MULTIPLE CHOICE: This exam contains 80 multiple choice questions. Read each question and their corresponding answers completely and carefully. Choose the best answer and mark the corresponding letter choice on your answer sheet.

Directions: Use the diagrams below to answer questions 1 – 2

_____1. The diagram shows a plant cell and an animal cell. Which structure is found in a plant cell but is absent in an animal cell?
   a. G  
   b. K  
   c. B  
   d. M

_____2. The cell uses structure A to
   a. To transport material from one part of the cell to another  
   b. To package proteins so they can be stored by the cell  
   c. As a receptor protein  
   d. To make energy

_____3. Which structure immediately identifies the cells as eukaryotes?
   a. B  
   b. E  
   c. I  
   d. G

_____4. Structure C is
   a. Endoplasmic reticulum  
   b. Golgi
5. Structure H is
   a. Endoplasmic reticulum
   b. Golgi
   c. Mitochondrion
   d. Nucleus

6. The plant cell organelles that contain photosynthetic pigments are
   a. Centrioles
   b. Lysosomes
   c. Amyloplasts
   d. Chloroplasts

7. A bacterium will construct different proteins to metabolize the sugars lactose or glucose, depending on which one it detects in the outside environment. What part of the bacterium allows it to recognize different substances in the outside environment?
   a. Lysosome
   b. Cell membrane
   c. Nucleus
   d. Vacuole

8. Which mitochondrion will make more energy during aerobic cellular respiration?
   a. Figure A
   b. Figure B

9. In both plants and animals, food molecules are broken down and CO2 is released by
   a. Cellular respiration
   b. The carbon cycle
   c. Breathing
   d. Glycolysis

10. In a microscope, if the eyepiece has a magnification of 10x and the objective lens has a magnification of 15x, what would be the total magnification of the object viewed?
    a. 10x
    b. 15x
    c. 100x
    d. 150x
Use the following diagram to answer questions 11-15

11. When viewing a prepared slide under a microscope, a student has to remove her glasses. This means she will need to readjust for fine focus with which part labeled above?
   a. A  
   b. B  
   c. I  
   d. J

12. What opens and closes the control of the amount of light allowed to pass through the object being viewed?
   a. J  
   b. I  
   c. E  
   d. B

13. One advantage of electron microscopes over light microscopes is their
   a. Size  
   b. Two dimensional image  
   c. Higher magnification  
   d. Use of live specimens

14. Which cell in the diagram to the right represents a prokaryotic cell?
   a. Cell A because it has a nucleus  
   b. Cell A because it lacks a nucleus  
   c. Cell B because it has a nucleus  
   d. Cell B because it lacks a nucleus

15. What is the major difference between prokaryotic and eukaryotic cells?
   a. Prokaryotic cells have no membrane around their nuclear material, eukaryotic cells do  
   b. Prokaryotic cells have no nuclear material, eukaryotic cells do  
   c. Prokaryotic cells can move on their own, eukaryotic cells can’t  
   d. Prokaryotic cells engage in photosynthesis, eukaryotic cells don’t

16. Which best explains why muscle cells are different from blood cells?
   a. A mutation occurs during the development of muscle cells but not in blood cells
b. Different genes are activated in muscle cells than in blood cells
c. Muscle cells are produced by the brain, but blood cells are produced by the heart
d. Muscle cells experience different environmental conditions than blood cells

17. Specialized cells are specialized for particular tasks. These cells are specialized to provide
   a. Structure and support
   b. Movement
   c. Transport oxygen
   d. Reproduction

18. Which term best describes how cells work together in your body?
   a. Corporation
   b. Cooperation
   c. Competition
   d. Coagulation

19. Young people grow to become adults and take jobs that serve a specific role in our economy and society. Everyone starts as a child with the potential to fill almost any of the jobs available. Which part of the biotic systems of cells does this situation resemble?
   a. Apoptosis
   b. Stem cells
   c. Genetic engineering
   d. Regeneration

20. The nerve cell shown has branches that develop during cell specialization. Which of these functions does a nerve cell’s branches help the cell perform?
   a. Communicating with other cells
   b. Moving from location to location
   c. Storing extra DNA
   d. Exerting force on non-nervous tissue

21. Tissue samples taken from the heart and stomach of a grasshopper would be expected to have the same
   a. Cell shape
   b. Cell size
   c. DNA
   d. Metabolic rates

22. Animal populations that are the least specialized generally stand the best chance of survival when the environment suddenly and drastically changes because they are able to
   a. Individuals can adapt to different conditions
   b. Mutate rapidly
   c. Move from place to place
d. Reproduce abundantly

23. Because cells have a watery environment both inside and outside, the polar ends of the phospholipids in the plasma membrane form
   a. Single layers
   b. Double layers
   c. Several layers
   d. A branching structure

24. If animal or plant cells are placed in a very concentrated sugar solution, water will
   a. Pass from the sugar solution into the cells
   b. Pass from the cells into the sugar solution
   c. Stay in the cell
   d. Pass back and forth equally

25. Some peeled pieces of apple were placed in distilled water and some in very salty water. The cells in the apple pieces will
   a. Lose water in both solutions
   b. Gain water in both solutions
   c. Lose water in the distilled water and gain water in the salty water
   d. Gain water in the distilled water and lose water in the salty water

26. Which of the following is not a form of passive transport?
   a. Osmosis
   b. Diffusion
   c. Facilitated diffusion
   d. Endocytosis

27. Which conditions might cause a cell to burst?
28. The diagram below shows a section of a cell membrane that includes a channel protein. The function of this protein is to

a. Strengthen the outer boundary of the cell
b. Connect reproductive cells during fertilization
c. Allow certain substances to enter or leave the cell
d. Exchange organelles or chromosomes between specialized cells

29. Choose the correct statement about diffusion

a. Diffusion is an active process that requires the cell to expend a great deal of energy
b. Diffusion only occurs in living systems
c. During diffusion, molecules move from an area where their concentration is low to an area where their concentration is high until molecules are evenly dispersed
d. During diffusion, molecules move from an area where their concentration is high to an area where their concentration is low until molecules are evenly dispersed

30. The main reason that eating salty foods makes a person thirsty is that additional fluid is needed to

a. Increase the salinity of the blood
b. Dissolve salt crystals in the stomach
c. Maintain the fluid balance in the cells
d. Prevent damage to the lining of the throat

31. Some fish travel from saltwater to freshwater or from freshwater to saltwater but still maintain the concentration of salt and water in their cells that is best for them. This is an example of
   a. Mutation
   b. Positive feedback
   c. Homeostasis
   d. Cellular injury

32. Biochemical systems in the human body are maintained at about a neutral pH except for the
   a. Blood
   b. Stomach fluids
   c. Internal material of living cells
   d. Lymph

33. Before mitosis begins, what happens before the nucleus starts dividing?
   a. The cytoplasm separates
   b. The DNA replicates
   c. The sister chromatids separate
   d. The homologous chromosomes cross over

34. The chromosomes shown are in what state of mitosis?

   a. Prophase
   b. Metaphase
   c. Anaphase
   d. Cytokinesis

35. Which of the cells in the line graph are most likely cancerous?

   a. A
   b. B
   c. C
   d. D
36. The longest phase of the cell cycle is
   a. Interphase
   b. Prophase
   c. Mitosis
   d. Cytokinesis

37. List the correct order for the stages of mitosis shown in the diagram
   a. D, B, C, A, E, F
   b. E, F, A, D, B, C
   c. F, A, D, B, E, C
   d. C, E, F, A, D, B

38. The two main stages of cell division are
   a. Mitosis and interphase
   b. Synthesis and mitosis
   c. Mitosis and cytokinesis
   d. Cytokinesis and interphase

39. As a result of mitosis in a human body cell, each of the two nuclei formed has
   a. A diploid set of chromosomes
   b. 23 chromosomes
   c. 92 chromosomes
   d. A haploid set of chromosomes

40. What is the name of the phase labeled X?
   a. Prophase
   b. Cytokinesis
   c. Telophase
   d. Interphase
41. During meiosis, homologous chromosomes can exchange DNA in a process known as
   a. Replication
   b. Internal fertilization
   c. Cytokinesis
   d. Crossing over

42. Which process produces the most variation within a species?
   a. Asexual reproduction
   b. Sexual reproduction
   c. Binary fission
   d. Cloning

43. The diagram shows a unicellular protist. What is the function of structure D?
   a. Movement
   b. Water balance
   c. Circulation
   d. Attachment

44. The diagram of euglena, a unicellular protist shows several structures. What is the function of the flagella?
   a. Movement
   b. Water balance
   c. Circulation
   d. Attachment

45. Rabbits have developed behavioral and physiological strategies to sustain them through periods of environmental stress. Which of the numbered life processes could be sacrificed with affecting an individual rabbit’s survival in periods of extremely poor environmental conditions?
   a. 1
   b. 2
   c. 3
   d. 4

46. What do phototaxis and chemotaxis enable organisms to do?
   a. Move toward needed resources, or away from toxins
   b. Prevent invasion by bacterial colonies
   c. Defend themselves against herbivores
   d. Develop pesticide resistance by exchanging DNA
47. Many Northern Hemisphere birds respond to seasonal environmental changes by
   a. Hibernating
   b. Mutating
   c. Migrating
   d. Estivating

48. The pictures show the cross section of the intestines of different animals. Which intestine can absorb the least amount of nutrition per centimeter of length of the intestine?
   a. F
   b. G
   c. H
   d. K

49. The pheromones by which ants transmit information are
   a. Visual signals
   b. Sound signals
   c. Electrical signals
   d. Chemical signals

50. Lichens are composed of both fungal and algal (or cyanobacterial) components. The fungal component absorbs nutrients for both organisms while the algal component manufactures food for both organisms through photosynthesis. This type of symbiotic relationship is referred to as
   a. Parasitism
   b. Commensalism
   c. Predation
   d. Mutualism

51. Carbon dioxide in the atmosphere enters the biotic parts of the environment through
   a. Burning of forests
   b. Photosynthesis
   c. Burning of fossil fuels
   d. Renewable resources

52. Water is lost to the abiotic parts of the environment from the biotic parts of the environment by the process of
   a. Precipitation
   b. Photosynthesis
   c. Transpiration
53. For a particular species, the carrying capacity is
a. The maximum number of individuals the environment can support
b. The number of animals in the population that are in their post-reproductive years
c. The number of individuals the species could produce
d. Maximum number that could be supported by any environment over one year

54. This food chain can be found off the coastal waters of North Carolina. The population of which organisms in the food chain would be first to decline if commercial fishing over-harvested shrimp?
   a. Algae
   b. Damselfish
   c. Barracuda
   d. Zooplankton

55. Which of the following is a density-independent limiting factor?
   a. Disease
   b. Parasites
   c. Earthquake
   d. Emigration

56. Nitrogen fixation is carried out primarily by
   a. Bacteria
   b. Consumers
   c. Plants
   d. Humans

57. According to the energy pyramid, the most energy is available in the organisms living at the same level as
   a. Grass
   b. Grasshoppers
   c. Birds
   d. Bobcat

58. Some plant roots grow with mycorrhizal fungi. The fungi absorb water and minerals and pass them on to the plant and receive carbohydrates from the plant. This is an example of
   a. Parasitism
   b. Mutualism
   c. Competition
   d. Predation
59. In the diagram, which organism provides nutrients for the largest number of other organisms?
a. Herring  
b. Snapper  
c. Bluefish  
d. Seal

60. What do the arrows in the diagram represent?
a. Direction of energy flow  
b. Fundamental niche  
c. Evolutionary relationships  
d. Parasitism

61. Based on this classification scheme, the European otter and the leopard are in the same
   a. Kingdom but different orders  
   b. Genus but in different species  
   c. Order but in different families  
   d. Family but different genera

62. Gymnosperms (a group of plants including conifers) and angiosperms (flowering plants) share many traits but are classified in separate groups. Which is a difference between gymnosperms and angiosperms?
   a. Only angiosperms form wood  
   b. Only gymnosperms reproduce with spores  
   c. Only angiosperms produce seeds within fruits  
   d. Only gymnosperms have vascular tissue

63. When a population surpasses its carrying capacity
   a. Limiting factors operate to remove members of the population  
   b. The ecosystem cannot maintain the population for long  
   c. Predation, parasitism, competition, crowding and stress become very strong  
   d. All of the above
64. How are the populations of rabbits and foxes connected in the predator-prey graph?
   a. The population of foxes increases after the population of rabbits
   b. The population of rabbits increases after the population of foxes
   c. The population of foxes increases before the population of rabbits
   d. Predator and prey populations are not connected

65. If a predator of the fox enters the food chain, in the short term you might expect the number of
   a. Foxes and rabbits to become equal
   b. Foxes to increase
   c. Rabbits to increase
   d. Foxes and rabbits to decrease

66. When a group of foxes moves to a new environment, a change in which of the following is least likely to be a selective pressure on the foxes?
   a. Temperature
   b. Food sources
   c. Decomposers
   d. Predator populations

67. Resources that are used up faster than they can be replenished are examples of
   a. Sustainable crops
   b. Renewable resources
   c. Non-renewable resources
   d. Biodiversity

68. The following occurs when carbon dioxide water, and methane molecules absorb energy radiated by Earth's surface to slow the release of this energy from Earth's atmosphere
   a. Ozone depletion
   b. Acid Rain
   c. Greenhouse Effect
   d. Eutrophication

69. What is the primary cause of species extinction today?
   a. Overhunting
   b. Habitat loss
   c. Invasive species
A sea turtle has washed up on a remote section of beach. This is known as “stranding.” Stranding occurs when a dead, sick or injured sea turtle washes up on the shoreline. Which statement best explains why “stranding” should be reported immediately to local authorities?

a. The information can be very useful to biologists and managers who are trying to protect the species
b. The information can be very useful to protect the sea turtles from predators
c. The information can be very useful to local fishermen who try to catch fish that sea turtles eat.
d. The information can be very useful to tourists who may want to keep sea turtles as pets.

RNA and DNA are which type of organic compound?

a. Protein
b. Carbohydrate
c. Lipid
d. Nucleic acid

In eukaryotic cells, the process indicated by arrow A occurs in the

a. Cytoplasm
b. Ribosome
c. Nucleus
d. Cell membrane

A strand of DNA has these bases:

AGC CAT GTA TAC

What is the complementary DNA strand?

a. ACG GAT CTA TAG
b. TCG GTA CAT ATG
c. TGC CTA GAT ATC
d. UCG CUA CAU AUG

Which statement best describes the relationship that exists among proteins, DNA, and cells?

a. Proteins combine to produce cells, which produce DNA
b. Proteins are made up of DNA, which determines the cells that are produced
c. DNA is made up of proteins, which tell the cell how to function
d. Cells contain DNA, which directs the production of protein

The diagram represents a process that occurs within a cell in the human pancreas. This process is known as

a. Digestion by enzymes
b. Protein synthesis
c. Energy production
d. