MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY
Bachelor of Science Clinical Medicine & Community Health Y1S2
CCM 3123: Medical Biochemistry II
MAIN PAPER

INSTRUCTIONS
All questions are compulsory
Section A: Short Answer Questions. Answer all questions in the booklet provided
Section B: Long Answer Questions. Answer all questions in the booklet provided
Section C: Multiple Choice Questions. Write the best answer in the booklet provided

Section A: Short Answer Questions. (40 marks)

1. Explain the difference between glycolysis and gluconeogenesis (6 marks)
2. Describe the formation of LDL and HDL and their diagnostic importance (7 marks)
3. Explain the formation of ammonia from amino acid catabolism (6 marks)
4. Describe the urea cycle (8 marks)
5. Describe the ATPs produced by oxidation of 16 carbon fatty acid molecule (6 marks)
6. Describe the energy metabolism during the fed state (7 marks)

Section B: Long Answer Questions. (40 marks)

1. Wekesa laboratory test results indicate elevated levels of conjugated bilirubin and clay colored stool. Describe most likely diagnosis and the cause of the abnormal results (15 marks)
2. A young woman is found to have an enlarged liver due to accumulation of glycogen. Explain the types of glycogen storage diseases that result in liver enlargement. (15 marks)
3. Describe anaerobic respiration of glucose in muscle cells (10 marks)

Section C: Multiple Choice Questions. (20 marks)

1. Glucagon secretion increases
    A. After a carbohydrate-rich meal
    B. After a fat-rich meal
    C. When blood glucose is high
    D. When blood glucose is low
2. Biluveridin is converted to bilirubin by the process of
    A. Oxidation
    B. Reduction
    C. Conjugation
    D. Decarboxylation
3. Oxidation of acetyl CoA in the citric acid cycle gives a net yield of all the following except
    A. FADH2
    B. 3 NADH
    C. 2 ATP
    D. 2CO2
4. All the following statements correctly describe ketone bodies except
    A. They may result from starvation
    B. They are present at high levels in uncontrolled diabetes
    C. They include hydroxybutyrate and acetone
    D. They are utilized by the liver during long term starvation
5. During each cycle of on going fatty acid oxidation, all the following compounds are generated except
    A. H2O
    B. Acetyl CoA
    C. Fatty acyl CoA
    D. NADH

6. Acetyl CoA required for fatty acid synthesis is produced by
    A. Pyruvate dehydrogenase complex
    B. Citrate lyase
    C. Thiolase
    D. Carnitine-acyl transferase
7. The enzyme glucose 6-phosphatase is present in
    A. Liver
    B. Adipose tissue
    C. Muscle
    D. Brain
8. The 'Committed step' in the biosynthesis of cholesterol from acetyl CoA is
    A. Formation of acetoacetyl CoA from acetyl CoA
    B. Formation of mevalonate from HMG CoA
    C. Formation of HMG CoA from acetyl CoA and acetoacetyl CoA
    D. Formation of squalene by squalene synthetase
9. Excessive intake of ethanol increases the ratio:
    A. NADH : NAD+
    B. NAD+ : NADH
    C. FADH2 : FAD
    D. FAD : FADH2
10. A pathway that requires NADPH as a cofactor is
    A. Fatty acid oxidation
    B. Fatty acid synthesis
    C. Ketone bodies formation
    D. Glycogenesis
11. What is the sub cellular site for the β - oxidation of fatty acids?
    A. Nucleus
    B. Mitochondria
    C. Lysosome
    D. Cytosol
12. Cholesterol is excreted into
    A. Urine
    B. Faeces
    C. Bile
    D. Tears
13. The single intermediate in gluconeogenesis that is not present in the glycolysis pathway is a product of a reaction catalyzed by the enzyme
    A. 6-phosphogluconate dehydrogenase
    B. PEP-carboxykinase
    C. Pyruvate kinase
    D. Pyruvate carboxylase
14. The pentose phosphate pathway uniquely produces the following product
    A. Glucose
    B. Glucose-6-phosphate
    C. NADPH
    D. Fructose-6-phosphate
15. Action of insulin on lipid metabolism
    A. Increases lipolysis and increases triglyceride synthesis
    B. Decreases lipolysis and increases triglyceride synthesis
    C. Decreases lipolysis and decreases triglyceride synthesis
    D. Increases synthesis of triglyceride and increased ketogenesis
16. The following is a glucogenic amino acid
    A. Thymine

B. Leucine
C. Lysine
D. Valine

17. Carbon dioxide is produced in which pathway during cellular respiration
    A. Glycolysis
    B. Krebs cycle
    C. Electron transport chain
    D. Fatty acid oxidation
18. A 35-year-old man with severe hypercholesterolemia has a family history of deaths at a young age from heart disease and stroke. Which of the following genes is likely to be defective?
    A. Apolipoprotein E
    B. The LDL receptor
    C. Lipoprotein lipase
    D. All the above
19. Cori's cycle transfers
    A. Glucose from muscles to liver
    B. Lactate from muscles to liver
    C. Lactate from liver to muscles
    D. Pyruvate from liver to muscles
20. The conversion of alanine to glucose is termed
    A. Glycolysis
    B. Oxidative decarboxylation
    C. Specific dynamic action
    D. Gluconeogenesis