Coaching Report

Participant	mikko virta	**Student detail**	User_46
Group	ntc.fi ats.fi	**Status**	Ended normally
Assessment name	Organic Chemistry 3 - EN V4	**Final Score**	19
Time Used	00:03:58	**Time limit (min)**	60
Date taken	15-09-2016 16:26:24		

Questions - presented: 30, answered: 30

1 **Use the marker to select which one of the following structures represents a pyrimidine-2-desoxynucleotide.**

Question type	Hotspot
Topic	Biomolecules
Difficulty	3/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 42,3,234,124

2 **Use the marker to select which one of the following structures represents ascorbic acid (vitamin C).**

Question type	Hotspot

Topic	Biomolecules
Difficulty	3/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 312,3,443,120

3 **Use the marker to select which one of the following compounds is not a natural a-amino acid.**

Question type	Hotspot
Topic	Biomolecules
Difficulty	3/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 386,1,519,134

4 **Select from the list below which two statements about the compound shown are correct.**

Question type	Multiple Response
Topic	Biomolecules
Difficulty	3/3
Score	2.31
Score max	1
Answer choosen	the compound is soluble in chloroform the compound is soluble in water

	the compound gives glycerol and fatty acids on hydrolysis
Answer	0) the compound is soluble in chloroform 1) the compound gives glycerol and fatty acids on hydrolysis 2) the compound is soluble in water 3) the compound is an oil at ambient conditions 4) the compound is a typical detergent

5	**Use the marker to select which one of the compounds shown would be the major product in the reaction of thiophene with acetyl nitrate (a good nitrating agent).**

Question type	Hotspot
Topic	Ar Subst of Heteroaromatics
Difficulty	3/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 191,172,298,248

6	**Use the marker to select which one of the compounds shown below would be the major product in the reaction of 3-methyl pyridine under the condition given in the scheme.**

Question type	Hotspot
Topic	Ar Subst of Heteroaromatics

Difficulty	3/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 352,149,491,235

7 **Use the marker to select which one of the compounds shown below is predominantly formed in the reaction of pyrrole with acetic anhydride.**

Question type	Hotspot
Topic	Ar Subst of Heteroaromatics
Difficulty	3/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 118,196,230,284

8 **Select which of the following statements concerning the electrophilic substitution of furan are correct.**

Question type	Multiple Response
Topic	Ar Subst of Heteroaromatics
Difficulty	3/3
Score	0.00
Score max	1
Answer choosen	Furan gives mostly b-derivatives, like pyridine. Furan gives mostly a-derivates, because the corresponding cationic intermediate is better

	stabilised.
Answer	0) Furan gives mostly a-derivates, because the corresponding cationic intermediate is better stabilised. 1) Furan is very reactive because of the strong mesomeric effect of the free electron pair at the oxygen atom. 2) Furan is very reactive because of the strong inductive effect of the oxygen atom. 3) Furan gives mostly b-derivatives, like pyridine.

9	**Use the marker to select which one of the isomers of triaminocyclohexane shown below has the following spectroscopic properties in D2O.** **1H NMR: d = 2.74 (3H, tt, J = 3.9, 11.3 Hz), 1.97 (3H, td, J = 3.9, 12.8 Hz), 0.95 (3H, td, J = 11.3, 12.8 Hz).**

Question type	Hotspot
Topic	Adv. Struct. Elucidation using Spectro
Difficulty	3/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 445,2,580,113

10	**To analyze a mixture of ethyl 9,10-dihydroxystearate (1) and ethyl epoxystearate (2), the mixture was silylated (to form the derivative 3 from 1). The 1H NMR spectrum of the mixture of 2 and 3 shows, among others, signals**

at d 0.15 (integral 72 mm) and at d 4.2 (20 mm). What is the molar ratio of 1 : 2?

Question type	Multiple Choice
Topic	Adv. Struct. Elucidation using Spectro
Difficulty	3/3
Score	0.00
Score max	1
Answer choosen	1 : 2
Answer	0) 2 : 3 1) 3 : 2 2) 2 : 1 3) 1 : 3 4) 1 : 2

11 **Use the marker to select which one of the trimethylcyclohexane stereoisomers shown below would exhibit only 3 signals in its 13C NMR spectrum.**

Question type	Hotspot
Topic	Adv. Struct. Elucidation using Spectro
Difficulty	2/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 208,10,391,104

12 **Use the marker to select which one of the compounds shown below is used**

as monomer for the production of Nylon-6 (a polyamide) by anionic polymerisation.

