



سُلْطَنَةُ عُومَانِ
وَزَارَةُ التَّرْبِيَةِ وَالتَّعْلِيمِ

حاضر

غائب

رقم الورقة	
رقم المغلف	

امتحان دبلوم التعليم العام للمدارس الخاصة (ثنائية اللغة)

للعام الدراسي ١٤٣٤/١٤٣٥ هـ - ٢٠١٣ / ٢٠١٤ م

الدور الثاني - الفصل الدراسي الأول

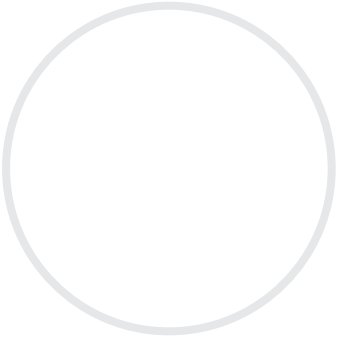
- زمن الإجابة: ثلاث ساعات.
- الإجابة في الورقة نفسها.

- تنبيه: المادة: الكيمياء.
- الأسئلة في (١٢) صفحة.

تعليمات وضوابط التقدم للامتحان:

- الحضور إلى اللجنة قبل عشر دقائق من بدء الامتحان للأهمية.
- إبراز البطاقة الشخصية لمراقب اللجنة.
- يمنع كتابة رقم الجلوس أو الاسم أو أي بيانات أخرى تدل على شخصية الممتحن في دفتر الامتحان، وإلا ألغى امتحانه.
- يحظر على الممتحنين أن يصطحبوا معهم بمركز الامتحان كتباً دراسية أو كراسات أو مذكرات أو هواتف محمولة أو أجهزة النداء الآلي أو أي شيء له علاقة بالامتحان كما لا يجوز إدخال آلات حادة أو أسلحة من أي نوع كانت أو حقائب يدوية أو آلات حاسبة ذات صفة تخزينية.
- يجب أن يتقيد المتقدمون بالزي الرسمي (الدشداشة البيضاء والمصر أو الكمة للطلاب والدارسين والزي المدرسي للطالبات واللباس العماني للدارسات) ويمنع النقاب داخل المركز ولجان الامتحان.
- لا يسمح للمتقدم المتأخر عن موعد بداية الامتحان بالدخول إلا إذا كان التأخير بعذر قاهر يقبله رئيس المركز وفي حدود عشر دقائق فقط.
- يتم الالتزام بالإجراءات الواردة في دليل الطالب لأداء امتحان شهادة دبلوم التعليم العام.
- يقوم المتقدم بالإجابة عن أسئلة الامتحان المقالية بقلم الحبر (الأزرق أو الأسود).
- يقوم المتقدم بالإجابة عن أسئلة الاختيار من متعدد بتظليل الشكل () وفق النموذج الآتي:
س - عاصمة سلطنة عمان هي:
 القاهرة الدوحة
 مسقط أبوظبي
- ملاحظة: يتم تظليل الشكل () باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

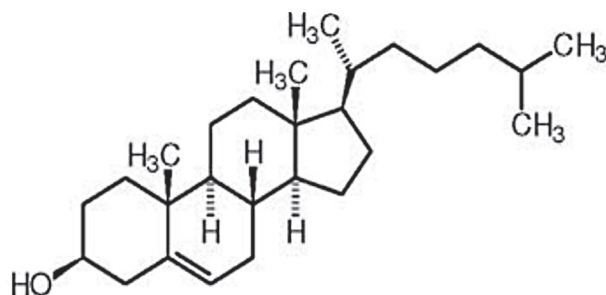
صحيح غير صحيح



Question 1**(28 marks)**

Shade the best correct answer for each of the following questions.

- 1) What is the type of organic compound indicated by the opposite molecule?



