

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR BACHELOR OF SCIENCE IN NURSING

NURU 119: MEDICAL BIOCHEMISTRY II

STREAMS: BSC (NURS)

TIME: 2 HOURS

DAY/DATE: FRIDAY 09/7/2021

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

1. All questions are compulsory.
2. Part I: Multiple choice questions (MCQ): Write the correct answer on the space provided in the answer booklet. Each MCQ is one mark
3. Part II: Short answer questions – answer questions following each other on the answer booklet
4. Part III: Long Answer questions: Answer each question on the answer booklet

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. In Rapaport-Leubering shunt in erythrocytes, 2, 3-biphosphoglycerate (2, 3-BPG) is produced from which intermediate in glycolytic pathway?
 - (a) 3-phosphoglycerate
 - (b) 2-phosphoglycerate
 - (c) 1, 3-biphosphoglycerate
 - (d) Glyceraldehyde-3-P
 - (e) Dihydroxyacetone-P
2. β -oxidation of odd-carbon fatty acid chain produces:
 - (a) Succinyl-CoA
 - (b) Propionyl-CoA
 - (c) acetyl-CoA
 - (d) Malonyl-CoA
 - (e) Acetoacetyl-CoA

3. All statements regarding ketone bodies are true except:
- (a) They must result from starvation
 - (b) They are formed in kidneys
 - (c) They include acetoacetic and acetone
 - (d) They may be excreted in urine
 - (e) They are present in high concentration in uncontrolled diabetes mellitus
4. Untreated diabetes mellitus may result in all of the following except:
- (a) Blindness
 - (b) Cardiovascular disease
 - (c) Tinnitus
 - (d) Kidney disease
 - (e) Lower limb amputation
5. Tryptophan is best described by which of the following statements?
- (a) It produces thyroid hormones
 - (b) It is a precursor of the pineal hormone melatonin
 - (c) It produces catecholamine
 - (d) It is a precursor of Epinephrine hormone
 - (e) Is a precursor for melanin
6. In haem catabolism, the first bile pigment formed is:
- (a) Cholic acid
 - (b) Bilirubin
 - (c) Lithocholic acid
 - (d) Deoxycholic acid
 - (e) Biliverdin
7. The enzyme responsible for conjugation of bilirubin is:
- (a) Bilirubin esterase
 - (b) Haemoglobin reductase
 - (c) Bilirubin conjugase
 - (d) Glucuronyl transferase
 - (e) Glutamyl-bilirubin esterase

8. A 42 year old male patient undergoing radiation therapy for prostate cancer develops severe pain in the metatarsal phalangeal joint of his right big toe. Monosodium urate crystals are detected by polarized light microscopy in fluid obtained from this joint by arthrocentesis. Uric acid crystals are present in this urine. This patient's pain is directly caused by the overproduction of the end product of which of the following metabolic pathways?

- (a) Purine degradation
- (b) Pyrimidine degradation
- (c) De novo purine biosynthesis
- (d) Purine salvage
- (e) Amino acid degradation

9. Medium chain fatty acids are given because they:

- (a) Stimulates VLDL production by the liver
- (b) Can only be metabolized by the liver
- (c) Are activators of lipoprotein lipase
- (d) Are more efficiency packed into serum lipoproteins
- (e) Enter directly into the portal blood, and can be metabolized by the liver

10. Bilirubin is derived from all of the following except:

- (a) Destroyed effete red blood cells
- (b) Cytochromes
- (c) Haemoglobin
- (d) Catalase
- (e) Coenzymes

11. A patient has large deposit of liver glycogen, which after an overnight fast had shorter than normal branches. This abnormality could be caused by a defective form of which of the following proteins?

- (a) Amylo 1, 6 glucosidase
- (b) Amylo 4, 6 transferase
- (c) Glycogen phosphorylase
- (d) Glycogenin
- (e) Glycogen synthase

12. Which of the following statements is not true about chylomicrons?

NURU 119

- (a) Transport exogenous dietary fats and cholesterol from intestines to tissues
 - (b) Transport endogenous dietary fats and cholesterol from tissues to liver
 - (c) Consists of triglycerides, phospholipids, cholesterol and proteins
 - (d) Travel into the bloodstream via lymph system
 - (e) They are lipids
13. Which of the following enzyme is not involved in gluconeogenesis?
- (a) Hexokinase
 - (b) Glucose-6-phosphatase
 - (c) PEP carboxykinase
 - (d) Pyruvate carboxylase
 - (e) Fructose 1, 6BPase
14. Glucagon and epinephrine stimulate glycogen breakdown to glucose 6-phosphate
- (a) Directly by binding to glycogen phosphorylase
 - (b) Indirectly by first stimulating adenylate cyclase to make Camp
 - (c) Only in the liver
 - (d) Only in muscle cell
 - (e) Only in the kidney
15. The main function of pentose phosphate pathway is to;
- (a) Give the cell an alternate pathway should glycolysis fail
 - (b) Degrade G-6-P
 - (c) Provide mechanism for utilization of the carbon skeletons of excess amino acids
 - (d) Supply glyceraldehydes 3-phosphate for glycolysis
 - (e) Supply pentose and NADPH
16. The degradation of amino acids can be classified into families, which are named after the end product of the degradative pathway. Which of the following is such an end point?
- (a) Citrate
 - (b) Glyceraldehyde-3-phosphate
 - (c) Fructose-6-phosphate
 - (d) Succinyl-CoA
 - (e) Acetae
17. How many moles of ATP are generated by the complete aerobic oxidation of 1 mole of glucose to 6 moles of CO₂

NURU 119

- (a) 2 – 4
 - (b) 18 – 22
 - (c) 30 – 32
 - (d) 40 – 42
 - (e) 108
18. Albinism is a congenital disorder resulting from the lack of which enzyme?
- (a) Homogentisate dioxygenase
 - (b) Xanthine oxidase
 - (c) Catalase
 - (d) Fructokinase
 - (e) Tyrosinase
19. A patient presented with a bacterial infection that produced an endotoxin that inhibits phosphoenolpyruvate carboxykinase. In this patient, then, under these conditions, glucose production from which of the following precursors would be inhibited?
- (a) Pyruvate
 - (b) Glycerol
 - (c) Even-chain-number fatty acids
 - (d) Phosphoenolpyruvate
 - (e) Alanine
20. Which of the following amino acids produce a vasodilator on decarboxylation:
- (a) Glutamic acid
 - (b) Histidine
 - (c) Ornithine
 - (d) Cysteine
 - (e) Arginine

PART II: SHORT ANSWER QUESTIONS (30 MARKS)

1. Describe the process of glycogen formation and breakdown in the liver. Highlight the points of difference and their significance. [7 marks]
2. Describe glycolytic pathway and its relevance in metabolism [8 marks]

NURU 119

3. Outline five disease conditions associated with defective aromatic amino acid metabolism
[5 marks]
4. Explain action and importance of hypocholesterolemic drugs [5 marks]
5. Describe mitochondrial chemiosmotic synthesis of ATP and explain how the process can be chemically inhibited [5 marks]

PART III: LONG ANSWER QUESTIONS (30 MARKS)

1. Describe biosynthesis of fatty acids and their role in metabolism during exercise
[15 marks]
 2. Discuss metabolic changes that occur during diabetes mellitus highlighting possible danger
[15 marks]
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