



UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

TRIMESTER EXAMINATION

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
(NURSING)

HNS 133: MEDICAL BIOCHEMISTRY II

DATE: JULY 31, 2018

TIME: 11:00-2:00PM

INSTRUCTIONS:

Answer:

All MCQs in Section A;

All Short-answer Questions in Section B

All Long-answer Questions in Section C

Cancelled work should be done neatly by crossing with a single line in the essay and by use of X in the MCQs

SECTION A: MULTIPLE CHOICE QUESTIONS (TOTAL: 20 MARKS)

Choose (CIRCLE/TICK) only one correct answer from the following questions

1. Vitamin D is _____ .
 - a) Not a hormone, it is an element consumed in the diet.
 - b) A peptide hormone that must be processed in the body into a biologically active form.
 - c) A steroid hormone which must be processed in the body into a biologically active form.
 - d) A steroid hormone which does not need to be processed by the body into a biologically active form.
2. Endocrine hormones _____ .
 - a) Are released by ductless glands and act on nearby cells via diffusion.
 - b) Are released into the bloodstream for action on receptor cells distant from the source.
 - c) Are released only by the adrenal glands.

Reg No.

- d) bind to special proteins which enable them to act on the DNA.
3. High levels of dopamine are implicated in _____.
- a) Parkinson disease
 - b) Attention deficit disorder.
 - c) Schizophrenia.
 - d) Alzheimer disease.
4. Cortisol can be characterized as a hormone which _____.
- a) Increases blood pressure.
 - b) Increases vasoconstriction, but has minimal effect on blood pressure.
 - c) Reduces blood pressure.
 - d) Is only involved in stressful effects on the immune system
5. The final intermediate product in the citric acid cycle is _____
- a) L-malate.
 - b) Acetyl-CoA.
 - c) Oxaloacetate.
 - d) Fumarate.
6. Isocitrate dehydrogenase _____.
- a) Is activated by high concentrations of ATP and NADH.
 - b) Is activated by high concentrations of ATP and NADPH.
 - c) Is unaffected by high concentrations of NADPH.
 - d) Is inhibited by high concentrations of high-energy compounds.
7. In the electron transport chain, complex II _____.
- a) Does not contribute to the proton gradient, but mediates the transfer of electrons from succinate to cytochrome a.
 - b) Does not contribute to the proton gradient, but mediates the transfer of electrons from succinate to cytochrome c.
 - c) Does not contribute to the proton gradient, but mediates the transfer of electrons from succinate to coenzyme Q.
 - d) Contributes to the proton gradient, and mediates the transfer of electrons from succinate to coenzyme

8. Gluconeogenesis occurs in organelles called _____.
- a) Spherosomes
 - b) Lysosomes
 - c) Mitochondria
 - d) Glyoxysomes
9. _____ is the terminal electron acceptor during oxidative phosphorylation.
- a) FADH
 - b) NAD
 - c) Oxygen
 - d) ATP
10. The formation of a nucleic acid involves _____
- a) A dehydration process involving a base, a phosphate, and a pentose sugar.
 - b) A hydrolysis process involving a base, a phosphate, and a pentose sugar.
 - c) A dehydration process involving a base, a phosphate, and a hexose sugar.
 - d) None of the above.
11. Purine bases include:
- a) Adenine and cytosine
 - b) Adenine and uracil
 - c) Adenine and guanine
 - d) Adenine and thymine
12. DNA differs from RNA in some features such as:
- a) DNA residues are linked by 3'-->5' phosphodiester bonds; RNA is 2'-->5' linked.
 - b) DNA has deoxyribose residues; RNA has ribose residues.
 - c) DNA contains the A, C, G and T bases; RNA contains A, C, G, and U.
 - d) All of the above
13. Gluconeogenesis _____
- a) Splits glucose to pyruvate which can be converted to lactate under anaerobic condition.
 - b) Converts pyruvate to glucose.
 - c) Synthesis of glycogen, carbohydrate fuel storage form.
 - d) Produces NADPH for cell biosynthesis.

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14. In a eukaryotic cell, most of the enzymes of the citric acid cycle are located in the _____.
- Mitochondrial matrix.
 - Inner mitochondrial membrane.
 - Intermembrane space of the mitochondria.
 - Outer mitochondrial membrane.
15. Isocitrate dehydrogenase _____.
- Is activated by high concentrations of ATP and NADH.
 - Is activated by high concentrations of ATP and NADPH.
 - Is unaffected by high concentrations of NADPH.
 - Is inhibited by high concentrations of high-energy compounds.
16. Uncoupling agents of oxidative phosphorylation _____.
- Allow electron transport to continue but prevent the phosphorylation of ADP to ATP
 - Prevent electron transport from occurring but allow the phosphorylation of ADP to ATP
 - Block both electron transport and the phosphorylation of ADP to ATP
 - Are agents like rotenone and cyanide that block electron transport at specific carrier
17. In the pentose phosphate pathway, NADPH is produced at the step catalyzed by:
- Phosphopentose isomerase
 - Gluconolactonase
 - 6-phosphogluconate dehydrogenase
 - Transketolase
18. The basic building blocks during biosynthesis of fatty acids are:
- Three-carbon units
 - Two-carbon units
 - Two-nitrogen units
 - Glucose molecules
19. Cholesterol _____.
- Is a precursor to most steroid hormones. The first step in the synthesis of a hormone involved the cleavage of a 6-carbon residue from cholesterol.
 - Is not involved in the synthesis of most steroid hormones. It is an undesirable component of the diet.

- c) Is a precursor to most steroid hormones. The first step in the synthesis of a hormone involved the addition of a 6-carbon residue from cholesterol.
- d) Is a precursor to all steroid hormones.
20. _____ is the primary regulatory enzyme in fatty acid biosynthesis.
- a) Acetyl-CoA carboxylase
 - b) Pyruvate carboxylase
 - c) Kinase
 - d) Thiokinase

SECTION B: Answer ALL the questions in this section (40 marks; Use the answer booklet provided)

1. Differentiate transamination and reductive amination (5 marks)
2. Describe the significance of the pentose phosphate pathway in the human body (5 marks)
3. Describe the common symptoms of impaired production of gonadotropins (5 marks)
4. Briefly describe five common urea cycle defects (5 marks)
5. Describe the regulation of fatty acid oxidation (5 marks)
6. Discuss the general functions of hormones (5 marks)
7. Describe the major causes of Ketosis (5 marks)
8. Vitamins play a significant role in the TCA cycle. Explain (5 marks)

SECTION C: Answer ALL the questions in this section (40 marks; Use the answer booklet provided)

1. a) Describe the common areas of hormone production (10 marks)
- b) Describe the different classes of hormones based on the distance they cover and chemical composition. (10 marks)
2. a) Discuss the coupling concept and its significance in oxidative phosphorylation. (10 marks)
- b) Discuss the uncoupling concept and its significance in oxidative phosphorylation. (10 marks)

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