

School of Bioscience

WRITTEN EXAMINATION

Course Basic Chemis	try							
Examination Supervi	ised wr	itten examination II						
Course code Ke117G Credits for written examination								
Date 2025-02-21		Examination time 14.15-18.30						
Examination respons	sible Pa	atric Nilsson/Magnus Fagerlind						
Teachers concerned								
Aid at the exam/appo	endices	s: Calculator (either a calculator provided by the University or the student´						
Other All answers mu	ıst be g	given in the exam sheet. Answers given on extra sheets will not be						
Instructions		Take a new sheet of paper for each teacher.						
		Take a new sheet of paper when starting a new question.						
	\boxtimes	Write only on one side of the paper.						
	\boxtimes	Write your name and personal ID No. on all pages you hand in.						
	\boxtimes	Use page numbering.						
	\boxtimes	Don't use a red pen.						
	\boxtimes	Mark answered questions with a cross on the cover sheet.						
Grade points: To pas	s the ex	xam, all learning objectives require the grade E or higher. The following						
grade scale will be ap	plied.							

Examination results should be made public within 18 working days $Good\ luck!$

 $F < 35 \le E < 42 \le D < 49 \le C < 56 \le B < 63 \le A$

Total number of pages

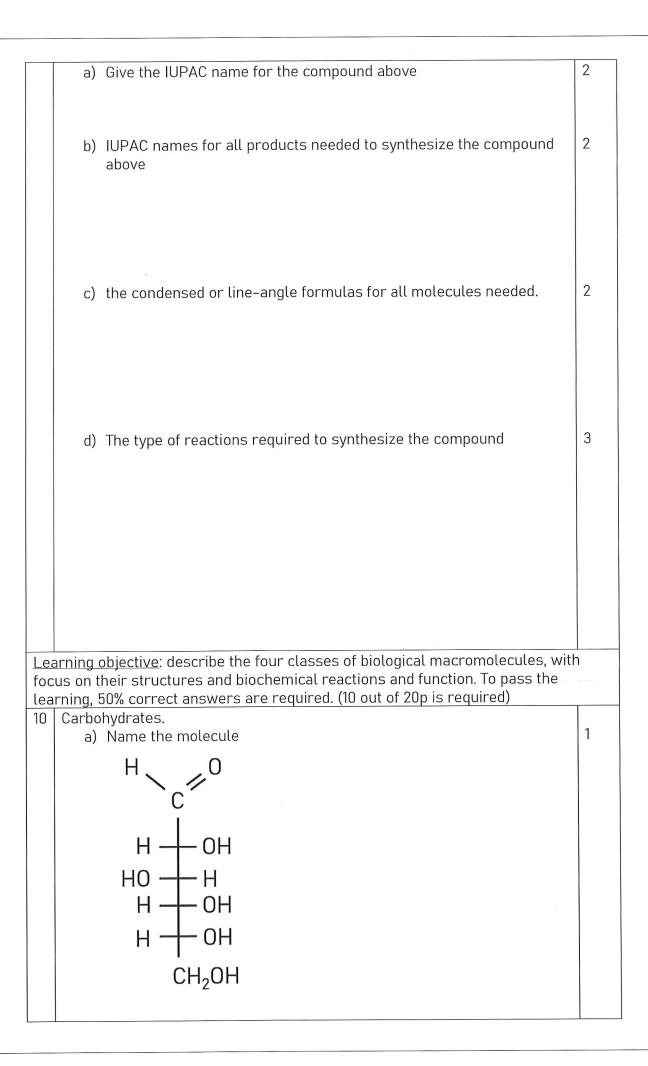
for	<u>Learning objective</u> : name organic chemical substances and draw their structural formula. To pass the learning objective, 50% correct answers are required (10 out										
20p	Op is required) Indicate whether each pair of Fischer projection represents enantiomers 2										
!	or identical structures										
	CH_2OH CH_2OH CH_2OH CH_2OH CH_2OH CH_2OH CH_2OH CH_2OH CH_2OH CH_3 CH_3										
	A) H——OH and HO——H C) H——OH and HO——H										
	H C O C OH OH OH OH OH OH OH OH										
	B) H——OH and HO——H										
	CH ₂ OH CH ₂ OH CH ₃ CH ₃										
	A)										
	В)										
	C)										
	D)										
2.	The noncaloric sweetener Equal contains aspartame, which is made from two amino acids, aspartic acid and phenylalanine. Identify the functional groups in aspartame OHNH2 OCH3	5									
3	Draw the condensed structural formula or line-angle formula for a) 2-methyl-3-pentanol	1									
	b) 2-methyl-1-pentanethiol	1									

