



**INTI**  
**International College Penang**  
 LAUREATE INTERNATIONAL UNIVERSITIES\*

**FINAL**  
 Examination Paper

(COVER PAGE)

Session : August 2017

Programme : Foundation in Science (CFSI)

Course : CHM1204 : Chemistry 2

Date of Examination : 11 December 2017 (Monday)

Time : 11:00am – 1:00pm Reading Time : Nil

Duration : 2 hours

**Special Instructions** :

This paper consists of FIVE (5) questions. Answer any FOUR (4) questions in the answer booklet provided. All questions carry equal marks.

Materials permitted :

Non-Programmable Scientific Calculator

Materials provided :

Periodic Table

Examiner(s) : Lim Sze Theng

Moderator : Dr. Lim Gin Keat

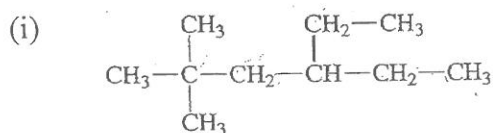
*This paper consists of 12 printed pages, including the cover page.*

INTI INTERNATIONAL COLLEGE PENANG  
 FOUNDATION IN SCIENCE (CFSI)  
 CHM1204: CHEMISTRY 2  
 FINAL EXAMINATION: AUGUST 2017 SESSION

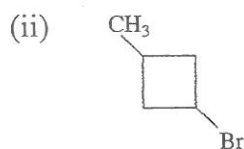
**Instructions:** This paper consists of **FIVE (5)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

**Question 1**

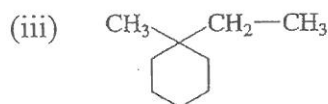
(a) Give the IUPAC name for each of the following compounds :



(1 mark)



(1 mark)



(1 mark)

(b) Consider the compound ethylcyclopentane.

(i) Draw the condensed structural formula. (2 marks)

(ii) Write the balanced equation for the complete combustion of ethylcyclopentane. (2 marks)

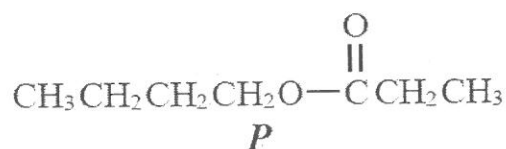
(c) Predict the major organic product for each of the following reactions :



(d) Would you expect ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ ) to have higher or lower boiling point than ethanal ( $\text{CH}_3\text{CHO}$ )? Explain.

(2 marks)

(e)



(i) Draw full equation to show how *P* can be formed.

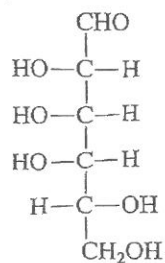
(2 marks)

(ii) Give the IUPAC name of *P*.

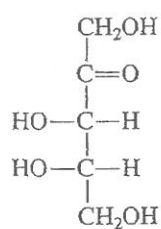
(2 marks)

(f) Classify each of the following monosaccharides as an aldose or a ketose.

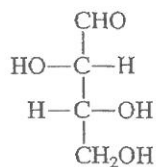
(i)



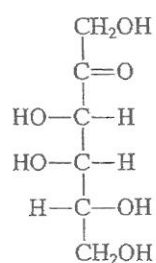
(ii)



(iii)



(iv)



(4 marks)

(g) Indicate whether each of the following compound is chiral or achiral.

- (i) 1-Chloro-2-methylpentane
- (ii) 2-Chloro-2-methylpentane
- (iii) 2-Chloro-3-methylpentane
- (iv) 3-Chloro-2-methylpentane

(4 marks)

## Question 2

(a) Draw the structural formula for each of the following compounds:

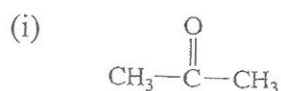
(i) 3-methoxypentane

(2 marks)

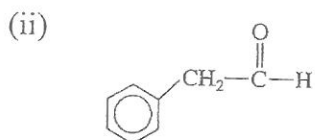
(ii) *trans*-1,4-cyclohexanediol

(2 marks)

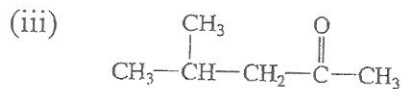
(b) Write the structural formula of the organic product when hydrogen in the presence of nickel catalyst reduces each of the followings :



(2 marks)



(2 marks)



(2 marks)

(c) Linolenic is an essential fatty acid with structural notation of 18:3<sup>Δ9,12,15</sup> omega-3.

