Exam Answer Key

1. The accessory glands of the mammalian digestive system are: (2 marks)
2. salivary glands
3. the pancreas
4. the liver
5. Stomach
6. A, b, c are correct
7. All of the above
8. What the terminal acceptor of electrons in the ETC? (2 marks)
9. Water
10. Hydrogen peroxide
11. Carbon dioxide
12. Molecular oxygen
13. An amphibian such as a frog ventilates its lungs by: (2 marks)
14. Negative pressure breathing
15. Tracheal system
16. Positive Pressure Breathing
17. One direction air movement
18. Cholesterol is: (2 marks)
19. Fat
20. Steroids
21. A digestive organ
22. A hormone
23. b & d are correct
24. a, b, & d are correct
25. The Peroxisome is: (2 marks)
26. An organelle with various specialized metabolic functions; produces hydrogen peroxide as a by-product, then converts it to water
27. An organelle where cellular respiration occurs and most ATP is produced
28. An organelle active in synthesis, modification, sorting, and secretion of cell products
29. A digestive organelle where macromolecules are hydrolyzed
30. Many aquatic animals are: (2 marks)
31. Substrate feeders
32. Bulk feeders
33. Fluid feeders
34. Suspension feeders
35. In the article “A Burger a Day”, what compound was used to decrease the amount of cholesterol in our foods? (2 marks)
36. Sterols
37. Enzymes
38. Unsaturated fats
39. Plant Chloroplast
40. Glycolysis occurs in: (2 marks)
41. The cytosol
42. The lysosome
43. The mitochondria
44. The matrix
45. The stomach is located just below the: (2 marks)
46. Diaphragm
47. Liver
48. Esophagus
49. Large intestine
50. Which of these are saturated fats: (2 marks)
51. Lard
52. Butter
53. Olive Oil
54. Only a & b
55. All of the above
56. In glycolysis, glucose-6-phosphate enters a series of reactions to eventually get converted to: (2 marks)
57. Pyruvate
58. G3P
59. Alpha-ketogluterate
60. Malate
61. a & b are correct
62. a & d are correct
63. The article “Narrative Portrayls of Genes and Human Flourishing” by Aline H. Kalbian focuses on: (2 marks)
64. Prenatal genetic testing
65. Genes
66. Gene discrimination
67. GATTACA
68. All of the above
69. What is located where the stomach opens to the small intestine to help regulate the passage of chyme into the small intestine? (2 marks)
70. Epiglottis
71. Sphincter
72. Villi
73. Bile
74. Chemiosmosis couples: (2 marks)
75. Glycolysis and the proton gradient
76. TCA and ATP synthase
77. ATP synthase and the proton gradient
78. ETC and the proton gradient
79. The endoplasmic reticulum is: (2 marks)
80. A network of membranous sacs and tubes; active in membrane synthesis and other synthetic and metabolic processes
81. A double membrane enclosing the nucleus
82. Reinforces cell’s shape, functions in cell movement; components are made of proteins
83. A locomotion organelle present in some animal cells
84. The terminal portion of the large intestine is: (2 marks)
85. Anus
86. Sphincter
87. Rectum
88. Reproduction organs
89. The consumption of more calories than the body needs for normal metabolism, causes: (2 marks)
90. A higher metabolic rate
91. Obesity due to clogged arteries
92. A higher pH in the stomach
93. All of the above
94. Veins: (2 marks)
95. Carry blood back to the heart
96. Carry blood away from the heart
97. Are microscopic blood vessels
98. Carry out gas exchange
99. In the TCA cycle, FADH2 is released at which of the following stages: (2 marks)
100. When oxidizing malate
101. When oxidizing Succinic acid
102. When reducing malate
103. When reducing succinic acid
104. Will the future be: (2 marks)
105. Ruled by robots
106. We will all die in 2012, there is no future
107. Ruled by people with super powers
108. Everything will be done by a computer, we won’t have to leave our house
109. I do not know. We shall find out
110. Label any of the 5 missing arteries or veins: (5 marks)



1. Describe in detail how a mammal breathes. Provide the full branching pathway. (10 marks)

Mammals employ **negative pressure breathing** – pulling rather than pushing air into their lungs. Using muscle contraction at actively expand the thoracic cavity, mammals lower air pressure in their lungs below that of the air outside the body. Because gas flows from a region of higher pressure to a region of lower pressure, air rushes through the nostrils and mouth and down the breathing tubes to the alveoli. During exhalation, the muscles controlling the thoracic cavity relax, and the volume of the cavity is reduced. The increased air pressure in the alveoli forces air up the breathing tubes and out of the body. Thus, inhalation is always active and requires work, whereas exhalation is usually passive.
Expanding the thoracic cavity during inhalation involves the animal’s rib muscles and the **diaphragm,** a sheet of skeletal muscles that forms the bottom wall of the cavity. Contracting the rib muscles expand the rib cage, the front wall of the thoracic cavity, by pulling the ribs upwards and the sternum outward. At the same time, the diaphragm contracts, expanding the thoracic cavity downward.
Within the thoracic cavity, a double membrane surrounds the lungs. The inner layer adheres to the outside of the lungs, and the outer layer adheres to the wall of the thoracic cavity. A thin space filled with the fluid separates the two layers.

1. Describe in detail how the circulatory system of a mammal. Provide the full pathway blood takes. (10 marks)

Contraction of the right ventricle pumps blood to the lungs via 2) the pulmonary arteries. As the blood flows through 3) capillary beds in the left and right lungs, it loads oxygen and unloads carbon dioxide. Oxygen-rich blood returns from the lungs via the pulmonary veins to 4) the left atrium of the heart. Next, the oxygen-rich blood flows into 5) the left ventricle, which pumps the oxygen-rich flood out to the body tissues through the systemic circuit. Blood leaves the left ventricle via 6) the aorta, which conveys blood to arteries leading throughout the body. The first branches of the aorta are coronary arteries, which supply blood to the heart. Then branches lead to 7) capillary beds in the head and arms. The aorta then descends into the abdomen, supplying oxygen-rich blood to arteries leading to 8) capillary beds in the abdominal organs and legs. Within the capillaries, there is net diffusion. Oxygen-poor blood from the head, neck, and forelimbs is channeled into a large vein, 9) the superior vena cava. Another large vein, 10) the inferior vena cava, drains blood from the trunk and hind limbs. The two venae cavae empty their blood into 11) the right atrium, from which the oxygen-poor blood flows into the right ventricle.

1. What is the genotypic ratio of the progeny produced from this mating?
Parental cross: female aaBb crossed with a male AABb (2 marks)
2. You were thrilled to have a new baby sister, but excitement turned to
anxiety when she began to have digestive problems with persistent
vomiting. Doctors quickly learned that she had an autosomal
recessive disorder called galactosemia. Your sister lacked the enzyme
that breaks down the milk sugar galatose, so her pediatrician put her
on a special diet free of lactose and galactose. In a short time, your
sister was fine. (3 marks)
a. Neither of your parents is affected with galactosemia. If your
sister's genotype is gl/gl, what are your parents' genotypes?
b. You are not affected with galactosemia. What is your genotype or
possible genotypes?
c. Will your sister automatically pass on this disease to her children?
Why or why not?