

A HIGHER GRADE

IN

BIOCHEMISTRY

$\frac{73}{80}$

36.5

$\frac{34.75}{40}$

Section A

$\frac{7}{10}$

Section B 40

$\frac{34.75}{40}$

NAME: NCHINDIKANI G. SIMPAMISA

PHONE: 0770241487

1. Pyruvate Kinase
2. Phosphoglycerate Kinase

Produced by: **MULONGOTI JUSTINE**

Co-producer: **DARJI DHRUV**

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NOTE: This pamphlet is not exhaustive of your entire syllabus but a supplement to enable you prepare adequately for your final examination hence to appreciate this work.

Attend your lectures and study.

(0972 814028/0964 024626)

Produced and compiled by: Justine Mulongoti, co-producer: Darji Dhruv

SECTION A

1. The universal energy currency in cells is
 - a. ADP
 - b. P_{Pi}
 - c. ATP
 - d. AMP
 - e. None of the above
2. Which one below has the highest phosphoryl group transfer potential?
 - a. Glucose 6-phosphate
 - b. 2-phosphoglycerate
 - c. Phosphoenolpyruvate
 - d. 3-phosphoglycerate
 - e. Dehydroxyacetone phosphate
3. Which one below is a thioester?
 - a. Acetyl-CoA
 - b. Phosphoenolpyruvate
 - c. ATP
 - d. ADP
 - e. Glucose 6-phosphate
4. Glucokinase differs from hexokinase in that
 - a. It catalyzes a different reaction from that catalyzed by hexokinase
 - b. It has a higher K_m than hexokinase for a substrate
 - c. It is found in the muscle while hexokinase is found in the liver
 - d. It is inhibited by its product whereas hexokinase is not
5. Both hexokinase and phosphofructokinase-1 require
 - a. Fe^{2+}
 - b. Fe^{3+}
 - c. Mg^{2+}
 - d. K^+
 - e. Ca^{2+}
6. How many oxidation steps are in glycolysis?
 - a. 1
 - b. 0
 - c. 4
 - d. 2
 - e. 3

7. Which enzyme below catalyses a reaction that results in substrate-level phosphorylation?
- Enolase
 - Hexokinase
 - Phosphoglycerate kinase
 - Aldolase
 - All the above are correct
8. The following are cofactors of the pyruvate hydrogenase complex except
- Thiamine pyrophosphate
 - FAD
 - NAD
 - Lipoate
 - Pyridoxal phosphate
9. The most important allosteric effector of phosphofructokinase-1 is
- Dehydroxyacetone phosphate
 - Pyruvate
 - Fructose-2,6-biphosphate
 - Glucose 6-phosphate
 - Glyceraldehyde 3-phosphate
10. Fluoride inhibits
- Phosphoglycerate mutase
 - Enolase
 - Citrate synthase
 - Pyruvate kinase
 - All the above
11. The main reason for lactate formation in seriously working muscles is
- To allow glycolysis to continue
 - To improve oxygen delivery to peripheral tissues
 - To stimulate the citric acid cycle
 - To inhibit the citric acid cycle
 - To increase the rate of oxidation in the mitochondria
12. The five carbon intermediate in the citric acid cycle is
- Isocitrate
 - Oxaloacetate
 - α -ketoglutarate
 - Mulate
 - Succinate