(i) Draw the structure of linolenic fatty acid.

(2 marks)

(ii) Triacylglycerol can be produced from the reaction between one molecule of glycerol with three molecules of linolenic acids.

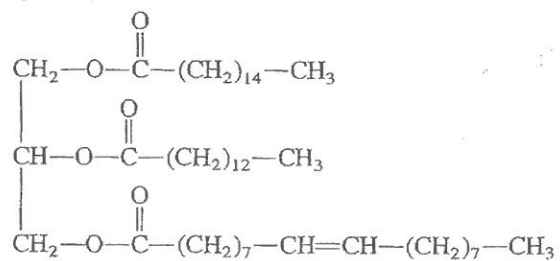
(1) Draw the structure of the triacylglycerol produced.

(2 marks)

(2) Write the chemical equations for the triacylglycerol that undergoes complete saponification with potassium hydroxide. You may draw structural formula in your equations.

(3 marks)

- (d) Draw condensed structural formula for all products you would obtain from the complete hydrolysis of the following triacylglycerol.



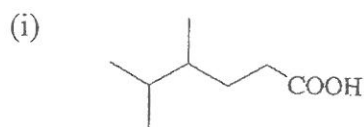
(4 marks)

- (e) Write an equation for the oxidation of 1-propanol and name each product.

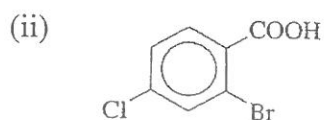
(4 marks)

## Question 3

(a) Assign an IUPAC name to each of the following compounds.



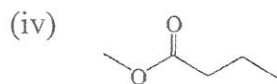
(2 marks)



(2 marks)

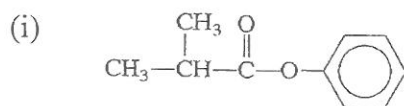


(2 marks)

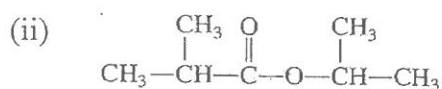


(2 marks)

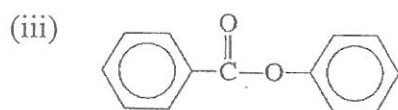
(b) Write the structural formulas of the products when each of the following esters is hydrolyzed under acidic conditions.



(2 marks)

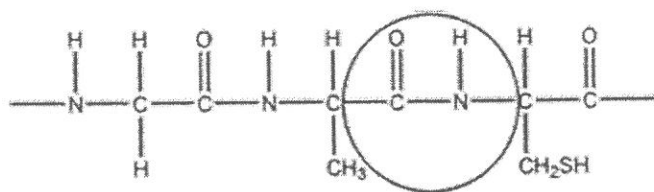


(2 marks)



(2 marks)

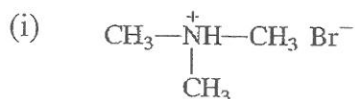
(c)



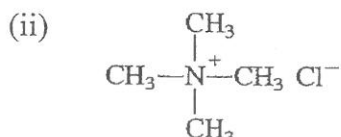
- (i) A protein is built up of amino acids. The amino acid molecules are held together by a bond, **X**. State the name of **X**. (2 marks)
- (ii) Name the reaction that forms a protein. (2 marks)
- (iii) Explain why protein cannot perform its biological function at a very high temperature. (2 marks)
- (d) What are the two functional groups involved in the formation of a peptide bond? (2 marks)
- (e) Draw the structural formula for the tripeptide Ala-Gly-Val. (3 marks)

