



UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

3

DEPARTMENT OF PHARMACY

FIRST BPHARM PART I EXAMINATION – NOVEMBER 2020

PH 1123 BIOCHEMISTRY I – SEQ

TIME: TWO HOURS

INSTRUCTIONS

- There are **four** questions in A, B and C parts in this paper
- Answer **all** questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Use illustrations where necessary.

PART A

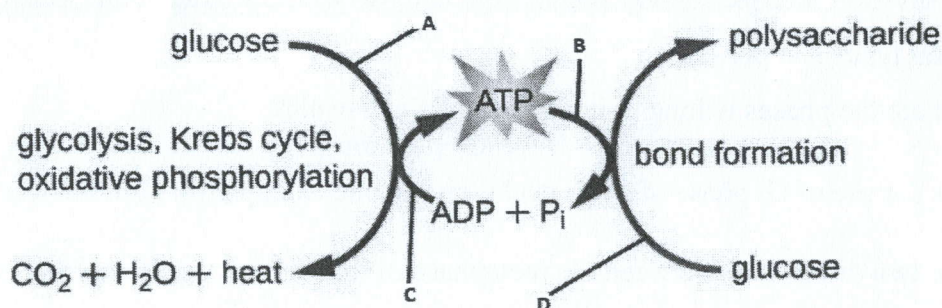
- 01** Cell division is a process by which new cells arise from other living cells. This includes several types and phases.
- 1.1 What are the phases belong to interphase of a cell cycle? *(06 marks)*
- 1.2 State the use of G₀ phase of a cell cycle, giving one example for your answer. *(10 marks)*
- 1.3 Write **two** differences between the metaphase of mitosis and the metaphase I of meiosis. *(15 marks)*
- 1.4 State the importance of cell cycle check points available in the eukaryotic cells and give two examples of cell cycle check points. *(14 marks)*
- 1.5 Briefly explain the characteristic features of telophase of a skin cell division. *(25 marks)*
- 1.6 Explain the mechanism of action of sodium-potassium pump in cells. Use Diagram/s where necessary. *(30 marks)*
- 02** Glucose is one of the most important molecules for human life because it is mainly responsible for the supply of energy to all cells in the body and produce some other important compounds via different pathways.
- 2.1 Briefly explain the action of **fluoride** and **iodoacetate** on the glycolysis. *(25 marks)*
- 2.2 Tri Carboxylic Acid (TCA) cycle and its intermediates play a dual role in catabolic and anabolic reactions. Explain the above statement. *(35 marks)*

- 2.3 Name **two** important byproducts of the Pentose Phosphate Pathway. (10 marks)
- 2.4 State the importance of **one** compound you mentioned in 2.3. (10 marks)
- 2.5 Name **one** important product formed as a result of Uronic Acid Pathway. (05 marks)
- 2.6 State why ascorbic acid cannot be synthesized in humans by the Uronic Acid Pathway. (15 marks)

PART B

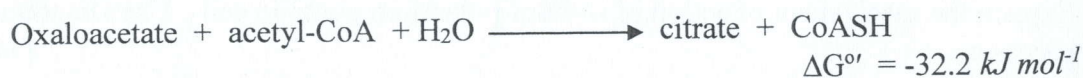
03

- 3.1 The following scheme shows how the reactions of ATP phosphorylation and ATP dephosphorylation are coupled to a reaction of catabolism and a reaction of anabolism respectively.



Indicate whether the reactions, **A**, **B**, **C** and **D** are exergonic or endergonic. (20 marks)

- 3.2 Given the ΔG° values for the following two reactions.