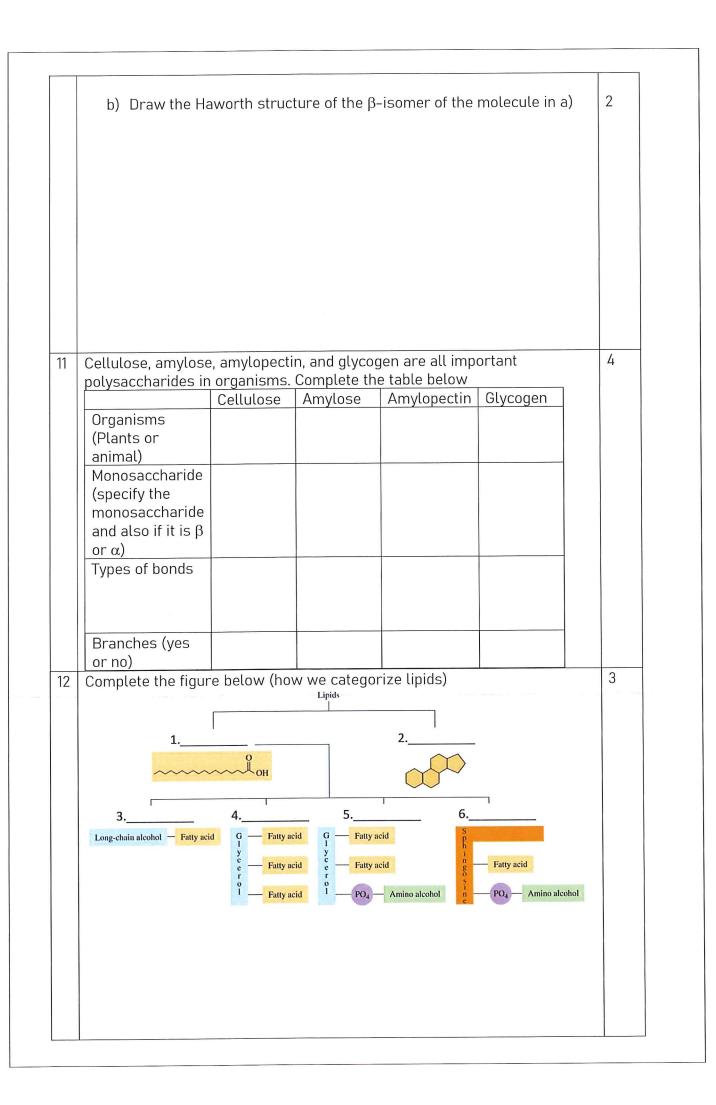
c) 1-ethoxy-2-methylbutane	I
d) N-methylpropanamide	1
e) Pentyl ethanoate	1
f) 3,4-dimethyl-2-hexanone	1
g) 3-bromo-2-chloropentanoic acid	1
h) 2-hydroxy-cyclopentanone	1
i) 1-bromo-4-chloro-3-nitropentane	1

4	Draw the condensed structural formulas and write the IUPAC names for all the aldehydes and ketones that have the molecular formula C_4H_8O	4
		rtios
tr	arning objective: present different classes of organic substances, their prope uctures, reactivity and biological functions. To pass the learning objective, 50 rect answers are required. (15 out of 30p is required)	111es, 1%
	Methyl benzoate, which smells like pineapple guava, is used to train	
	detection dogs. a) Draw the condensed structural formula for methyl benzoate	1
	b) Write the IUPAC name of the <u>carboxylic acid</u> and the <u>alcohol</u> used to	2
	DEODER MOINU DONZOSIO	1
	prepare methyl benzoate	
	pi epare memyr benzoare	
	pi epare metriyi berizoate	
	pi epare memyi benzoate	

d) Use condensed structural or line angel formulas to write the balanced chemical equation for the base hydrolysis of methyl benzoate with NaOH. The IUPAC name of ethyl vanillin, a synthetic compound used as a flavouring, is 3-ethoxy-4-hydroxybenzaldehyde. a) Draw the condensed or line-angle formula for anisaldehyde and identify all functional groups b) Draw the condensed or line-angle formula and name the product formed when anisaldehyde is oxidized	c)	Use condensed structural or line angel formulas to write the balanced chemical equation for the acid hydrolysis of methyl benzoate.	2
flavouring, is 3-ethoxy-4-hydroxybenzaldehyde. a) Draw the condensed or line-angle formula for anisaldehyde and identify all functional groups b) Draw the condensed or line-angle formula and name the product 3	d)	balanced chemical equation for the base hydrolysis of methyl	2
b) Draw the condensed or line-angle formula <u>and name the product</u> formed when anisaldehyde is oxidized	flavou	uring, is 3-ethoxy-4-hydroxybenzaldehyde. Draw the condensed or line-angle formula for anisaldehyde and	4
	b)	Draw the condensed or line-angle formula <u>and name the product</u> formed when anisaldehyde is oxidized	3

	c) Draw the condensed or line-angle formula <u>and name the product</u> formed when anisaldehyde is reduced. Also classified the product as 1°, 2° or 3°	3
7	Draw the condensed structural or line angle formula for the alcohols needed to give each of the following oxidation products. Also, classify the alcohols needed as 1°, 2° or 3°.	4
8	Sometimes several steps are needed to prepare a compound. Identify all steps required to prepare from a ketone	





