TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Applied and Health Sciences

DEPARTMENT OF MEDICAL SCIENCES

DIPLOMA IN PHARMACEUTICAL TECHNOLOGY

(DPT 12M)

AMD 2108: MEDICAL BIOCHEMISTRY II

SUPPLEMENTARY/SPECIAL EXAMINATIONS

SERIES: JULY 2013

TIME: 2 HOURS

INSTRUCTIONS:

– Answer all the questions in Section **A** and **B** and any **THREE** questions in Section **C.**

This paper consists of Five printed pages.

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SECTION A (40 Marks) Answer All questions

1. Where in a eukanyotic cell are the proteins of oxidative phosphorylation located
   A. Inner mitochondrial membrane
   B. Plasma membrane
   C. Cytoplasm
   D. Nucleus

2. How many protons are pumped out of the mitochondrial matrix for every $FADH_2$ molecule oxidized to FAD?
   A. 2
   B. 4
   C. 6
   D. 10

3. The cytochromes are proteins involved in electron transport what prostnetic group do cytochromes contain?
   A. Thiamine pyrophosphate (TPP)
   B. Ubiquinone (coenzyme Q)
   C. A heme containing an iron
   D. Coenzyme A

4. Which of the following directly results in the activation of glycogen synthase
   A. Binding of glucose-b-phosphate
   B. Insulin
   C. Glycosylation of glycogen synthase
   D. Epinephrine

5. Which of the following is true about glycogen synthesis and breakdown
   A. Phosphorylation activates the breakdown enzyme and inactivates the synthetic enzyme
   B. Synthesis is catalysed by the same enzyme that catalyzes breakdown
   C. The glycogen molecule grows at its reducing end
   D. The intermediate product of glycogen breakdown is free glucose.

6. An increase in the concentration of the following molecules would increase the rate of gluconeogenesis?
   A. Glucose
   B. Fructose-zib-bisphosphate
   C. Acetyl-CoA
   D. Adenosine disphosphate (ADP)

7. Which of the following is not a intermediate of the TCA cycle?
   A. Malate
   B. Pyruvate
   C. Oxaloacetate
   D. Fumarate

8. The degradative process are categorized under the heading of
   A. Anabolism
   B. Catabolism
   C. Metabolism
   D. None of the above

9. Enzymes catalyzing electron transport are present mainly in the
   A. Ribosomes
   B. Endoplasmic reticulum
   C. Lysosomes
   D. Inner mitochrodrial membrane

10. Urea is formed from:
   A. Citrulline
   B. Argininosuccinase
   C. Arginine
   D. Ornithine

11. Where does glycolysis occur?
   A. Mitochondria
   B. Nucleus
   C. Ribosome
   D. Cytosol

12. Okasaki fragments are present in:
   A. Leading strand
   B. Both parental strands
   C. Lagging strand
   D. Both the daughter strands

13. Which of the following is the central intermediate that links several carbohydrate metabolic pathways?
   A. Glucose
   B. Glucose glucose-I-phosphate
   C. Glucose-6-phosphate
   D. UDP-Glucose

14. Dihydroxyacetone phosphate is
   A. An aldotriose
   B. An enantiomer of glyceraldehydes 3-phosphate
   C. Derived from C4 – C6 of fructose-1, 6-bisphosphate
   D. Isomerized to glyceraldehydes 3 phospate by triosephaphate isomerase

15. McArdle's disease is due to the deficiency of
   A. Glucose-6-phosphatase
   B. Phosphofructokinase
   C. Liver phosphrylase
   D. Muscle phosphorylase

16. The reaction that converts succinly CoA to succinate requires:
    A. CDP
    B. ADP
    C. GDP
    D. $NADP^+$

17. Amylo 1, 6 glucosidase is also called
    A. Branching enzyme
    B. Debranching enzyme
    C. Glucantraseferase
    D. Phosphorylase

18. A ketogenic amino acid is
    A. Valine
    B. Cysteine
    C. Leucine
    D. Threonine

19. The main sites for oxidative deamination are:
    A. Liver and kidney
    B. Skin and pancreases
    C. Intestine and mammary gland
    D. Lund and spleen

20. Transfer of the carbamoyl moiety of carbamoyl phosphate to ornithine is catalysed by a liver mitochondrial enzyme called
    A. Carbamoyl phosphate synthetase
    B. Ornithine trans carbamoylase
    C. N-acetyl glutamate synthetase
    D. N-acetyl glutamate hydrolase

21. The 2 nitrogen atoms in urea are contributed by
    A. Ammonia and glutamate
    B. Glutamine and glutamate
    C. Ammonia and aspartate
    D. Ammonia and alanine

