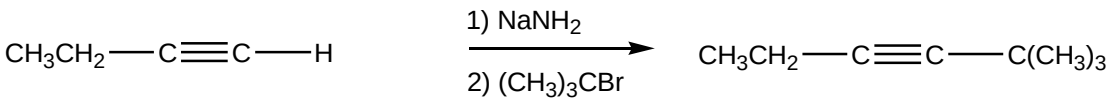
(1)



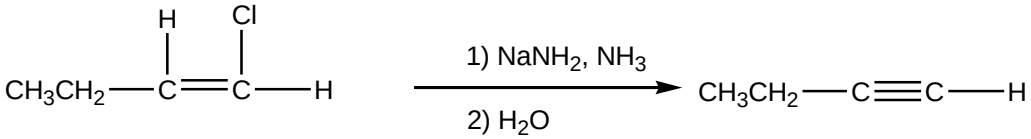
(2)



(3)

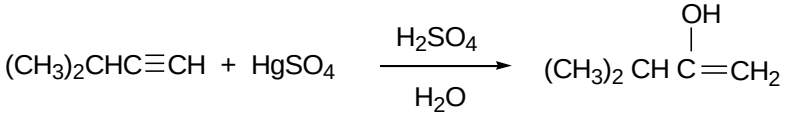


(4)

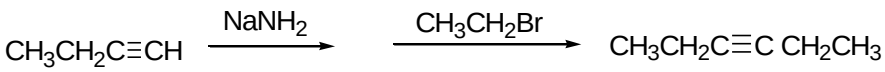


15. Which of the following reactions yields the final product as shown?

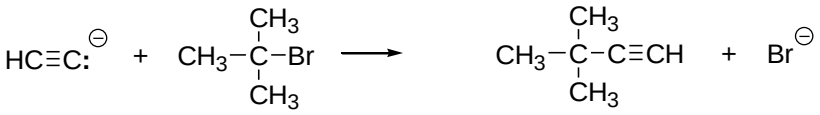
(1)



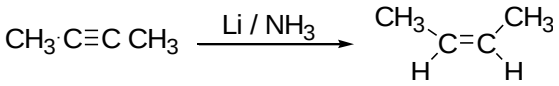
(2)



(3)



(4)



16. The reaction of 2-butyne with Na/NH_3 gives the following product:

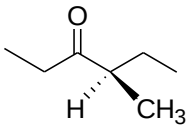
(1) 1-butyne

(2) cis-2-butene

(3) butane

(4) trans-2-butene

17. The absolute configuration of a chiral carbon is defined as R- or S- according to the Cahn-Ingold-Prelog rules. What is the name for the following compound?



(1) (R)-3-methyl-4-hexanone

(2) (R)-4-methyl-3-hexanone

(3) (S)-3-methyl-4-hexanone

(4) (S)-4-methyl-3-hexanone

18. The presence of the carbonyl group make ketones and aldehydes susceptible to nucleophilic addition. Which of the following statement is **INCORRECT**?

(1) The two alkyl groups attached to the carbonyl carbon in ketones, cause a greater

steric crowding in the tetrahedral product.

(2) The two electron-releasing groups in ketones stabilise the carbonyl group more which makes ketones more reactive.

(3) Aldehydes have one electron-releasing group which partially stabilise the positive charge at their carbonyl carbon, making aldehydes more reactive.

(4) The presence of the small hydrogen atom, makes the central carbon atom of the tetrahedral product formed from an aldehyde less crowded and more stable.

19. The positively polarized carbon atom of a carbonyl group acts as:

(1) an electrophile and a Lewis acid.

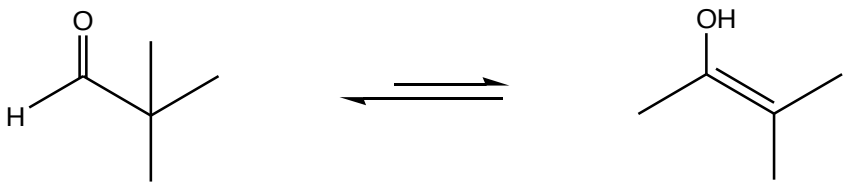
(2) an electrophile and a Lewis base.

(3) a nucleophile and a Lewis base

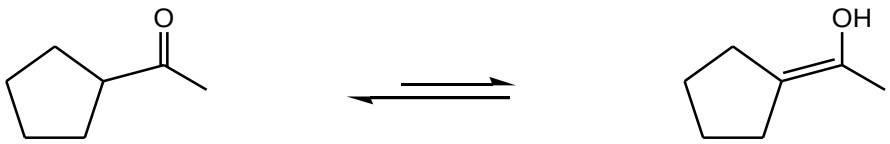
(4) a nucleophile and a Lewis acid.

20. Which of the following DOES NOT represent keto-enol tautomerIsm?

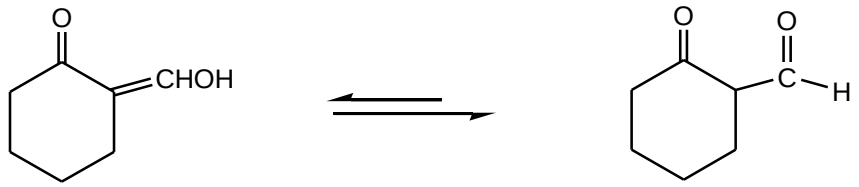
(1)



(2)



(3)



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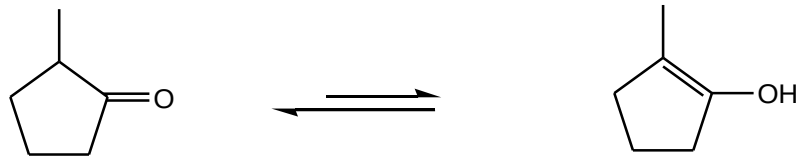


21. Which of the following represents the correct ranking in terms of increasing boiling point?

(1) *n*-butane < 1-butanol < diethyl ether < 2-butanone

(2) 2-butanone < *n*-butane < diethyl ether < 1-butanol

(3) *n*-butane < diethyl ether < 2-butanone < 1-butanol

(4) *n*-butane < diethyl ether < 1-butanol < 2-butanone

22. What reagent can be used to convert 2-methylbutan-1-ol into 2-methylbutanoic acid?

(1) $LiAlH_4$

(2) PCC

(3) O_3

(4) $Na_2Cr_2O_7$

23. What reagents can be used to convert 1-hexyne into 2-hexanone?

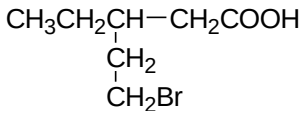
(1) i. CH_3MgBr; ii. CO_2

(2) i. O_3; ii. $(CH_3)_2S$

(3) Hg^{2+}, H_2SO_4, H_2O

(4) i. H_2, Ni; ii. $Na_2Cr_2O_7$, H_2SO_4

24. What is the IUPAC name of the following compound?



(1) 5-bromo-isopentanoic acid

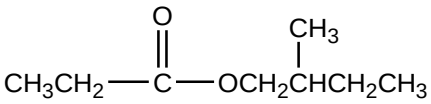
(2) 3-ethyl-5-bromopentanoic acid

(3) 5-bromo-3-ethylpentanoic acid

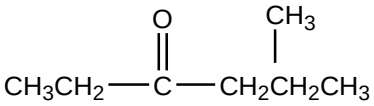
(4) 5-bromo-3-ethyl-1-carboxypentane

25. What is the correct structure of ethyl 3-methyl butanoate?

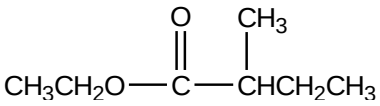
(1)



(2)



(3)



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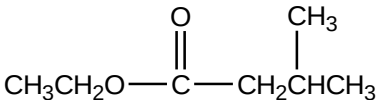
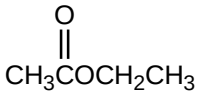
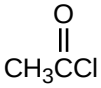


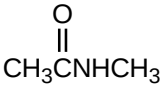
26. Rank the following in order of increasing reactivity (least →most) toward acid hydrolysis:



C



A



B

Which of the following ranking order represents the order of increasing reactivity?

