**ST MARY’S UNIVERSITY**

**TWICKENHAM, LONDON**

BSc Degree Examination students registered for

Level **FIVE**

Title**: Nutritional Biochemistry**

Code: **NUT5036**

Semester: **TWO**

Date: **4th July 2019**

Time: **13:30- 15:30 PM**

TIME ALLOWED: **TWO** HOURS

**SECTION A:**

Multiple choice; answer **ALL** questions (2 marks each)

1. The net yield of ATP in anaerobic Glycolysis is:
2. 2
3. 4
4. 36
5. 38
6. In gluconeogenesis, the glycolytic enzyme phosphofructokinase-1 is substituted by:
   1. Pyruvate Carboxylase
   2. Phosphoenolpyruvate carboxykinase
   3. Glucose-6-phosphatase
   4. Fructose 1,6-bisphosphatase
7. In the electron transport chain, what happens when O2 is not available?
   1. ETC is accelerated to meet energy demands
   2. There is accumulation of ATP molecules in the mitochondria
   3. Activity of ATP synthase increases to compensate
   4. Production of ATP molecules stops
8. When there is excess glucose provision and a low energy demand
9. The excess glucose is first converted to fatty acids via acetylCoA and the rest to glycogen
10. The excess glucose is first converted to glycogen and the rest to fatty acids via acetylCoA
11. The excess glucose is first converted to fatty acids via pyruvate and the rest to glycogen
12. The excess glucose is first converted to glycogen and the rest to fatty acids via pyruvate

1. Linoleic Acid, 18:2n-6 is:
   1. A polyunsaturated 18-carbon trans fatty acid with 6 double bonds
   2. A polyunsaturated 18-carbon fatty acid with 2 double bonds, the first occurring the carbon 6.
   3. A polyunsaturated 18-carbon fatty acid with 2 functional groups and 6 double bonds
   4. A monounsaturated fatty acid with 6 amine groups attached
2. A polyunsaturated fatty acid in CIS formation has:
   1. Adjacent hydrogen atoms on the same side as the double bond
   2. Adjacent hydrogen atoms on the opposite side of the double bond
   3. All hydrogen atoms on the same side as the double bond
   4. All hydrogen atoms on the opposite side as the double bond
3. Lipolysis describes:
   1. The breakdown of carbohydrates to glucose
   2. The breakdown of protein to amino acids
   3. The breakdown of triglycerides into fatty acids and glycerol
   4. The formation of fat from fatty acids
4. How many essential amino acids are there for humans?

a) 7

b) 9

c) 11

d) 23

1. The structure of an amino acid includes:
2. An Amino
3. An Amine group and carboxylic acid
4. An enzyme and an acid group
5. A glucose and an acid
6. Transamination is the process by which:
   1. An amino group is attached to a keto-acid
   2. An amino acid is broken down
   3. An amino group is attached to an enzyme
   4. An amino acid is converted into energy
7. In order for glycolysis to occur, \_\_\_\_\_ must be present.
8. glucose molecules
9. appropriate cytoplasmic enzymes
10. ATP and ADP
11. all of the above

12. Which of the following has the ability to denature a protein’s structure?

a) Alcohol

b) Heat

c) Acid

d) All of the above

1. What enzyme mediates the uptake of triacylglycerol into the adipose tissue?
2. Hormone sensitive lipase
3. Pancreatic lipase
4. Lipoprotein lipase
5. Insulin
6. The sum of all of the biochemical processes going on within the human body at any given time is called:
   1. glycolysis
   2. oxidative phosphorylation
   3. catabolism
   4. metabolism
7. Inside the mitochondrion, each pyruvate molecule:
   1. forms a molecule of citrate
   2. loses a carbon atom
   3. attaches to NAD
   4. directly enters the electron transport system

**SECTION B:**

Answer **TWO** questions from this section (35 marks each)

1. Present an overview of gluconeogenesis (i.e. substrates, importance and site) (15 marks) and describe the differences between the metabolic pathways of glycolysis and gluconeogenesis. (20 marks)
2. Describe and compare the process of fatty acid synthesis and fatty acid breakdown. (35 marks)
3. Describe the biochemical processes by which a Marathon runner would fuel their muscles during the London Marathon. (35 marks)

**END OF EXAMINATION**