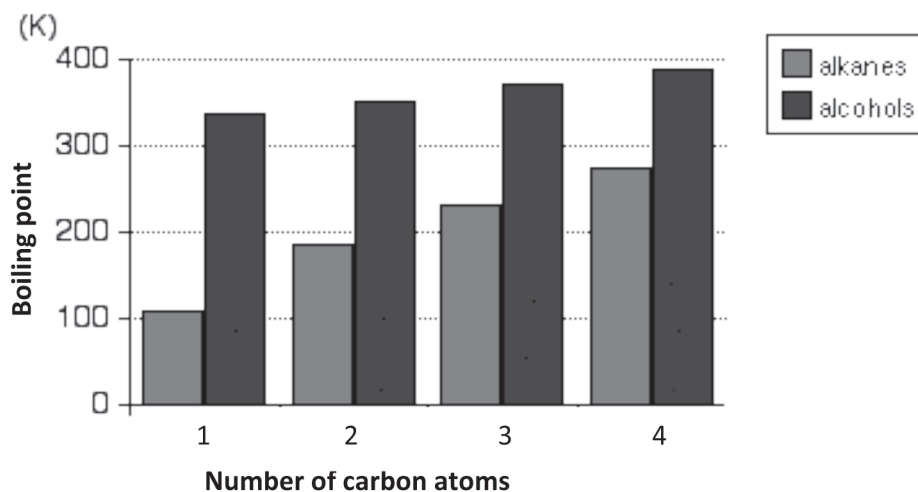
- Ketone.
- Alcohol.
- Aldehyde.
- Carboxylic acid.
- 2) What is the name of salts produced from the reaction of alcohols with sodium?
- Esters.
- Alkyls.
- Alkenes.
- Alkoxides.

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Use the following information to answer questions 3 and 4

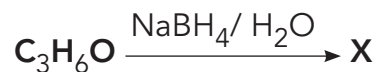
The bar chart below shows the boiling points of some simple primary alcohols with up to 4 carbon atoms compared with the corresponding alkanes.



- 3) Which of the following statements interprets the bar chart?
- The boiling point of butane is higher than that of methanol.
 - The boiling point of ethanol is higher than that of propan-1-ol.
 - The boiling points of the alcohols decrease as the number of carbon atoms increases.
 - The boiling point of an alcohol is always higher than that of the alkane with the same number of carbon atoms.
- 4) If the alcohol with the highest boiling point oxidizes in excess of acidified potassium dichromate, what will be the product?
- $\text{CH}_3\text{COCH}_2\text{CH}_3$
 - $\text{CH}_3\text{CH}=\text{CHCH}_3$
 - $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$
 - $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$

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For the following reaction:



- 5) Which of the following two compounds could represent (X)?
- Propan-1-ol ,propanoic acid .
- Propan-2-ol , propanoic acid.
- Propan-1-ol , Propan-2-ol.
- Propanal , propanone.
- 6) How many different ketones can be made from the molecular formula $\text{C}_5\text{H}_{10}\text{O}$?
- 1
- 2
- 3
- 4
- 7) When acidified potassium dichromate and iodine alkaline solution are used to test propanal, choose the option that gives the correct test results ?

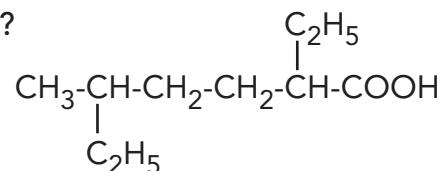
	acidified potassium dichromate test	alkaline iodine test
<input type="checkbox"/>	Positive	Negative
<input type="checkbox"/>	Positive	Positive
<input type="checkbox"/>	Negative	Negative
<input type="checkbox"/>	Negative	Positive

- 8) Which of the following reagents can be used to produce $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCl}$ from $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$?
- Cl_2
- PCl_5
- AlCl_3
- NaCl

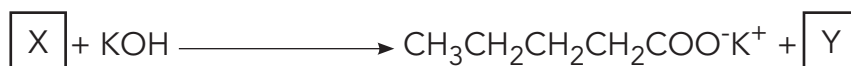
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9) What is the IUPAC name for the following compound?

- 2,5-diethylhexanoic acid.
 2,5-dimethylheptanoic acid.
 2-ethyl-5-methylhexanoic acid.
 2-ethyl-5-methylheptanoic acid.



10) For the reaction below



Which statement describes this reaction correctly?

- X is an organic acid.
 It is a halogenation reaction.
 The products are salt and hydrogen.
 It undergoes breaking the C-C bond of compound (X).

11) Which of the followings is not the simplest compound in its group?