(1) A < B < C

(2) B < A < C

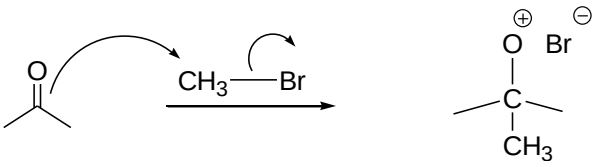
(3) A < C < B

(4) B < C< A

27. Consider the carbonyl group. Which of the following steps is INCORRECT?

(1)

(2)



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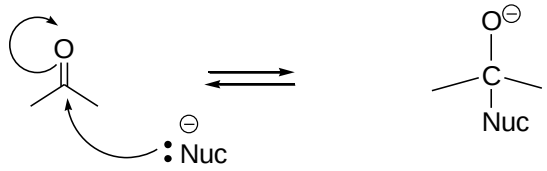
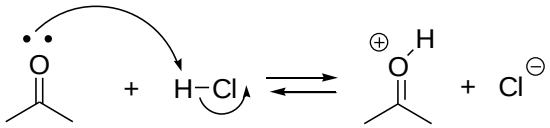
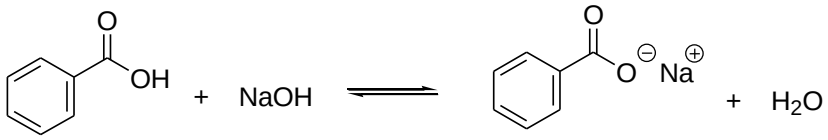


(4)



28. Consider the following reaction:



Which of the following statements are **INCORRECT**?

(1) resonance stabilization of the carboxylate anion accounts for the acidity of carboxylic acids.

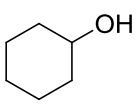
(2) carboxylic acids are strong organic acids and reacts readily with Lowry-Bronsted bases.

(3) carboxylic acids are strong acids because it is stabilized by the inductive effect only.

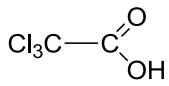
(4) an acid can be deprotonated by a base that has a conjugate acid with a higher pK_a value.

29. Which of the following organic molecules is the strongest acid?

(1)



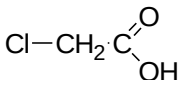
(2)



(3)

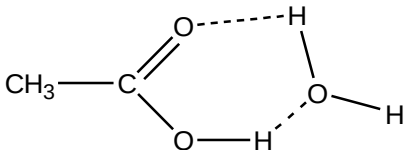
CH_2ClCH_2OH

(4)

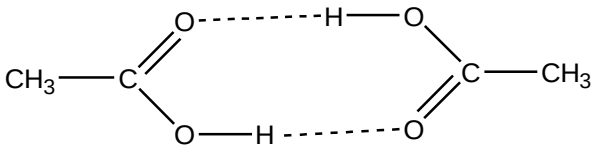


30. Carboxylic acids such as acetic acid tend to be soluble in water due to hydrogen-bonding formation. Which representation shown below **CORRECTLY** explains it?

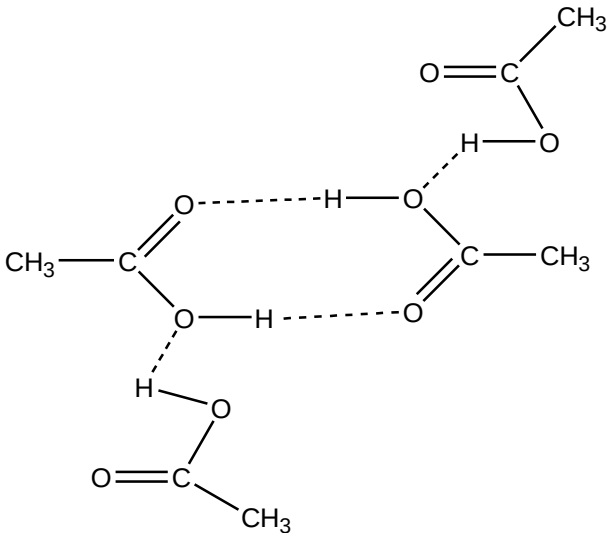
(1)



(2)



(3)



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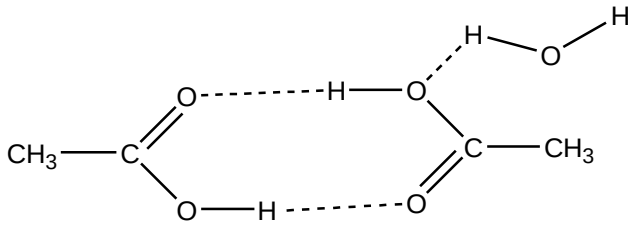

TOTAL [30]