13. The citric acid cycle is aerobic because
- The reactions are in the cytosol
 - The presence of oxygen causes availability of oxidized coenzymes for some reactions
 - Oxygen participates directly in the reactions of the citric acid cycle
 - Oxygen directly activates some enzymes of the citric acid cycle
 - None of the above
14. In anaerobic cells the ratio of pyruvate/lactate is much less than 1 while under aerobic conditions the ratio of pyruvate is much greater than 1 because
- Lactate is produced from pyruvate only under anaerobic conditions
 - Under anaerobic conditions, pyruvate is converted to carbon dioxide
 - Under anaerobic conditions, pyruvate is converted to glucose using energy from light.
 - Pyruvate is transported into mitochondria under aerobic conditions
 - Pyruvate is transported into mitochondria under anaerobic conditions
15. As a result of glycolysis, pyruvate oxidation and the citric acid cycle, only a small portion of the energy of glucose has been converted to ATP. At this point, the majority of the usable energy is contained in
- Oxidized electron carriers NAD^+ and FAD
 - Carbon dioxide
 - Pyruvate
 - Acetyl coenzyme A
 - Reduced electron carriers NADH and FADH_2
16. The production of what molecule marks the end of glycolysis and the beginning of cellular respiration?
- Pyruvate
 - Isocitrate
 - Malate
 - Citrate
 - Acetyl-CoA
17. Which molecule has a thioester bond in the citric acid cycle?
- Malate
 - Succinate
 - Succinyl-CoA
 - α -ketoglutarate
 - fumarate
18. In eukaryotic cells, the enzymes for the citric acid cycle are located in

- a. cell membrane
 - b. nucleus
 - c. mitochondria
 - d. Golgi complex
 - e. Lysosomes
19. How many molecules of ATP would be produced from 20 molecules of glucose at the end of fermentation?
- a. 35
 - b. 40
 - c. 20
 - d. 100
 - e. 30
20. In the citric acid cycle, GTP is formed in a reaction catalyzed by
- a. Citrate synthase
 - b. Phosphohexose isomerase
 - c. Succinate thiokinase
 - d. Isocitrate dehydrogenase
 - e. Fumerase
21. Lactase is converted to glucose in the
- a. Adipose tissue
 - b. Liver
 - c. Muscle
 - d. Brain
 - e. Red blood cells
22. The only enzyme of the citric acid cycle that is bound to the inner mitochondrial membrane is
- a. Furase
 - b. Succinate thiokinase
 - c. Succinate dehydrogenase
 - d. Aconitase
 - e. Citrate synthetase
23. Glycogen is synthesised in the
- a. Bone marrow
 - b. Liver
 - c. Brain
 - d. Red blood cells
 - e. Skin

24. Glycogen is a polysaccharide composed of
- Glucose molecules
 - Glucose and fructose molecules
 - Manose
 - Galactose molecules
 - Galactose and manose molecules
25. Which protein is found in the glycogen primer?
- Haemoglobin
 - Myosin
 - Glycogenin
 - Actin
 - Fibrinogen
26. The enzyme in the muscle which is most stimulated by epinephrine is
- Glucose 6-phosphatase
 - Glycogen synthase
 - Phosphofruktokinase-1
 - Isocitrate dehydrogenase
 - Adenyl cyclase
27. Glycogen from muscles cannot be released in circulation because
- Muscles have no phosphoglucomutase
 - Muscles have no glucose 6-phosphatase
 - Muscles cannot synthesise and store glycogen
 - Muscle have no glycogen phosphorylase
 - Muscles are responsive to glycogen
28. Which enzyme below inhibits glycogen breakdown?
- Phosphorylase kinase
 - Protein phosphatase-1
 - Glycogen phosphorylase
 - cAMP -dependent protein kinase
 - None of the above
29. In glycogenesis α 1,4-bonding of glucose molecules is carried out by
- Glycogen phosphorylase
 - Glycogen synthase
 - Phosphorylase kinase
 - cAMP -dependent protein kinase
 - protein phosphatase-1
30. Gluconeogenic enzymes include all the following except

- a. Pyruvate carboxylase
 - b. Phosphoglucomutase
 - c. Phosphoenolpyruvate carboxykinase
 - d. Glucose 6-phosphatase
 - e. Fructose 1,6-biphosphate
31. Ca^{2+} increases glycogenolysis by
- a. Activating cAMP protein dependent kinase
 - b. Binding to glucagon receptors
 - c. Activating phosphorylase kinase b
 - d. Protecting cAMP from degradation
 - e. Binding to epinephrine receptors
32. Which of the following two enzymes are thought to be major control enzymes of the citric acid cycle?
- a. α -ketoglutarate dehydrogenase and isocitrate dehydrogenase
 - b. succinate dehydrogenase and fumarate
 - c. Succinyl-CoA synthetase and succinate dehydrogenase
 - d. Succinyl-CoA synthetase and alpha-ketoglutarate dehydrogenase
 - e. malate dehydrogenase and fumarate
33. Which of the following is one of the cofactors involved in the formation of acetyl-CoA from pyruvate?
- a. Folate
 - b. Biotin
 - c. Pyridoxal phosphate
 - d. Ascorbic acid
 - e. Thiamine pyrophosphate
34. Which of the following an oxidation prior to decarboxylation?
- a. Malate dehydrogenase
 - b. Pyruvate dehydrogenase complex
 - c. Aconitase
 - d. Isocitrate dehydrogenase
 - e. Citrate synthase
35. A patient was brought to casualty in a critical condition and when his blood sample was analyzed, there was pyruvic and lactic acidosis. Which enzyme deficiency would have probably let to this condition?
- a. Glyceraldehyde 3-phosphate dehydrogenase
 - b. Pyruvate kinase
 - c. Pyruvate dehydrogenase complex

- d. Phosphoglycerate kinase
 - e. Phosphohexose isomerase
36. If you were told that the patient in 35 question above had swallowed a toxic substance, which one below is the most likely substance?
- a. Penicillin
 - b. Iodoacetate
 - c. Arsenite
 - d. Fluoride
 - e. None of the above
37. The first oxidation step in the citric acid cycle is catalyzed by
- a. Malate dehydrogenase
 - b. Pyruvate dehydrogenase complex
 - c. Enolase
 - d. Succinate dehydrogenase
 - e. None of the above
38. Which amino acid below is not Gluconeogenic?
- a. Aspartate
 - b. Asparagine
 - c. Leucine
 - d. Alanine
 - e. None of the above
39. ATP has a high free energy of hydrolysis of the terminal phosphoryl group because of
- a. Electrostatic repulsion
 - b. Stabilization by ionization
 - c. Stabilization by resonance
 - d. Greater degree of solvation of products
 - e. All the above
40. In the cytosol, ATP is complexed to
- a. Na^+
 - b. Mg^{2+}
 - c. Cu^{2+}
 - d. Fe^{3+}
 - e. Fe^{3-}
41. The standard free energy for the hydrolysis of Phosphoenolpyruvate is about
- a. -15 KJ/mol
 - b. -25 KJ/mol
 - c. -19 KJ/mol

- d. -43 KJ/mol
 - e. -61.9 KJ/mol
42. The standard free energy for hydrolysis of ATP is about
- a. -10 KJ/mol
 - b. -30.5 KJ/mol
 - c. -53 KJ/mol
 - d. -48 KJ/mol
 - e. -12 KJ/mol
43. The redox potential (E_0) of oxygen is
- a. -0.82 V
 - b. +0.42 V
 - c. -3.80 V
 - d. +0.22 V
 - e. +0.82 V
44. The currency of readily available reducing power in the cells is?
- a. NADH + H^+
 - b. FMN H_2
 - c. FAD H_2
 - d. NADPH + H^+
 - e. Pyruvate
45. A requirement for transketolase in the pentose phosphate pathway is
- a. Pantothenic acid
 - b. Thiamine pyrophosphate
 - c. Cobalamin
 - d. Riboflavin
 - e. Ascorbic acid
46. The products of the pentose phosphate pathways include the following except?
- a. Xylulose 5-phosphate
 - b. CO_2
 - c. ATP
 - d. Ribose 5-phosphate
 - e. NADPH + H^+
47. Protection against malaria can result from
- a. Insulin deficiency
 - b. Glucose 6-phosphate dehydrogenase deficiency
 - c. Transketolase deficiency
 - d. Glycogen phosphorylase deficiency

- e. Hexokinase deficiency
48. In biosynthetic reactions, hydrolysis of pyrophosphate
- Prevents enzymatic reactions
 - Makes an irreversible reaction reversible
 - Is endergonic
 - Drives reversible reactions forward
 - None of the above
49. Ketosis may develop as a result of which of the circumstances below?
- Glucose synthesis from fatty acids during glucose deprivation
 - Acute attack of gout
 - Carnitine acyltransferase I deficiency
 - Fat mobilization to support gluconeogenesis
 - None of the above
50. When epinephrine binds to its receptor on skeletal muscle, glycogenolysis is stimulated. The hormone signal influences the activity of each of these enzymes except?
- Phosphorylase
 - Adenyl cyclase
 - Phosphorylase kinase
 - Cyclic AMP- dependent protein kinase
 - Debranching enzyme
51. Which one below is not a substrate in transaldolase catalyzed reaction in the pentose phosphate pathway?
- Sedoheptulose 7-phosphate
 - Glyceraldehyde 3-phosphate
 - Erythrose 4-phosphate
 - Xylulose 5-phosphate
 - Fructose 6-phosphate
52. The substrate for the decarboxylation step in the pentose phosphate pathway is
- Erythrose 4-phosphate
 - Fructose 6-phosphate
 - 3-keto 6-phosphogluconate
 - 6-phosphogluconolactone
 - Sedoheptulose 7-phosphate
53. Which of the following is formed in glucuronic acid pathway?
- Fructose 6-phosphate
 - Uridine diphosphate glucuronate
 - Fructose 1,6-diphosphate

- d. Isocitrate
 - e. Malonyl CoA
54. Which of the following is not formed in glucuronic acid pathway?
- a. CO₂
 - b. L-Xylulose
 - c. ATP
 - d. D-Xylulose
 - e. Oxalate
55. Which vitamin is formed from 2-keto-L-gulonolactose?
- a. Vitamin A
 - b. Vitamin D
 - c. Ascorbate
 - d. Vitamin B₆
 - e. None of the above is correct
56. Pancreatic lipase requires a small protein known as
- a. Haemoglobin
 - b. Colipase
 - c. Myosin
 - d. Glycogenin
 - e. Phospholipase A2
57. Dietary lipids are primarily
- a. Monoacylglycerols
 - b. Fatty soluble vitamins
 - c. Diacylglycerols
 - d. Triacylglycerols
 - e. Cholesteroeesters
58. After absorption dietary lipids are incorporated into
- a. HDLs
 - b. VLDLs
 - c. Chylomicrons
 - d. LDLs
 - e. IDLs
59. β -oxidation occurs on the
- a. Cytosol
 - b. Mitochondria
 - c. Nucleus
 - d. Golgi complex

- e. None of the above
60. In fatty acid synthesis, carboxylation of acetyl-CoA forms
- a. Malonyl-CoA
 - b. Propionyl-CoA
 - c. Succinyl-CoA
 - d. Acetoacetate
 - e. None of the above
61. Which organ cannot use ketone bodies as a source of energy?
- a. Kidney
 - b. Brain
 - c. Liver
 - d. Muscle
 - e. Heart
62. Carnitine acyltransferase 1 is inhibited by
- a. Propionyl-CoA
 - b. Malonyl-CoA
 - c. Succinyl-CoA
 - d. Acetyl-CoA
 - e. None of the above is correct
63. The production and export of ketone bodies
- a. Occurs when oxaloacetate is abundant
 - b. Is an anaerobic process
 - c. Allows β -oxidation to continue
 - d. Frees CoA which activates the citric acid cycle
 - e. All the above are correct
64. Which one below is to a large extent volatilized in the lungs?
- a. Acetate
 - b. Acetoacetate
 - c. D-3-hydroxybutyrate
 - d. Succinate
 - e. Acetone
65. During formation of ketone bodies, the product of thiolase catalyzed reaction is
- a. D-3-hydroxybutyrate
 - b. 3-OH-3 methylglutaryl-CoA
 - c. Acetone
 - d. Acetoacetate
 - e. None of the above

66. The key regulatory enzyme in fatty acid synthesis is
- Citrate synthase
 - Enoyl reductase
 - 3-ketoacyl synthase
 - Acetyl-CoA carboxylase
 - 3-ketoacyl reductase
67. Elongation of fatty acids occurs in the
- Lysosomes
 - Nucleus
 - Cytosol
 - Endoplasmic reticulum
 - Peroxisomes
68. In which organelle does elongation of fatty acids occur by reversal of β -oxidation
- Lysosome
 - Mitochondrion
 - Nucleus
 - Cytosol
 - None of the above
69. Malic enzyme converts malate to
- Pyruvate
 - Oxaloacetate
 - Citrate
 - Fumerate
 - Acetate
70. Acetyl-CoA carboxylase is activated by
- AMP
 - Glucagon
 - Insulin
 - Epinephrine
 - Long chain acyl-CoA molecules
71. Major point of regulation of cholesterol synthesis is catalysed by
- HMG-CoA reductase
 - HMG-CoA synthase
 - Mevalonate kinase
 - Squalene synthetase
 - Phosphomevalonate kinase
72. Which intermediate is a precursor for dolichol and ubiquinone?

- a. Squalene
 - b. Guaranyl pyrophosphate
 - c. Farnesyl pyrophosphate
 - d. Lanosterol
 - e. 5-pyrophosphomevalonate
73. Which amino acid is completely conjugated to coyl-CoA and chenodeoxycholy-CoA?
- a. Serine
 - b. Leucine
 - c. Glutamine
 - d. Valine
 - e. Glycine
74. Cholesterol is a precursor for the synthesis of
- a. Vitamin B₆
 - b. Folate
 - c. Vitamin D
 - d. Vitamin C
 - e. Vitamin B₂
75. Total plasma cholesterol is about
- a. 1 mmol/L
 - b. 10.2 mmol/L
 - c. 2 mmol/L
 - d. 5.2 mmol/L
 - e. 8.5 mmol/L
76. Humans synthesise about
- a. 1 g cholesterol each day
 - b. 5.2 mg cholesterol each day
 - c. 2.5g cholesterol each day
 - d. 2.5mg cholesterol each day
 - e. 1 mg cholesterol each day
77. Which pair of amino acids play a key role in Nitrogen metabolism?
- a. Glutamate and glycine
 - b. Proline and alanine
 - c. Histidine and valine
 - d. Glutamate and glutamine
 - e. Alanine and asparagine
78. Which amino acid transports excess amino groups from muscles to the liver?
- a. Glutamate

- b. Alanine
 - c. Methionine
 - d. Lysine
 - e. Isoleucine
79. How many major helical segments are in myoglobin?
- a. 5
 - b. 3
 - c. 8
 - d. 4
 - e. None of the above
80. Affinity of myoglobin and haemoglobin for CO is about
- a. 200 times as great as for O₂
 - b. 2000 times as great as for O₂
 - c. 20 times as great as for O₂
 - d. 300 times as great as for O₂
 - e. 25 000 times as great as for O₂
81. The oxygen-haemoglobin dissociation curve is shifted to the right by
- a. Increased production of CO from heme breakdown
 - b. A decrease in [H⁺]
 - c. An increase in CO₂ partial pressure
 - d. A decrease in CO₂ partial pressure
 - e. None of the above
82. How many amino acid molecules are in each of the γ chains of haemoglobin?
- a. 157
 - b. 141
 - c. 164
 - d. 411
 - e. 146
83. Which apoprotein binds to liver receptor for chylomicron remnants to enter the cells?
- a. Apo-E
 - b. Apo-B48
 - c. Apo-CII
 - d. Apo-AI
 - e. Apo-B100
84. Which of the following compounds would generate the largest amount of free energy for ATP synthesis by its aerobic catabolism to CO₂ and H₂O?
- a. Three molecules of glucose