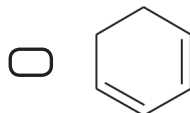
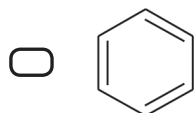
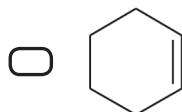
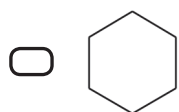
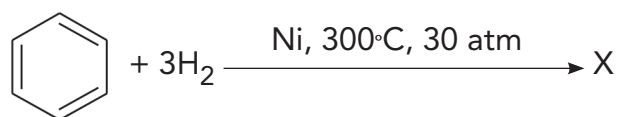
- ethylamine.
 ethannitrile.
 ethanamide.
 aminoethanoic acid.

12) Which of the following statements is correct about phenol ?

- It is basic due to the presence of (OH) group.
 Its melting point is less than that of benzene.
 It forms hydrogen bonds between its molecules.
 It undergoes substitution reaction less readily than benzene.

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13) What is the organic product represented by (X) in the following reaction?



14) Which of the following polymers is used as a bases for conducting polymers ?

- Poly(ethene).
- Poly(ethyne).
- Poly(chloroethene).
- Poly(tetrafluoroethene).

Question 2**(14 marks)**

- 15) The table below contains four different alcohols with the same molecular formula C_4H_9OH . Consider it to answer the following questions.

Alcohol	Structural formula
A	$CH_3(CH_2)_3OH$
B	$ \begin{array}{c} CH_3 \\ \\ CH_3 - C - CH_3 \\ \\ OH \end{array} $
C	$ \begin{array}{c} H \\ \\ CH_3 - C - CH_2OH \\ \\ CH_3 \end{array} $
D	$ CH_3CH_2 - \underset{\begin{array}{c} \\ OH \end{array}}{CH} - CH_3 $

- A. Write the IUPAC name of alcohol (C).
- _____
- B. One of the alcohols above **does not** oxidize with acidified potassium dichromate(VI).
- (i) Identify this compound.
- _____
- (ii) Write the chemical equation for the dehydration reaction of this compound.
- _____
- C. Identify the alcohol which can be oxidised to a ketone. Give the structure of the ketone formed.
- (i) Compound: _____
- (ii) Structure formula of the ketone formed: _____

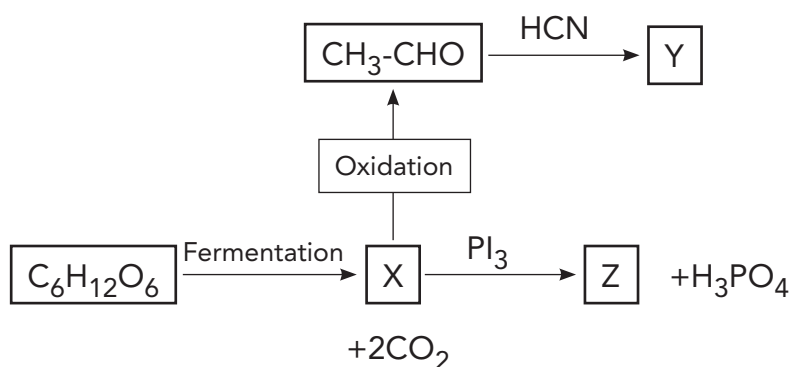
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D. Which test can be used to distinguish between compounds (C) and (D). Write what you would observe in the test?

(i) Test name: _____

(ii) Observation: _____

16) A series of chemical reactions was carried out as follows:



A. Write the structural formulae for the organic compounds represented by X, Y and Z.

X: _____

Y: _____

Z: _____

B. What are the two raw materials used for production of compound (X) in industry?

C. State one main use of compound (X) in industry.

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Question 3**(14 marks)**

17) Explain why:

- A. Silver mirror forms on the inside of a test tube when butanal is heated with Tollen's Reagent.

- B. Aldehydes undergo nucleophilic addition more readily than ketones.

18) The table below shows four carboxylic acid compounds. Consider it and answers the following questions.

Compound (A)	Compound (B)	Compound (C)	Compound (D)
$\text{CH}_3\text{CH}_2\text{COOH}$	HCOOH	$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$	CH_3COOH

- A. Which compound found in vinegar solution?
- B. What is the name of the reaction of compound (D) with propan-1-ol in the presence of sulphuric acid and heating under reflux?
- C. Arrange the compounds according to the solubility in water from the least to the highest.

_____ , _____ , _____ , _____
 (least) \longrightarrow (highest)

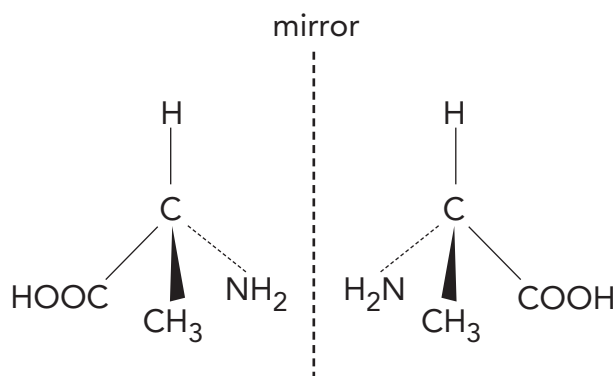
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- D. The boiling point of compound (C) is higher than of pentan-1-ol. Explain why. (Note: the two compounds have the same molecular mass).

- E. Write the chemical equation that shows the reduction of compound (D) with LiAlH_4 in dry ether.

- F. Write the structural formula of the organic compound produced by reacting compound (C) with $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$.

- 19) The following two structures show two optical isomers of an organic nitrogen compound. Study it and answer the questions below.



- A. Which group of organic nitrogen compounds do those two structures belong to?

- B. What is the name of this compound?

- C. What do we call those two optical isomers?

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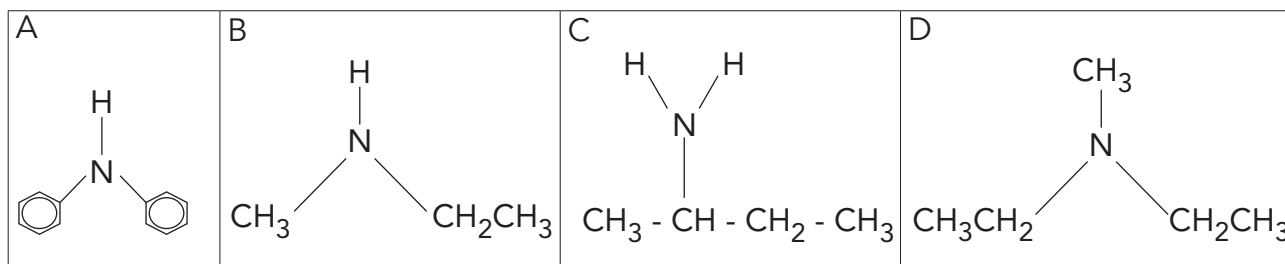
D. What do we call a mixture containing equal amounts of each isomer?

E. If (CH₃) group in this compound is replaced with (H), will the new compound exhibit an optical isomerism? Explain your answer.

Question 4

(14 marks)

20) The following grid shows the formulae for four organic nitrogen compounds. Study it and answer the questions below.



A. Identify the class of compound (A) whether it is primary, secondary or tertiary in its group.

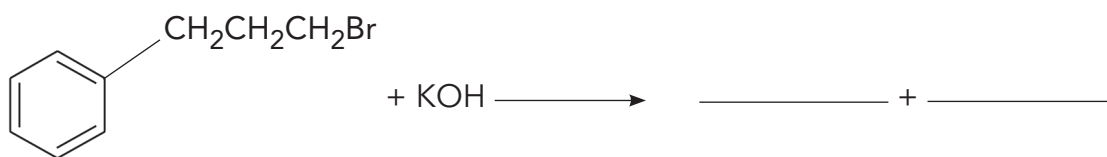
B. Which compound from the grid is the weakest base?

C. If (CH₃ - $\overset{|}{\text{CH}}$ - CH₂ - CH₃) group in compound (C) is replaced with ($\overset{|}{\text{COCH}_3}$), to which group of organic nitrogen compounds will the new compound belong?