22. All of the following statements about phenylketonuria are correct except
    A. Phenylalanine cannot be converted into trysine
    B. Urinary excretion of phenylpyruvate and phenylactate is increased
    C. It can controlled by giving a low pnenylactic is increased
    D. It leads to decreased synthesis of thyroid hormones, catecholamines and melanin

23. Long chain fatty acids penetrate the inner mitochondrial membrane
    A. Freely
    B. As acyl-CoA derivative
    C. As carnitine derivative
    D. Requiring Na dependent carrier

24. In EM pathway 2-phosphoglycerate is converted to
    A. Phosphoenol pyruate
    B. Enol pyruvate
    C. Dihydroxyacetone phosphate (DHAP)
    D. 1,3-bisphoglycerate

25. For glycogenesis, glucose should be converted to
    A. Glucuronic acid
    B. Pyruvic acid
    C. UDP glucose
    D. Sorbitol

26. Control of urea cycle involves the enzyme
    A. Garbamoyl phosphate synthetase
    B. Ornithine transcarbamoylase
    C. Argininosuccinate
    D. Arginase

27. A compound serving as a link between citric acid cycle and urea cycle is
    A. Malate
    B. Citrate
    C. Succinate
    D. Fumarate

28. How many irreversible steps occur in glycolysis
    A. 2
    B. 4
    C. 3
    D. 5

29. The number of carbon atoms is cholesterol is
    A. 17
    B. 19
    C. 27
    D. 30

30. De novo synthesis of fatty acids requires all of the following except:
    A. Biotin
    B. NaOH
    C. Panthrothenic acid
    D. ATP

31. Ketone bodies are synthesized in
    A. Adipose tissue
    B. Liver
    C. Muscles
    D. Brain

32. Glycerol is converted into glycerol-3-phosphate by
    A. Thiokinase
    B. Glycerol kinase
    C. Triokinase
    D. All of these

33. Garnitine is required for the transport of:
    A. Triglycerides out of the liver
    B. Triglycerides into mitochondria
    C. Short brain faty acids into mitochondria
    D. Long chain fatty acids into mitochondria

34. Garnitine acylcarnitine translocase is present
    A. In the inner-mitochodrial membrane
    B. In the mitochondrial matrix
    C. On the surface of the inner mitochondrial membranes
    D. On the inner surface of inner mitochondrial membrane

35. With respect to the B-oxidation of stearate which is true?
    A. B-oxidation results in production of 8 aceytl CoA, 7 NAOH and 7 $FAOH_2$
    B. B-Oxidation results in production of 9 acetyl-CoA, and 9 $FAOH_2$
    C. B-oxidation results in production of 9 acetyl-CoA, 8NAOH and 8 $FADH_2$
    D. B-oxidation results in production of 8 acetyl-CoA, 8 NAOH and 8 $FADH_2$

36. A nucleoside consists of:
    A. Nitrogenous base
    B. Purine or pyrimidine base + sugar
    C. Purine or pyrimidine base + phosphorous
    D. Purine + pyrimidine base + sugar + phosphorous

37. The sugar moiety present in RNA is:
    A. Ribulose
    B. Ribose
    C. Arabinose
    D. Deoxyribose

38. DNA rich is A-T pairs have
    A. 1 hydrogen bond
    B. 2 hydrogen bonds
    C. 3 hydrogen bonds
    D. 4 hydrogen bonds

39. The carbon of the pestose in ester linkage with the phosphate in a nucleotide structure is
    A. C_1
    B. C_3
    C. C_4
    D. C_5

40. The number of base pair in a single turn of B-form DNA about the axis of the molecule is:
    A. 4
    B. 8
    C. 10
    D. 12

SECTION B (40 Marks)

41. Describe briefly how glucose is converted to glycogen via glycogenises?
42. Outline the electron transport chain components.
43. Explain TWO ways of regulating phosphofructonase I.
44. List the steps involved in the biosynthesis of fatty acids.
45. Briely explain how transmination of amino acids takes place.
46. Give an account on the synthesis of ketone bodies
47. Explain briefly how the citric acid cycle is regulated
48. Write on one inborn errors of fatty acid metabolism.
49. List any FOUR features of the Watson. Crick model of DNA.
50. Draw structures of the following:
    A. Purine
    B. A ribonucleotide

SECTION C (Answer any THREE questions) 60 marks)

51. Outline the pentose phosphate pathway, explaining how it is linked to the glycolytic pathway.
52. Discuss on the metabolism of triacylglycerides and how it is regulated.
53. Discuss on all the steps involved in DNA replication
54. Describe the metabolism of phenylalanine and the disorders associated with it
55. Compare and contrast glycolysis and gluconeogenesis pathways in carbohydrate metabolism