



THE OPEN UNIVERSITY OF SRI LANKA
BACHELOR OF SCIENCE DEGREE PROGRAMME
LEVEL 5 - ASSIGNMENT TEST II- 2019/2020
CYU5304 – CHEMISTRY OF BIOMOLECULES

197

Duration: One Hour

Registration No:

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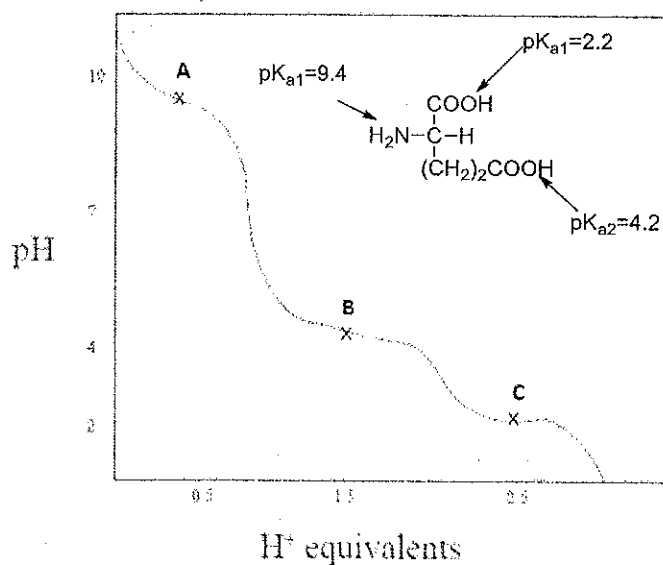
DATE: 14th September 2019 (Saturday)

TIME: 9.00 a.m. to 10.00 a.m.

This Assignment test paper consists of 04 (four) structured essay questions. Your answer must be written in the space provided.

- Answer **ALL** the questions.
- Use a **PEN** (not a pencil) in answering.
- You are **NOT allowed** to keep Mobile phones with you during the examination. **Switch off** and leave them in a safe place.

(1) A student performed an experiment for titrating Glutamic acid (Glu) with 0.1 M HCl solution. The titration curve he obtained for this experiment and the structure of Glutamic acid (Glu) is given below.



(a) Interpret the above titration curve by drawing the possible ionic structures formed at equilibrium points A, B and C that exists for Glutamic acid.

At point A

At point B

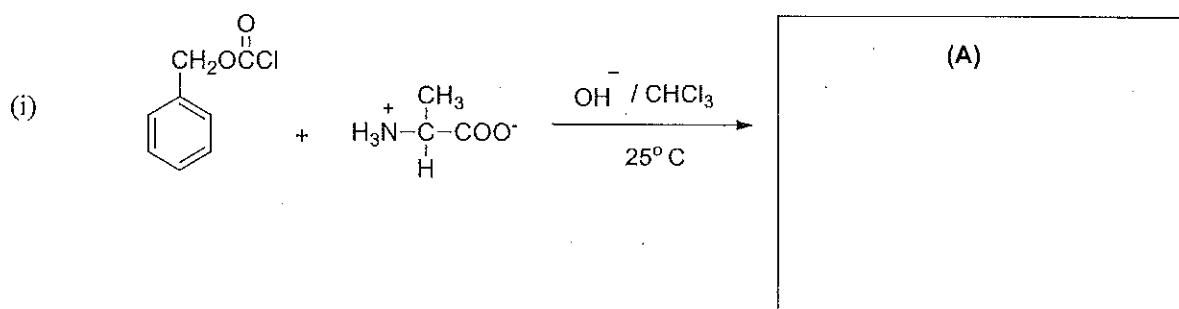
At point C

- (b) Mark with the letter **Z** on the titration curve at the possible place where the Zwitter ion pH can be existed. (18 marks)