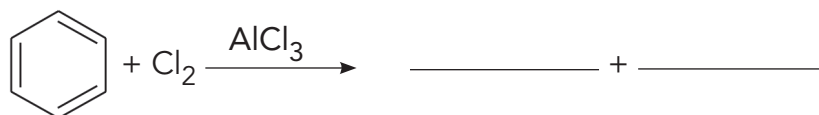
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21) A. Complete the following two equations and then answer the questions below:

Reaction 1:



Reaction 2:



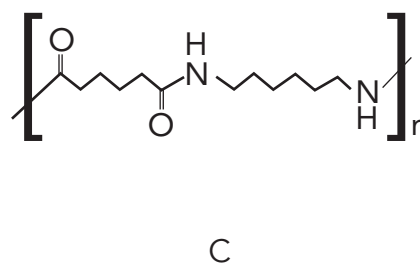
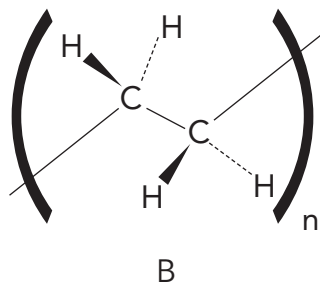
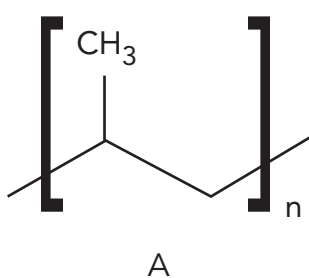
B. What is the type of reaction 1 and reaction 2?

C. A new reaction will take place if the reactants in reaction 2 react under sun light.

(i) Identify the type of the new reaction.

(i) Draw the structural formula of the organic compound produced?

22) Study the three polymers below and answer the following questions:



A. Which polymer is:

(i) Polyethene: _____

(ii) Nylon: _____

B. Draw The structural formula of the monomer(s) that form(s) polymer (A).

C. What is the type of polymerization by which polymer (B) is formed?

D. What is the name of the functional group found in polymer (C)?

E. Explain why polymer (C) has high melting point.

[End of Examination]

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MARKING GUIDE


GENERAL EDUCATION DIPLOMA
BILINGUAL PRIVATE SCHOOLS
SEMESTER ONE - SECOND SESSION

CHEMISTRY

2013 / 2014

Question One (28 Marks)

There are 14 multiple-choice items. Each correct answer is worth TWO marks.

Item No.	Correct option
1	Alcohol.
2	Alkoxides .
3	The boiling point of an alcohol is always much higher than that of the alkane with the same number of carbon atoms.
4	$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$
5	Propan-1-ol , Propan-2-ol.
6	3
7	Positive Negative
8	PCl_5
9	2-ethyl-5-methylheptanoic acid.
10	X is an organic acid
11	ethylamine.
12	It forms hydrogen bonds between its molecules
13	
14	Poly(ethyne).



Question Two (14 Marks)

Part	Section	The answer	The mark
15.	A.	2-methylepropan-1-ol	1 mark
	B. i	B or $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ \\ \text{OH} \end{array}$	1 mark
	B. ii	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ \\ \text{OH} \end{array} \xrightarrow[\text{Heat}]{\text{c. H}_2\text{SO}_4} \begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} = \text{CH}_2 \end{array}$	2 marks To get the mark, all the components of the equation should be written correctly. - If the reagent H_2SO_4 was not written (1 mark) is given
	C. i	D or $\begin{array}{c} \text{CH}_3\text{CH}_2 - \text{CH} - \text{CH}_3 \\ \\ \text{OH} \end{array}$	1 mark
	C. ii	$\begin{array}{c} \text{CH}_3\text{CH}_2 - \text{C} - \text{CH}_3 \\ \\ \text{O} \end{array}$	1 mark
	D.i	Iodoform test	1 mark
	D.ii	For (D) yellow precipitate of (CHI_3) will form and for (C) no reaction	1 mark
	16.	A	X : $\text{CH}_3\text{CH}_2\text{OH}$ Y : $\text{CH}_3\text{CH}(\text{CN})(\text{OH})$ Z : $\text{CH}_3\text{CH}_2\text{I}$
B		1- From ethene. 2- From glucose(sugar cane).	1 mark 1 mark
C		Fuel or solvent or drink	1 mark



QUESTION Three (14 marks)

<u>Part</u>	<u>Section</u>	<u>The answer</u>	<u>The mark</u>
17.	A.	When butanal heated with <u>Tollen's Reagent</u> it is oxidized to <u>butanoic acid</u> and <u>Ag⁺</u> present in Tollen's Reagent is reduced to <u>(Ag)</u> which forms a silver mirror. <i>- if student writes equation correctly, mark is given</i>	(½ mark) (½ mark)
	B.	-Because aldehydes have <u>one alkyl group donating electrons</u> or <u>ketones have two alkyl groups donating electrons</u> (1 mark) - <u>the positive charge</u> on the electron-deficient carbon atom in aldehydes is larger than in ketones (1 mark)	(2 marks)