Question type	Hotspot
Topic	Polymers
Difficulty	2/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 204,2,278,97

13 Which one of the following dienes would be expected to give an adduct upon heating with maleic anhydride (1)?

Question type	Multiple Choice
Topic	Cyclo-Add Rx, Rad add to Alkenes, StChem
Difficulty	2/3
Score	0.00
Score max	1
Answer choosen	CH2=CHCH2CH2CH=CH2
Answer	0) CH2=CH-CH=CHCH2CH3
	1) CH2=C=CHCH2CH3
	2) CH2=CHCH2CH=CHCH3
	3) CH2=CHCH2CH2CH=CH2

14 Select from the list below the correct number of stereoisomers (configurational isomers) with the following constitution.

Question type	Multiple Choice
Topic	Stereochem Cpds 2+ St.genic, Cyclic Cpds
Difficulty	2/3
Score	0.00
Score max	1
Answer choosen	6 (2 pairs of enantiomers plus 2 meso compounds)
Answer	0) 4 (1 pair of enantiomers plus 2 meso compounds) 1) 8 (4 pairs of enantiomers) 2) 3 (1 pair of enantiomers plus 1 meso compound) 3) 6 (2 pairs of enantiomers plus 2 meso compounds)

15 **Which one of the following statements concerning chemical equilibria is correct?**

Question type	Multiple Choice
Topic	C+ Rearrgt, Beckman B-V, Hofman,Curtius
Difficulty	2/3
Score	0.00
Score max	1
Answer choosen	The equilibrium constant, K, for any reaction does not depend on the temperature.
Answer	0) If the equilibrium constant, K, for a reaction is very large, the equilibrium yield of products

will be high.

1) If the equilibrium constant, K, for a reaction is very large, the equilibrium yield of products will be low.

2) The equilibrium yield of products is independent from the equilibrium constant, K.

3) The equilibrium constant, K, for any reaction does not depend on the temperature.

16 **Select from the list below the one set of reaction conditions which would be suitable for the following transformation.**

Question type	Multiple Choice
Topic	Further Substn & Elim Rx, StChem of Elim
Difficulty	2/3
Score	0.00
Score max	1
Answer choosen	not ok
Answer	0) CH3OH, H2SO4
	1) NaOCH3, CH3OH
	2) CH3MgBr
	3) KOH, (CH3)2SO4, H2O
	4) CH2Cl2, NaOH, H2O

17 **Select from the sets of reagents and conditions below the one which most likely will lead to the product shown in the reaction scheme.**

Question type	Multiple Choice

Topic	More Complex Synth, PG, Multistep
Difficulty	2/3
Score	0.00
Score max	1
Answer choosen	1. C6H5Br, NaOCH3; 2. LiAlH4
Answer	0) 1. C6H5MgBr (excess); 2. H+, H2O 1) 1. NaOH, H2O; 2. C6H5Li (excess) 2) 1. C6H5Br, NaOCH3; 2. LiAlH4 3) 1. C6H6, AlCl3; 2. C6H5MgBr

18 **Use the marker to select which would be the major product resulting from treatment of 1 under the conditions given below.**

Question type	Hotspot
Topic	Enolate Anion Chem, Michael Reactions
Difficulty	2/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 2,112,201,176

19 **Use the marker to select which one of the compounds shown below is the major product of the reaction of compound 1 under the conditions given in the scheme.**

Question type	Hotspot
Topic	Enolate Anion Chem, Michael Reactions
Difficulty	2/3

Score	3.3
Score max	1
Answer choosen	not ok
Answer	0) 317,173,461,261

20 **Use the marker to select which one of the compounds shown below is the major product in the following reaction.**

Question type	Hotspot
Topic	Enolate Anion Chem, Michael Reactions
Difficulty	2/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 206,136,393,233

21 **Which one of the following functional groups is present in the structure shown?**