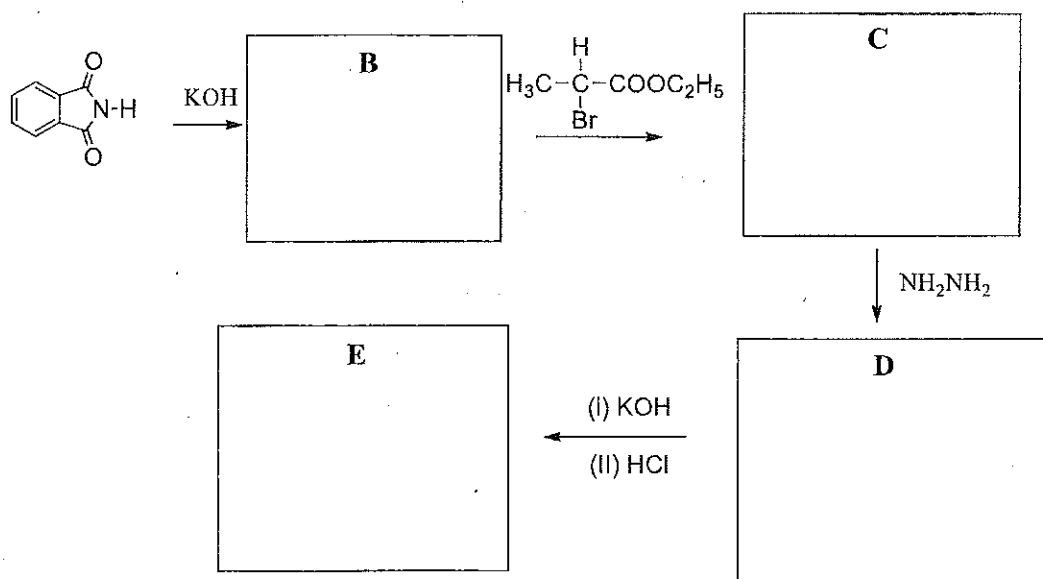
(2)

(5 marks)

- (a) Identify the products of following reactions

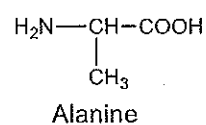
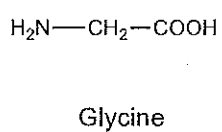
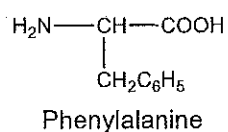


(ii)



(12 marks)

(b) Glycine and phenylalanine are the N-terminal and C-terminal residues respectively of a tripeptide composed of phenylalanine, glycine and alanine amino acids. Write the structural formula for the tripeptide.



(9 marks)

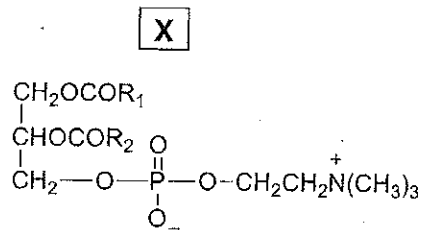
(3)

(a) Draw the structure of β -stearoyldipalmitin a triglyceride that gives two molecules of 16:0 (Palmitic acid) and one molecule of 18:0 (Stearic acid) on hydrolysis.

(12 marks)

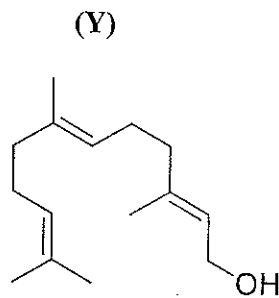
(b) What are glycerophospholipids?

(c) Identify all the possible products of hydrolysis of the complex lipid (X) given below. (5 marks)



(8 marks)

(d) Show the head (H) and tail (T) of all possible isoprene units in the following structure (Y).



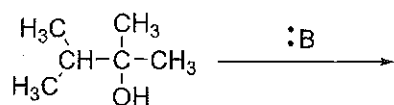
(6 marks)

(4) (a) Give three properties of metabolic pathways.

- i.
- ii.
- iii.

(3 marks)

- (b) Given below is an intermediate of a biochemical reaction that undergoes base catalyzed dehydration. Draw the structure of the product of this reaction giving mechanism.



(09 marks)

- (c) Illustrate the action of competitive inhibition of an enzyme in diagrammatic form.

(7 marks)

- (d) Name coenzymes derived from the following three Vitamin B complexes. Give the major metabolic role of each of them.

Vit. B	Principal coenzyme	Major metabolic role
Niacin		
Pantothenic acid		
Biotin		

(6 marks)

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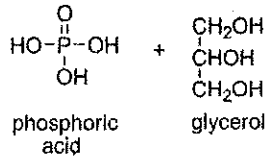
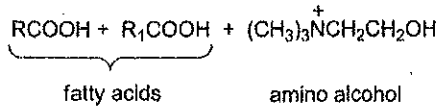
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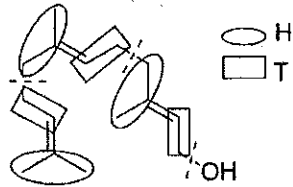
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(c)



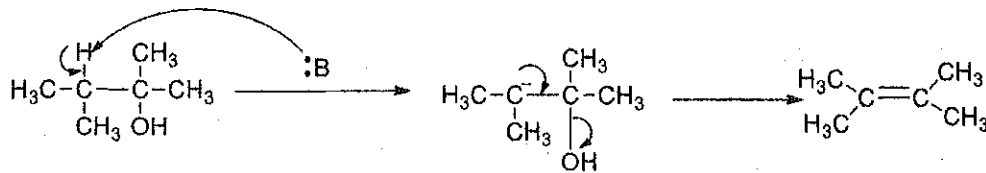
(d)



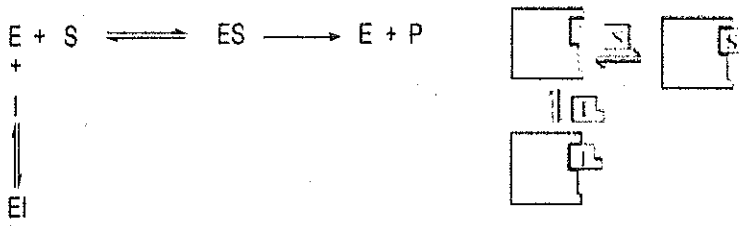
(4) (a)

- i. Irreversible; existing in a steady state
- ii. Linear or cyclic
- iii. Regulated by enzymes
- iv. Occur in specific cellular compartments
- v. Thermodynamically unfavourable reactions are coupled with thermodynamically stable reactions
- vi. Have a first committed step

(b)



(c)



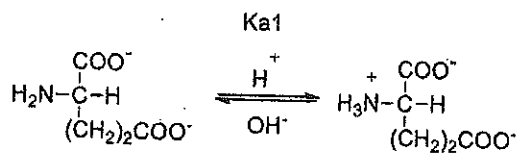
(d)

Vit. B	Principal coenzyme	Major metabolic role
Niacin	NAD ⁺ /NADP ⁺	Oxidation- reduction
Pantothenic acid	Coenzyme A (CoA)	Acetyl group transfer
Biotin	Biocytin	Carboxyl group transfer (carboxylation)

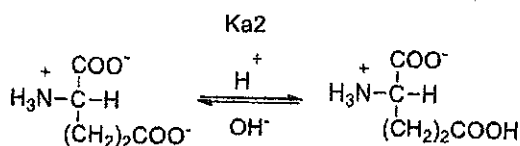
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LEVEL 5 – ASSIGNMENT TEST II (2019/2020)– ANSWER GUIDE

(1) (a).

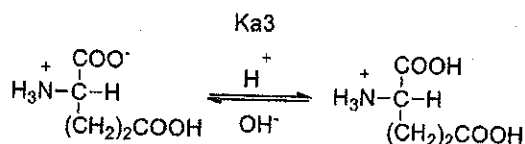
At point A



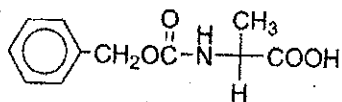
At point B



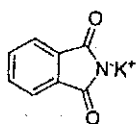
At point C



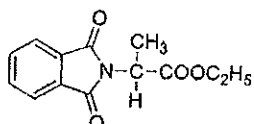
(2) (a). (i)



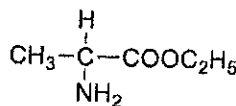
(ii)



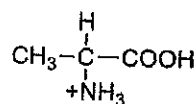
B



C

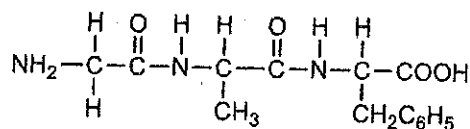


D

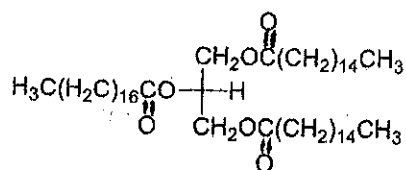


E

(b).



(3) (a)



(b) Glycerophospholipids are those that form glycerol, fatty acids, inorganic phosphate and an organic base or a polyhydroxy compound on hydrolysis.