Identify each of the following as saturated, monounsaturated, polyunsaturated, omega-3, or omega -6 fatty acid a) $CH_3 - (CH_2)_7 - CH = CH - (CH_2)_7 - COOH$ b) $CH_3 - (CH_2)_4 - HC = CH - CH_2 - HC = CH - (CH_2)_7 - COOH$ c) $CH_3 - CH_2 - (HC = CH - CH_2)_5 - CH_2 - CH_2 - COOH$	1 1 1
c) $CH_3 - CH_2 - (HC = CH - CH_2)_5 - CH_2 - CH_2 - COOH$	
	1
d) $CH_3 - (CH_2)_{14} - COOH$	1
14 Amino acids are the molecular building block of proteins a) Amina acids have a central carbon, called the α-carbon, bonded to two functional groups, which ones?	2
b) The central carbon also binds two other "things" what "two other things" are also bonded to the α-carbon?	2
15 True or False a) Purine bases have a single ring	0.25
b) Cytosine is a purine	0.25
c) Thymine is a pyrimidine	0.25
d) In RNA, cytosine is replaced by uracil	0.25
e) The pentose sugar in RNA is deoxyribose	0.25

f) Phosphodiester bonds link two sugars in DNA	0.25
g) 2 hydrogen bonds are formed between guanine and cytosine	0.25
h) Uracil is a component of RNA only	0.25

Equations and tables

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Priority rules

High ' Priority	Group Carboxylic acid Ester Amide Aldehyde Ketone Alcohol Thiol Amine Alkene Alkyne Alkane* Ether	Prefix carboxy- oxycarbonyl- carbamoyl- formyl- oxo- hydroxy- mercapto- amino- alkenyl- alkynyl- alkoxy-	Suffix -oic acid -oate -amide -al -one -ol -thiol -amine -ene -yne -ane
	Ether	alkoxy-	-ane
Low	Halo	halo-	-ane
priority	Nitro	nitro-	-ane

18	E iii 8	Re	Nean 20.18	I8 Ar	Argon 39.95	گې د	Krypten 84.80	X A	Xenon 131.29	å E	Radon 222.02	<u> </u>	Oganesson [294]	71 Lu Lutetim 174.97 103 Lr Limenoim
	11	щ	Puorne 19.00	٦ ت	Chlorine 35.45	SE Pr	Bramine 79.90	- ES	lodine 126.90	as At	Astaine 209.98	117 TS	Fernesine [294]	70 Vb Vb Vt
	16	့ဝ	02.ygen 16.00	န	Sulfur 32.06	Se Se	Selviim 78.97	⁵² P	Filhrim 127.6	² 0	Pobnium [208.98]	116 	Livernorium [293]	Tm Thium Indian 101 101 101 101 101 101 101 101 101 10
	15	N	Ndrogen 14.01	25 P	Phosphorus 30.97	AS	Arsenic 74.92	Sb	Antimony 121.76	Big	Bismuth 208.98	115 MC	Moscovium [289]	Ebim Brim 167.26 100 11 Fm Femina 18.257.10
	*	؈ؗ	1201	₹ Si	SS.09	Se S	Germanium 72.63	Sn Sn	Tin 118.71	22 Pb	Lead 207.20	114 E	Rerovium [289]	Hohim Rohim Rohim Rehim Residue
ıts	E	.	10.81	T3 A	Aluminum 26.98	E G	Galfum 69.72	ٿ ت	Indiam 114.82	F	Nalium 204.38	N N	Whonium 1286	Dy Dysmain Dysmain Edition Edition
Elements					12	Z Z	Zinc 65.38	្និ	Codmium 112.41	g Fd	Mercury 200.59	<u>1</u> 2	Copernicium [285]	
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of the					0	į į	Riddel S8.69	å Pd	Paladim 106.42	۳ ۲	Platinum 195.08	DS	Darmstattum [281]	63 Eu Enspire 151.56 95 95 95 95 95 95 95 95 95 95 95 95 95
able					0	ပ္ပ	Cobalt S8.93	sh R	Rhodium 102.91	<u>"</u>	Indian 192.22	M M	Meimenium [278]	
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Δ.					9	ڻ	Chromium 51.99	42 Mo	Malybdenum 95.95	74 X	Tungsen 183.85	Sq Sq	Seaborgium [266]	Proposition N Proposition N Proposition S 231.04
					٠,	²³	Kanadiem SO.94	N N	Mobium 92.91	^ل <mark>ه</mark>	Tantalem 180.95	Pp Dp	Debniem [262]	Section 140.12 Property 140.12
					4	Ę	Taniun 47.88	ŠŽ	Dromium 91.22	HŁ HŁ	Rafnin 178.49	¹⁶ R	Intherfordun [261]	La Emhanem 138.91 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
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-[]	Hydrogen 1,01	<u>, ;</u>	8.9	Na	22.99	<u>*</u>	Potassium 39.10	37 Rb	Aubidum 85.47	SS	(Esim 132.91	Fr Fr	Francium 223.02	

Actinide

Neble Gas

Metalloid

BasicMetal

Altali Metal Alkaline Earth Transition Metal