

**UNIVERSITY OF JAFFNA, SRI LANKA**  
**FIRST EXAMINATION FOR MEDICAL DEGREES (2<sup>ND</sup>) - JULY 2024**  
**ACADEMIC YEAR 2021/2022**

**BIOCHEMISTRY PAPER II**  
**(45<sup>TH</sup> BATCH)**

01.08.2024



**Answer all 10 questions.**

**Marks allotted to each part are indicated in brackets.**

**Answer Each Question on Separate Answer Books.**

1. 1.1 Diagrammatically show the modes of actions of glucagon and epinephrine on liver glycogenolysis. (40 Marks)
- 1.2 List the hormones which influence the glycogenolysis in skeletal muscle. (15 Marks)
- 1.3 Enumerate how the glycogenolysis in the liver differs from that in skeletal muscle. (25 Marks)
- 1.4 Give the principle of the specific method that is used to estimate glucose in urine. (20 Marks)
  
2. 2.1 List the tissues which are involved with gluconeogenesis. (10 Marks)
- 2.2 List the conditions which can lead to increased gluconeogenesis. (15 Marks)
- 2.3 List the hormones which increase gluconeogenesis. (20 Marks)
- 2.4 Explain how the hormones mentioned in Section 2.3 influence the appropriate steps of gluconeogenesis to increase the process. (55 Marks)

3. 3.1 List the Ketone Bodies (10 Marks)
- 3.2 List three tissues which can utilise ketone bodies. (15 Marks)
- 3.3 List the conditions which lead to increased ketogenesis. (15 Marks)
- 3.4 Explain how the conditions mentioned in Section 3.3 lead to increased ketogenesis. (40 Marks)
- 3.5 3.5.1 Name two tests which are used to detect the urine ketone body. (10 Marks)
- 3.5.2 Give the steps of one of the methods mentioned in Section 3.5.1. (10 Marks)
4. 4.1 Name the organ which is sensitive to elevated blood ammonia level. (10 Marks)
- 4.2 List the organs which are mainly involved with ammonia detoxification. (15 Marks)
- 4.3 List the enzymes / pathways which help in the detoxification of ammonia. (15 Marks)
- 4.4 Show the reaction steps with the appropriate cofactors which lead to ammonia production. Explain the biochemical importance of the reactions. (35 Marks)
- 4.5 Give the biochemical basis of the action of thermogenin. (25 Marks)
- 5 5.1 List the causes of vitamin B<sub>1</sub> deficiency. (15 Marks)
- 5.2 Name the most important dietary source of vitamin B<sub>1</sub> for Sri Lankans. (05 Marks)
- 5.3 List the enzymes and the biochemical reaction steps in which the coenzyme form of vitamin B<sub>1</sub> is involved. (30 Marks)
- 5.4 List the diseases caused by Vitamin B<sub>1</sub> deficiency. (20 Marks)
- 5.5 Relate how the biochemical reactions mentioned in Section 5.3 lead to the diseases caused by Vitamin B<sub>1</sub> deficiency mentioned in Section 5.4. (30 Marks)





6. 6.1 Regarding pre-hepatic, hepatic and post hepatic jaundice conditions.
- 6.1.1 list the different causes of each of the conditions. (25 Marks)
- 6.1.2 how the liver function test results can be differentiated? (35 Marks)
- 6.2 Explain the structure of Myoglobin. (20 Marks)
- 6.3 Explain how the structure of haemoglobin is suited for its function. (20 Marks)
7. 7.1 Diagrammatically show and explain the isohydric transport of hydrogen by haemoglobin. (30 Marks)
- 7.2 7.2.1 List the digestive products of starch by  $\alpha$ -amylase (15 Marks)
- 7.2.2 List the enzymes which further hydrolyse the digestive products of starch by  $\alpha$ -amylase. (15 Marks)
- 7.3 Name the transporters of glucose, galactose and fructose
- 7.3.1 into the enterocytes (10 Marks)
- 7.3.2 through the basolateral membrane into blood. (10 Marks)
- 7.4 Coconut oil solidifies easier than gingili oil. Explain. (20 Marks)
8. 8.1 8.1.1 What are isoenzymes? (10 Marks)
- 8.1.2 List the differences in-between the isoenzymes. (20 Marks)
- 8.1.3 Diagrammatically show the serum electrophoretic pattern of lactate dehydrogenase levels in a liver disease patient. (20 Marks)
- 8.2 8.2.1 What is lactose intolerance? (10 Marks)
- 8.2.3 Give the biochemical basis of the symptoms and complications observed in lactose intolerance. (20 Marks)
- 8.3 Write short notes on adenosine deaminase deficiency. (20 Marks)

9. 9.1 Define
- 9.1.1 Glycaemic index (10 Marks)
  - 9.1.2 Glycaemic load (10 Marks)
- 9.2 List the conditions in which low and high glycaemic index containing foods to be recommended. (20 Marks)
- 9.3 Justify recommending the low and high glycaemic index containing foods under the conditions mentioned in Section 9.2. (30 Marks)
- 9.4 Give the additional protein requirements and justify the amounts mentioned for a
- 9.4.1 pregnant woman. (15 Marks)
  - 9.4.2 lactating mother. (15 Marks)
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10. 10.1 10.1.1 List the different classes of immunoglobulins. (10 Marks)
- 10.1.2 Explain how the different classes of immunoglobulins differ in their physical and biological properties. (20 Marks)
  - 10.1.3 Enumerate the functions of the different classes of immunoglobulins. (20 Marks)
- 10.2 Chronic intake of non-steroidal anti-inflammatory drugs cause peptic ulcer. Explain. (25 Marks)
- 10.3 Explain the following with examples. (25 Marks)
- 10.3.1 Acceptable mutation
  - 10.3.2 Partially acceptable mutation
  - 10.3.3 Unacceptable mutation