## Question 4

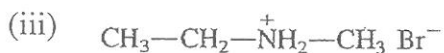
(a) Classify each of the following salts as an amine salt or quaternary ammonium salts :



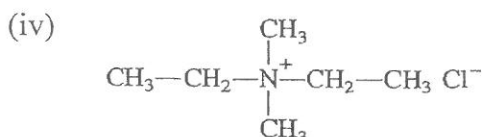
(2 mark)



(2 marks)



(2 marks)



(2 marks)

(b) Which compound in each of the following pairs of amines would you expect to be more soluble in water? Justify each answer.

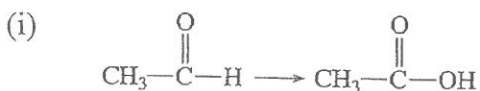


(2 marks)

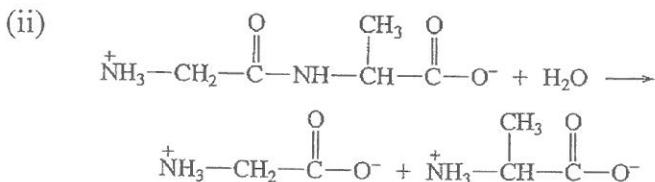


(2 marks)

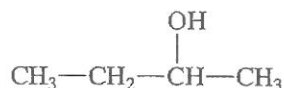
(c) What is the class of the enzyme that would catalyze each of the following reactions?



(2 marks)



(2 marks)



(2 marks)

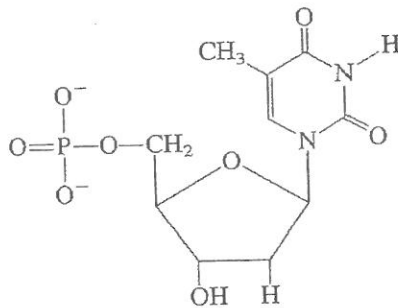
(d) How does reversible inhibition differ from irreversible inhibition? (2 marks)

(e) Predict the sequence of bases in the complimentary DNA strand to the single DNA strand below.

5' C-G-A-A-T-C-C-T-A 3'

(2 marks)

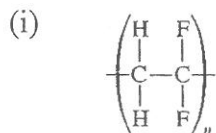
(f) Draw the structures of the three products produced when the nucleotide below undergoes hydrolysis.



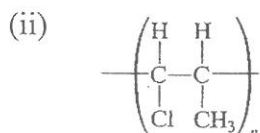
(3 marks)

## Question 5

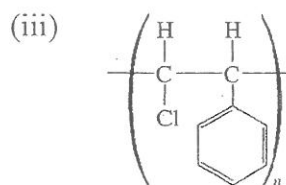
- (a) Draw the structural formula of the monomer(s) from which each of the following polymers was made :



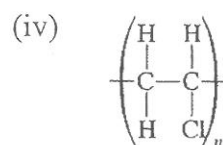
(2 marks)



(2 marks)



(2 marks)



(2 marks)

- (b) Compound A is 1-propanol. When compound A is heated with strong acid, it dehydrates to form compound B ( $\text{C}_3\text{H}_6$ ). When compound A is oxidized, compound C ( $\text{C}_3\text{H}_6\text{O}$ ) forms. Give the condensed structural formulas and names of compound B and C.

(4 marks)

- (c) Classify each of the following chemical processes as anabolic or catabolic.

- (i) Synthesis of a polysaccharide from monosaccharides.

(1 mark)

- (ii) Hydrolysis of a pentasaccharide to monosaccharides.

