KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2008/2009

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL LABORATORY SCIENCE

SBC 103: BASIC METABOLISM II

DATE: Tuesday 8th September, 2009 TIME: 8.00 a.m. – 10.00 a.m.

Section A:

Answer **ALL** questions in this Section.

1. Describe the metabolic disorders of histidine metabolism. (5 marks)

2. How may the environment cause DNA mutations? (5 marks)

3. What are the functions of fatty acids in the body? (5 marks)

Section B:

Answer only **ONE** question in this Section.

4. Describe the degradation of amino acids in the body. (20 marks)

5. Discuss the working of the fatty acid elongase system. (20 marks)

6. a) Discuss the various categories of antibiotics that inhibit protein synthesis. (10 marks)

b) Describe the metabolic disorders of porphyrin metabolism. (10 marks)

Section C: **Multiple choice questions. Each question is worth ½ mark**

Answer **ALL** the questions.

1. Which of the following amino acids have their alpha-amino group removed by dehydratases
   1. histidine
   2. trytophan
   3. serine
   4. glutamine
   5. threonine
      a) 1,2
      b) 2,4
      c) 4,1
      d) 3,5

2. One of the following reactions does not occur in the urea cycle
   a) Formation of carbomoyl phosphate
   b) Transfer of carbomoyl group to ornithine
   c) Condensation of citruline to aspartate
   d) Cyclization of linear tetraprolle

3. One of the enzymes below is not used in carnitine shuttle system:-
   a) Acyl Co A carnitine transferase I
   b) Acyl Co A carnitine transferase IV
   c) Translocase
   d) Acyl Co A carnitine transferase II

4. Which of the following answers completes the sentence correctly? Surplus dietary amino acids may be converted into:

   a) ketone and fat

   b) glucose and biomolecules for which they are precursors

   c) proteins and ketones

   d) all of the above

5. The conversion of IMP to GMP requires which of the following?

   a) ATP

   b) GTP

   c) Glutamine

   d) NAD

6. Which of the following is not intermediate or precursor in the synthesis of herne?

   a) gamma-aminolevulinic acid

   b) Bilirubin

   c) Porphobilinogen

   d) Succinly CoA

7. Which of the following are intermediate in the pathway for the synthesis of both phenyl alanine and tryptoplan?

   a) Prephenate, shikimate

   b) Anthranilate, chorismate

   c) Shikimate, chorismate

   d) Prephenate, anthranilate

8. Which of the following reactant and products are involved in the salvage reaction of purine biosynthesis?

   a) IMP→ AMP

   b) IMP→ GMP

   c) adenine→ AMP

   d) cytosine→ ATP

9. Which of the following is a high energy compound

a) glycerol –3- phosphate

b) adenosine diphosphate

c) glucose –1- phosphate

d) fluctose –6- phosphate

10. Which of the following answer completes the sentences correctly? Cytosine is a:-

a) purine base

b) pyrimidine base

c) purine nucleoside

d) pyrimidine nucleoside

11. One of the following is a non-essential amino acid:-

a) histidine

b) lysine

c) phenyl alanine

d) glutamic acid

12. Which of these symptoms occur in patients suffering from classic phenyl ketonuria

a) lack of myelinations of nerves

b) lighter skin and hair colour

c) hyperactive reflexes

d) all of the above

13. Which blotting technique is used for detection of DNA that has been separated from the mixture of DNA restriction fragment by electrophoresis through an agarose gel and then transformed nitrocellulose sheet?

a) Eastern blotting

b) Northern blotting

c) Southern blotting

d) Western blotting

14. Which of the following statements are correct? Chemically hydrolyzed oligonucleotides can be used.

a) As primers of sequencing DNA
b) To synthesize genes
c) As probes for hybridization
d) All of the above are true

15. Which of the following statement about DNA polymerases are correct?

a) they add de-oxyribonucleotide units to the 3'-hydroxyl of a primer
b) they use the template stand to help choose which deoxyribonucleotide unit to add to the growing DNA chain.
c) they check the size of an incoming deoxy ribonucleotide triphosphate (dNTP) to help ensure the correct complementary code choice.
d) all of the above statement are correct

16. One of the following statements about release factors is in correct

a) They recognize terminator tRNAs
b) They recognize translation stop codons
c) They cause peptidyl transferase to use water as a substitute
d) They are two proteins each of which recognizes two mRNA triplet sequences.

17. Which of the following statements about DNA application in *E.coli* is incorrect?

a) it occurs in the replication fork
b) it starts at a unique locus on the chromosomes
c) it uses RNA transciently as a template
d) it is bi-directional

18. Which of the following statement about the triacylglcerols stored in adipose tissue are incorrect?

a) They are hydrolyzed to form fatty acids and dihydroxyacetone

b) They are hydrolysed by a lipase that is activated by covalent modification

c) They can yield a precursor of glucose

d) They are mobilized by epinephrine or glucagons

19. Which of the following answers complete the sentence correctly? The removal of alpha amino groups from amino acids for conversion to urea in animals may occur by:-

i) transamination

ii) reductive amination

iii) oxidative deamination

iv) transamination

a) i, iii

b) iii, iv

c) iv, I

d) ii, iv

20. Which of the following are amino acids does not have an aromatic side chain?

a) Leucine

b) Tyrosine

c) Tryptophan

d) Phenyl alainine

21. One of the following reasons does not lead to breakdown of triacylglycols:-

a) fight

b) constipation

c) flight

d) starvation

22. Epinephrine may initiate one of the following processes in the body

a) Increase the heart rate

b) Cause fever

c) Constrict blood vessels supply to the muscles

d) Act as a broncho-constrictor

23. Which of these enzymes absence or total decrease cause histidinemia?

a) Histidase

b) urocanase

c) transaminase

d) arginase

24. some enzymes involves in DNA replication are listed below. Which one is not involved

a) DNA polymesase I

b) DNA polymesase II

c) DNA ligase

d) DNA oxidase

25. Which of these statements does not account for the causes of mutation? Mutation may arise due to

a) Spontaneous damage of DNA

b) Environmental damage of DNA

c) Cross bleeding of related animal species

d) Exposure of DNA to high temperatures

26. Which of the following compounds serves as a receptor for the amino groups of many amino acids during catabolism?

a) glutamine

b) alpha – ketoglutarate

c) asparagines

d) oxalate

27. One of the following is not a biological cause for the synthesis of keto acids

a) Post exercise activities

b) Over eating

c) starvation

d) Diabetes mellitus

28. Fatty acyl glycerols:-

a) act as very rich in energy resource

b) form integral components of lipids

c) are isomeric

d) are building blocks of phosphospholipids and glycolipid synthesis

29. Which of the following portion of a longer duplex DNA segment are likely to be recognition sequences of a restriction enzyme?

a) 5’ – AGTC-3’
   3’ – TCAG-5’

b) 5-ATCG-3
   3’ – TAGC –5’

c) 5’ – ACCT –3’
   3’ – TGGA –5’

d) 5’ – AGGT – 3’
   3’ – TGCA – 5’

30. Which of the following doesn’t reverse transcriptase require for the conversion of single strand RNA into double strand DNA?

a) all four dNTPs

b) an RNA template

c) aprimer

d) a DNA template