Continue Question Three

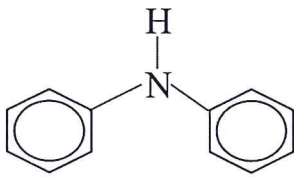
<u>Part</u>	<u>Section</u>	<u>The answer</u>	<u>The mark</u>
18	A	Compound (D) or CH ₃ COOH or ethanoic acid or acetic acid	(1 mark)
	B	Esterification.	(1 mark)
	C	HCOOH ,CH ₃ COOH, CH ₃ CH ₂ COOH, CH ₃ CH ₂ CH ₂ COOH Compound(B), Compound(D) ,Compound(A),Compound(C) • <i>½ mark for each correct compound.</i>	(2 marks)
	D	-Because the hydrogen bonds in the carboxylic acid CH ₃ CH ₂ CH ₂ COOH or Compound(C) is stronger than in the alcohol pentan-1-ol . -the molecules of the carboxylic acid CH ₃ CH ₂ CH ₂ COOH or Compound(C) pair up forming dimers. <i>-For any answer from above mark is given</i>	(1 mark)
	E	$\text{CH}_3\text{COOH} \xrightarrow[\text{then H}_2\text{O}]{\text{LiAlH}_4(\text{dry ether})} \text{CH}_3\text{CH}_2\text{OH}$ <p><i>To get the mark, all components of the equation should be written correctly.</i> <i>If student does not write LiAlH₄(dry ether) or H₂O, mark is given.</i></p>	(1mark)
	F	CH ₃ CH ₂ CH ₂ COOCH ₂ CH ₂ CH ₃	(1 mark)



Continue Question Three

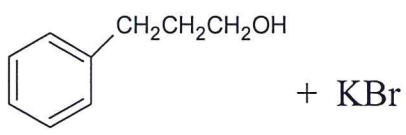
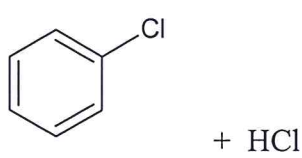
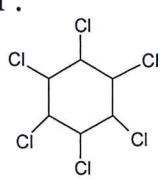

<u>Part</u>	<u>Section</u>	<u>The answer</u>	<u>The mark</u>
19	A.	Amino acid.	(½ mark)
	B.	Alanine.	(1 mark)
	C.	Enantiomers.	(½ mark)
	D.	Racemic mixture or racemate.	(1 mark)
	E.	No - because new compound will not rotate the plane of the polarised light. -because the two optical isomers of new compound are not mirror image of each other. - because new compound will not contain a carbon atom bonded to four different groups. - because new compound has not a chiral carbon atom. - because new compound is not asymmetric molecule. - because new compound is symmetric molecule. - because new compound will be glycine which does not exhibits optical isomerism.	(½ mark) (½ mark) -any answer from the given answers mark is given.

Question Four (14 Marks).

<u>Part</u>	<u>Section</u>	<u>The answer</u>	<u>The mark</u>
20	A.	secondary	(½ mark)
	B.	compound (A) or <div style="text-align: center;">  </div>	(½ mark)
	C.	Amide.	(1 mark)



Continue Question Four

<u>Part</u>	<u>Section</u>	<u>The answer</u>	<u>The mark</u>
21	A	 - 1/2 mark for each product	(1 mark)
		 - 1/2 mark for each product	(1 mark)
	B	Reaction 1 nucleophilic substitution or side-chain reaction. Reaction 2 electrophilic substitution or halogenation	(1 mark) (1 mark)
	C	i. addition .	(1 mark)
		ii. 	(1 mark)
22	A	i. B ii. C	(1mark) (1mark)
	B	CH ₂ =CHCH ₃	(1mark)
	C	i. Addition	(1mark)
	D	 Amide or peptide	(1mark)
	E	because its chain held to each other by hydrogen bonds or by strong intermolecular forces.	(1mark)

This is the end of the Marking Guide