- b. Three molecules of fructose
 - c. One molecule of palmitoyl-CoA
 - d. Four molecules of acetoacetyl-CoA
 - e. Eight molecules of acetyl-CoA
85. Cholesterol is a
- a. 27 carbon molecule
 - b. 21 carbon molecule
 - c. 19 carbon molecule
 - d. 18 carbon molecule
 - e. 25 carbon molecule
86. Ammonia intoxication can give rise to
- a. Flapping tremors
 - b. Slurring of speech
 - c. Blurring of vision
 - d. Coma
 - e. All the above
87. Glutamate is the substance for the formation of the following except
- a. Glutamine
 - b. Purines
 - c. Gamma amino butyric acid
 - d. α -ketoglutarate
 - e. glutathione
88. Parkinson's disease is associated with overproduction of
- a. Serotonin
 - b. Dopamine
 - c. Histamine
 - d. Bradykinin
 - e. Epinephrine
89. 21-carbon molecules include the following except
- a. Pregnenolone
 - b. Progesterone
 - c. Cortisol
 - d. Aldosterone
 - e. 17 β -Estradiol
90. The most common disorder of steroid hormone synthesis is the deficiency of
- a. 21-hydroxylase
 - b. 17,20-lyase

- c. 17 α -hydroxylase
 - d. 18 hydroxylase
 - e. 11 hydroxylase
91. Atoms at positions 4,5 and 7 of the purine ring are derived from
- a. N¹⁰-formyl-tetrahydro-folate
 - b. N⁵,N¹⁰-methylene-tetrahydrofolate
 - c. Glutamine
 - d. Glycine
 - e. Aspartate
92. Allopurinol, an analog of hypoxanthine is used in the treatment of
- a. Duodenal ulcers
 - b. Phenylketonuria
 - c. Alkaptonuria
 - d. Parkinson's disease
 - e. Gout
93. RNA synthesis differs from DNA synthesis in that
- a. Ribonucleotides are used in RNA rather than deoxyribonucleotides
 - b. U replaces T as the supplementary base pair in A of RNA
 - c. Unlike in DNA synthesis, a primer is not involved in RNA synthesis
 - d. A small portion of the genome is transcribed or copied into RNA, whereas the entire genome must be copied during DNA replication
 - e. All the above
94. 2,3-bisphosphoglycerate (BPG) diminishes the oxygen affinity for haemoglobin by
- a. Preventing the formation of salt bridges
 - b. Stabilizing the R state of haemoglobin
 - c. Binding to deoxyhaemoglobin
 - d. Increasing the pH
 - e. Decreasing the partial pressure of CO₂
95. In haemoglobin S, the 6th position of the beta chain is occupied by
- a. Glutamic acid
 - b. Proline
 - c. Valine
 - d. Histidine
 - e. Leucine
96. The activity of heme oxygenase enzyme system in the reticuloendothelial cells requires
- a. FAD
 - b. CO₂