(1 mark)

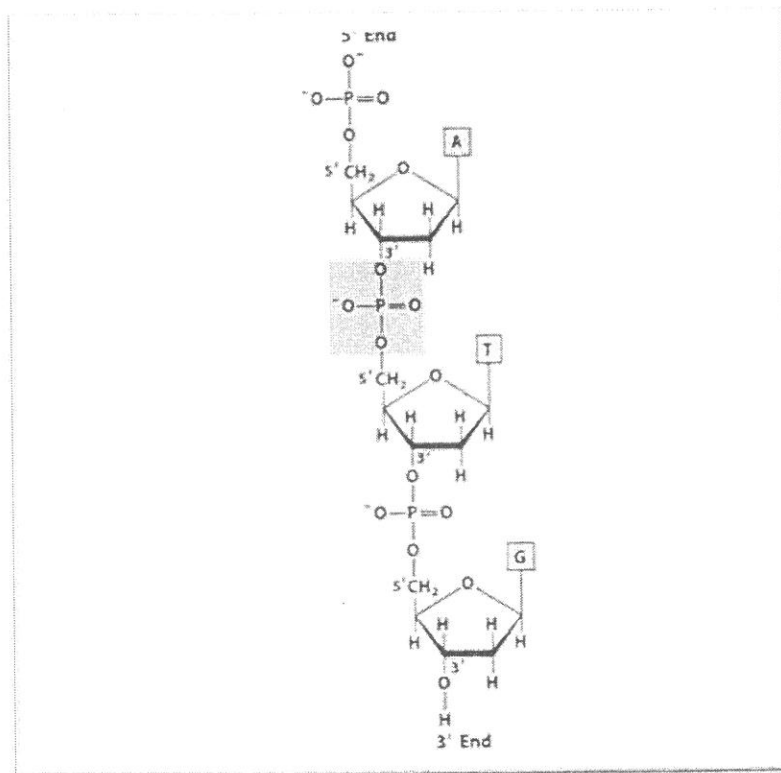
- (iii) Formation of nucleotide from phosphate, nitrogenous base and pentose sugar.

(1 mark)

- (iv) Hydrolysis of a triacylglycerol to glycerol and fatty acids.

(1 mark)

- (d) The polynucleotide chain is made up of nucleotides linked together with ester linkage.



- (i) Give the name of the ester linkage (as seen in box) in the diagram above. (2 marks)
- (ii) Name the process of polynucleotides formation. (1 mark)
- (iii) Classify the polynucleotide strand above as DNA or RNA strand. (1 mark)
- (iv) State the full name of all the bases A, T and G in the strand above. (3 marks)
- (e) Give TWO differences between RNA molecules and DNA molecules. (2 marks)

--THE END--

CHM1204(F)/AUG2017/S.T.LIM

PERIODIC TABLE

18  
Group  
VIII

1  
Group  
IA

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
	Group IA	Group IIA	Group IIIB	Group IVB	Group VB	Group VIB	Group VIIB	Group VIII	Group VIII	Group VIII	Group IB	Group IIB	Group IIIA	Group IVA	Group VA	Group VIA	Group VIIA	Group VIIIA	
1	1 H 1.01	2 He 4.00																	
2	3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18	
3	11 Na 22.99	12 Mg 24.31	3 Group IIIB	4 Group IVB	5 Group VB	6 Group VIB	7 Group VIIB	8 Group VIII	9 Group VIII	10 Group VIII	11 Group IB	12 Group IIB	13 Group IIIA	14 Group IVA	15 Group VA	16 Group VIA	17 Group VIIA	18 Group VIIIA	
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.63	33 As 74.92	34 Se 78.97	35 Br 79.90	36 Kr 83.80	
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.95	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29	
6	55 Cs 132.91	56 Ba 137.33	57 La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)	
7	87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (263)	105 Db (262)	106 Sg (266)	107 Bh (267)	108 Hs (277)	109 Mt (276)	110 Ds (281)	111 Rg (280)	112 Cn (285)	113 Nh (284)	114 Fl (289)	115 Mc (288)	116 Lv (293)	117 Ts (293)	118 Og (294)	

Atomic number  
Symbol  
Atomic mass

24  
Cr  
52.00

Nonmetals  
Metals

58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.05	71 Lu 174.97
90 Th (232)	91 Pa (231)	92 U (238)	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