Question type	Multiple Choice
Topic	Functional Group Recogn., Simple Spectro
Difficulty	1/3
Score	0.00
Score max	1
Answer choosen	b,g-unsaturated ketone
Answer	0) b,g-unsaturated aldehyde
	1) aldol
	2) a,b-unsaturated ketone

3) b,g-unsaturated ketone

22 **Rank the following bases in the order of their base strength : methylamine (1) ammonia (2) ethylamine (3) diethylamine (4)**

Question type	Multiple Choice
Topic	Acids and Bases Strength
Difficulty	1/3
Score	0.00
Score max	1
Answer choosen	3 1 2 4
Answer	0) 1 3 2 4
	1) 4 3 1 2
	2) 3 1 2 4
	3) 2 3 1 4

23 **Which one of the following statements concerning SN1 reactions is correct ?**

Question type	Multiple Choice
Topic	Further Substn & Elim Rx, StChem of Elim
Difficulty	1/3
Score	3.30
Score max	1
Answer choosen	SN1 reactions often result in racemization on substitution at a chirality centre.
Answer	0) In an SN1 reaction the rate of reaction is proportional to the concentration of the nucleophile.

1) Doubling the concentration of the nucleophile in an SN1 reaction doubles the reaction rate.

2) SN1 reactions are faster for strong nucleophiles than for weak nucleophiles.

3) SN1 reactions often result in racemization on substitution at a chirality centre.

24 **Use the marker to select which one of the compounds shown below would be the major product in the following reaction.**

Question type	Hotspot
Topic	Electrophilc Ar Subst of Bz der & Napht
Difficulty	1/3
Score	3.3
Score max	1
Answer choosen	not ok anhydrite
Answer	0) 2,2,146,109

25 **Which one of the following solvents easily forms dangerous peroxides when exposed to air and light for longer periods of time ?**

Question type	Multiple Choice
Topic	Safety, Solvents
Difficulty	1/3
Score	3.30

Score max	1
Answer choosen	Diisopropyl ether
Answer	0) Diisopropyl ether
	1) t-Butyl methyl ether
	2) tert. Butanol
	3) Toluene

26 **Which one of the following solvents is suitable for performing Grignard reactions ?**

Question type	Multiple Choice
Topic	Safety, Solvents
Difficulty	1/3
Score	0.00
Score max	1
Answer choosen	Acetonitrile
Answer	0) Tetrahydrofuran
	1) Dichloromethane
	2) Dimethyl sulfoxide
	3) Acetonitrile
	4) Toluene

27 **The 1H NMR spectrum of a compound C3H3Cl5 consists of a doublet at d 2.2 (J=7Hz) and a triplet at d 5.8 (J=7Hz) of relative areas 2:1. What is the structure of this compound?**

Question type	Multiple Choice
Topic	Adv. Struct. Elucidation using Spectro

Difficulty	1/3
Score	0.00
Score max	1
Answer choosen	1,1,2,3,3-pentachloropropane (2)
Answer	0) 1,1,1,3,3-pentachloropropane (1)
	1) 1,1,2,3,3-pentachloropropane (2)
	2) 1,1,2,2,3-pentachloropropane (3)
	3) 1,1,1,2,2-pentachloropropane (4)

28 **Use the marker to select which one of the compounds shown below has 13C NMR signals atd = 120.8 (singlet), 10.6 (quartet), 10.8 (triplet).**

Question type	Hotspot
Topic	Adv. Struct. Elucidation using Spectro
Difficulty	1/3
Score	0.0
Score max	1
Answer choosen	not ok
Answer	0) 279,11,362,50

29 **Select from the list below the angle corresponding most closely to the C-C-C bond angle in 2-propyn-1-ol .**

Question type	Multiple Choice
Topic	Resonance, Aromaticity
Difficulty	1/3
Score	0.00
Score max	1

Answer choosen	104
Answer	0) 90
	1) 104
	2) 120
	3) 150
	4) 180

30 **Select from the list below the correct order of reactivity of the following carbonyl compounds towards nucleophiles.**

Question type	Multiple Choice
Topic	Enolate Anion Chem, Michael Reactions
Difficulty	1/3
Score	3.30
Score max	1
Answer choosen	1 4 2 3
Answer	0) 1 4 2 3
	1) 1 3 4 2
	2) 4 2 1 3
	3) 3 2 4 1