- c. O₂
 - d. NH₃
 - e. NAD⁺
97. Which condition can result from a genetic defect with partial or total loss of one or more α or β chains?
- a. Thalassemia
 - b. Scurvy
 - c. Sickle cell disease
 - d. Hepatitis
 - e. Congenital erythropoietic porphyria
98. Defective formation of bones and rickets can result from deficiency of?
- a. Vitamin K
 - b. Vitamin E
 - c. Vitamin D
 - d. Vitamin A
 - e. None of the above
99. An asthmatic attack can be induced by overproduction of
- a. Prostaglandins
 - b. Vitamin A
 - c. Cholesterol
 - d. Thromboxanes
 - e. Leukotrienes
100. The correct pattern of double bonds in arachidonic acid is
- a. *Cis, cis, cis, -9,12,15*
 - b. *Cis, cis, cis, cis -5,8,11,14*
 - c. *Cis, cis, trans, cis -5,8,11,14*
 - d. *Cis, cis, cis, cis -5,8,11,15*
 - e. *None of the above*
101. During protoporphyrin III biosynthesis, methylene bridges are oxidized to methenyl bridges in a step catalysed by
- a. Ferrochelatase
 - b. Uroporphyrinogen decarboxylase
 - c. Uroporphyrinogen III cosynthase
 - d. Protoporphyrinogen oxidase
 - e. Porphyrinogen 1 synthase
102. Methemoglobinemia can be caused by
- a. Benzocaine

- b. Sulphonamide
 - c. Dapsone
 - d. Aniline dyes
 - e. All the above
103. The initial substrate for cholesterol synthesis is
- a. Cysteine
 - b. Succinyl-CoA
 - c. Acetyl-CoA
 - d. Isocitrate
 - e. Glutathione
104. Formation of pregnenolone from cholesterol requires removal of a
- a. Six carbon unit
 - b. Four carbon unit
 - c. Three carbon unit
 - d. Five carbon unit
 - e. Ten carbon unit
105. Aldosterone is formed from corticosterone by oxidation of a methyl group at
- a. C21
 - b. C11
 - c. C18
 - d. C17
 - e. C19
106. Testosterone is converted to 17 β -estradiol by
- a. 17 β -hydroxysteroid dehydrogenase
 - b. 21-hydroxylase
 - c. 18-hydroxylase
 - d. Aromatase
 - e. 5 α -reductase
107. Which amino acid below is both ketogenic and gluco(neo)genic?
- a. Glutamate
 - b. Lysine
 - c. Aspartate
 - d. Tyrosin
 - e. Arginine
108. One of the amino acids required for the synthesis of creatinine/phosphocreatinine is
- a. Proline
 - b. Lysine

- c. Methionine
 - d. Leucine
 - e. Cysteine
109. Histamine is formed by decarboxylation of
- a. Histidine
 - b. Valine
 - c. Arginine
 - d. alanine
 - e. asparagine
110. Serotonin, a neurotransmitter is derived from
- a. Phenylalanine
 - b. Serine
 - c. Threonine
 - d. Tryptophan
 - e. Proline
111. The urea cycle intermediates include
- a. Arginine
 - b. Homocystein
 - c. Tetrahydrofolate
 - d. α -ketobutyrate
 - e. none of the above
112. The primary estrogen of the ovarian origin is
- a. Androstendione
 - b. Estrone
 - c. Estriol
 - d. 17β -estradiol
 - e. 17α -hydroxyprogesterone
113. How many carbon atoms are in estrogen?
- a. 22
 - b. 18
 - c. 27
 - d. 19
 - e. 20
114. 21 -hydroxylase catalyses the conversion of 17α -hydroxyprgesterone
- a. Corticosterone
 - b. Progesterone
 - c. Pregnenolone

- d. 11-hydroxycortisol
 - e. None of the above
115. Conversion of cholesterol to pregnenolone in the testis is promoted by
- a. Follicle stimulating hormone (FSH)
 - b. Luteinising hormone (LH)
 - c. Adrenocorticotrophic Hormon (ACTH)
 - d. Insulin
 - e. None of the above
116. The amino acid precursor for the hormones/ neurotransmitters epinephrine, norepinephrine and dopamine is
- a. Tyrosine
 - b. Glutamine
 - c. Glutamate
 - d. Aspartate
 - e. Cysteine
117. The precursor for adenosine monophosphate (AMP) and guanosine monophosphate (GMP) biosynthesis is
- a. Carbonoyl phosphate
 - b. Succinyl-CoA
 - c. Inosine monophosphate
 - d. Acetoacetate
 - e. Orotic acid
118. The conversion of inosine monophosphate (IMP) to guanosine monophosphate (GMP) and the conversion of uridine triphosphate (UTP) to cytosine triphosphate (CTP) have in common
- a. Amido-N transfer as glutamine is converted to glutamate
 - b. Amido-N transfer as glutamate is converted to glutamine
 - c. Amido-N transfer as asparagine is converted to aspartate
 - d. Amido-N transfer as aspartate is converted to fumarate
 - e. Reduction by nucleotide reductase
119. Urea biosynthesis and pyrimidine biosynthesis the common intermediate
- a. Carbonoyl phosphate
 - b. Inosine monophosphate
 - c. Acetoacetate
 - d. Orotic acid

SECTION B (SHORT ANSWERS)

1. The genetic code is degenerate, what do you understand by the term degenerate?
2. Which reduced equivalents are produced during fatty acid oxidation?
3. Why is oxaloacetate unavailable for condensation with Acetyl-CoA, to form citrate during starvation?
4. What are the three sources of NADPH during lipogenesis?
5. Why is adenosine monophosphate (AMP) a better sensor of energy status of the cells than ADP or ATP?
6. What beneficial role does uric acid have in the body?
7. DNA polymerase III has high processivity. What is meant by high processivity?
8. What role does DNA polymerase I play in DNA synthesis?
9. Why do some single base changes produce normal protein without any detectable effect?

SECTION C

1. Explain why lactate is formed in the red blood cells in the presence or absence of glucose.
2. Explain why the dietary intake of excess carbohydrates can lead to obesity.
3. Explain how cAMP regulates gluconeogenesis and glycogenesis.
4. Outline the process of glycogenolysis and how the activation of glycogen phosphorylase in muscle differs from that one in the liver.
5. Explain how and why ketone bodies are formed in untreated diabetes.
6. Outline the sequence of reactions in the pentose phosphate pathway and explain how this is affected by cellular needs for ribose and NADPH + H⁺.
7. How are long chains fatty acids activated and transported into the mitochondria matrix for beta-oxidation?
8. Outline the main stages in cholesterol biosynthesis.
9. What are the features of DNA polymerase III that makes it an ideal enzyme for DNA replication? What are leading and lagging DNA strands? How are Okazaki fragments finally joined to form one daughter strand?
10. What role does tRNA play in protein synthesis? How does genetic information flow from DNA to RNA to protein?
11. Describe how cortisol is synthesised in the body, from the precursor cholesterol.
12. Describe the features of the genetic code.

ANSWERS

1.C 2.C 3.A 4.B 5.C 6.A 7.C 8.E 9.C 10.B 11.A 12.C 13.B
14.A 15.E 16.A 17.C 18.C 19.B 20.C 21.B 22.C 23.B 24.A
25.C 26.E 27.B 28.B 29.B 30.B 31.C 32.A 33.E 34.D 35.C
36.C 37.E 38.C 39.E 40.B 41.E 42.B 43.E 44.D 45.B 46.C
47.B 48.D 49.D 50.E 51.D 52.C 53.B 54.C 55.C 55.B 57.D
58.C 59.B 60.A 61.C 62.B 63.C 64.E 65.E 66.D 67.D 68.B
69.A 70.C 71.A 72.C 73.E 74.C 75.D 76.A 77.D 78.B
79.A 80.A 81.C 82.E 83.A 84.C 85.A 86.E 87.B 88.B 89.E
90.D 91.D 92.E 93.E 94.C 95.C 96.C 97.A 98.C 99.E
100.B 101.D 102.E 103.C 104.A 105.C 106.D 107.D 108.C
109.A 110.D 111.A 112.D 113.B 114.D 115.B 116.A 117.C
118.A 119.A

You will never be anything other than what you already are in your thoughts,
because you are a complete product of your thoughts, decisions and choices. -----
----- Justine Mulongoti -----