



Instructions to candidates

Duration: Two (02) hours

Number of questions: Part A : Three (03) Structured Essay Part B : Three (03) Essay

Mark allocation: 100 marks

Answer all questions

Index No:

Part A

1.

a. What is the main storage form of chemical energy of lipids?

.....

(1 mark)

b. What is / are the tissue cells, that extra fat gets deposited in?

.....

(1 mark)

c. Fill in the blanks using the correct term/s.

Fatty acid oxidation begins with the activation of the molecule. A bond is formed between the carboxyl group of the and the group of The activated form of fatty acid is an The enzyme catalyzes this reaction is, which requires ATP for its action. ATP converts to and PP_i. Hydrolysis of two high energy phosphate bonds provides energy for the activation of fatty acids and it is equivalent to the use of ATPs. This esterification take place in the

(9 marks)

d. Where does the β -oxidation take place?

.....

(2 marks)



What is the main product formed, when fatty acids with an even number of carbon atoms, undergo β -oxidation?

.....
(1 mark)

f. Lignoceric acid is a saturated fatty acid which contains 24 carbon atoms.

i. How many cycles of β -oxidations are required for the complete oxidation of lignoceric acid to above mentioned main product (in question 'e')?

.....
(1 mark)

ii. How many molecules of the main product (in question 'e') are formed from β -oxidation of lignoceric acid?

.....
(1 mark)

g. How many NADH and $FADH_2$ molecules are formed during the complete β -oxidation of lignoceric acid?

NADH:

$FADH_2$:

(2 mark)

h. How many of the following molecules are produced when the main product (in question (e)) resulted from complete β -oxidation of lignoceric acid, enters into the citric acid cycle?

NADH:.....

$FADH_2$:.....

GTP:.....

(3 marks)

i. Calculate the net yield of energy (ATP) after the complete oxidation of lignoceric acid after the electron transport chain (Including the activation step)? (NADH: 2.5 ATP, FADH₂: 1.5 ATP) Show your calculations.

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.....

(7 marks)

j. What are the two products result after the last cycle of β -oxidation of fatty acid, with an odd number of carbon atoms?

.....
.....

(2 marks)

2.

a. What are the two major products of Pentose Phosphate Pathway?

.....
.....

(2 marks)

b. Pentose Phosphate Pathway is an alternative to glycolysis. What is the uniqueness of Pentose Phosphate Pathway?

.....

(1 mark)





c. Fill in the blanks with the correct term/s.

Pentose Phosphate Pathway consists of two phases, oxidative and non-oxidative. Oxidative phase starts with while non-oxidative phase starts with

Glycolysis is the first stage of carbohydrate metabolism. It breaks down glucose into During the break down of one glucose molecule, ATP molecules are utilized and ATP molecules are produced.

During glycogen breakdown, inorganic phosphate and glycogen phosphorylase cleaves the linkage in glycogen, while debranching enzyme degrades the linkage.

3.

a. Nitrogenase enzyme complex found in nitrogen-fixing bacteria, catalyzes the reduction of ammonia from molecular nitrogen. Name three proteins involved in the nitrogenase enzyme complex.

.....
.....
.....

b. What is the amino group acceptor in reductive amination pathway?

.....



c. List two (02), one carbon carriers involved in amino acid synthesis.

.....
.....

(2 marks)

d. What happens in the first step of catabolism of amino acids?

.....

(1 mark)

e. Mention whether the following statements are true or false.

- i. Amino acids that yield pyruvate or oxaloacetate on degradation are called glucogenic amino acids.
- ii. Ketogenic amino acid can be converted into glucose.
- iii. Some amino acids have more than one pathway for catabolism.

(3 marks)

Part B

- 1.
 - a. Briefly describe how insulin regulates the metabolism of a human. (8 marks)
 - b. How does amino acids stimulates secretion of insulin and glucagon? (4 marks)
 - c. List the factors affecting glucagon secretion. (3 marks)
- 2.
 - a. What is Basal Metabolic Rate (BMR)? (3 marks)
 - b. How flexible total collection system differ from rigid total collection system? (3 marks)
 - c. Briefly explain the three (03) principal types of direct calorimetry. (9 marks)
- 3.
 - a. Dhammika Manike (800 m runner) is performing low intensity exercise while Susanthika Jayasinghe (100 m runner) is performing high intensity exercise. What can you say about their energy needs? Explain. (10 marks)
 - b. You are working in a beverage company. The company is going to introduce a sports drink . Briefly explain the constituents that you are going to include in the drink and the reasons for adding them. (10 marks)