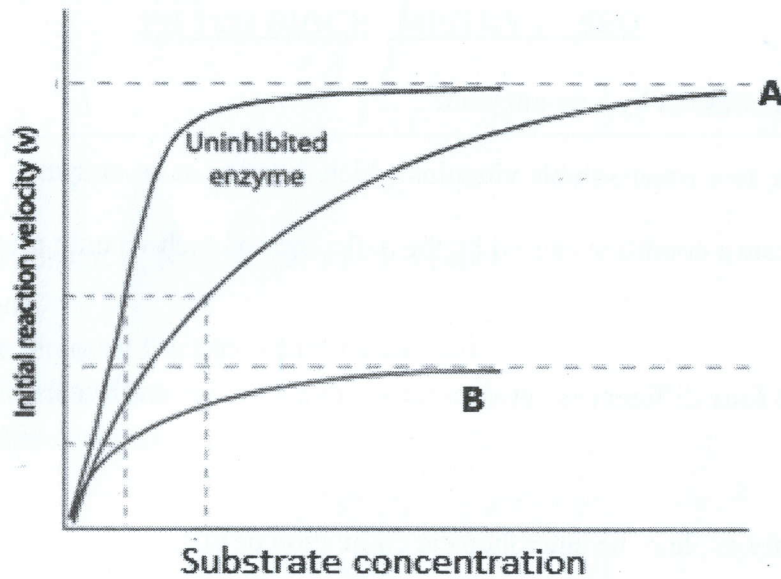


What is the ΔG° for the hydrolysis of acetyl-CoA?



- 3.3 The Lineweaver Burk is a linearization of the Michaelis Menten equation pertaining to the enzyme kinetics. Derive the Lineweaver Burk relationship starting from Michaelis Menten equation. (20 marks)

- 3.4 The following graph shows rate vs substrate plots for an uninhibited enzyme and the same enzyme in the presence of two different inhibitors.

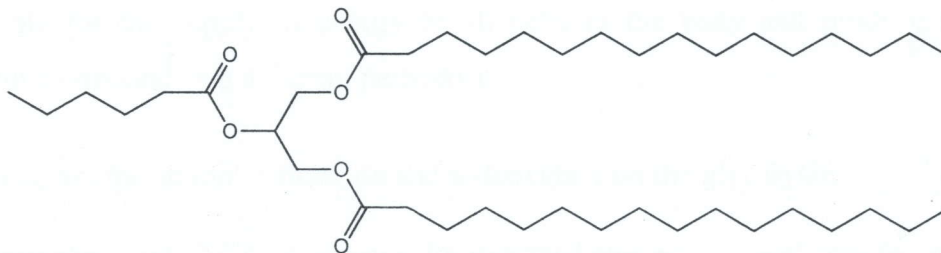


- 3.4.1 Giving reasons, identify the nature of the **two** inhibitors and the curve that corresponds to each inhibitor. (20 marks)
- 3.4.2 Draw approximate Lineweaver-Burk plots for each of the inhibitor types. (15 marks)
- 3.4.3 What is feedback inhibition? Explain briefly. (10 marks)

04

4.1

- 4.1.1 What is the main function of the carnitine shuttle system in fatty acid metabolism? (10 marks)
- 4.1.2 The triacylglycerol shown below acts as an energy source when administered to an organism through its diet. Assume that it is delivered by chylomicrons to the target cell intact and that lipoprotein lipase fully hydrolyses it to its constituents, which are absorbed into the cell efficiently.



Giving reasons, calculate the maximum amount of ATP that could be generated by the full oxidation of this triglyceride. (40 marks)

PART C

4.2

4.2.1 What is meant by a co-enzyme? *(04 marks)*

4.2.2 Name **two** water soluble vitamins which function as co-enzymes. *(06 marks)*

4.2.3 Indicate a condition caused by the deficiency of each vitamin mentioned in 4.2.2. *(06 marks)*

4.2.4 State **four** differences between fat-soluble vitamins and water-soluble vitamins. *(08 marks)*

4.2.5 Briefly explain the enterohepatic circulation of bile. *(10 marks)*

4.2.6 Explain **two** major roles of bile acid in fat digestion and absorption. *(16 marks)*

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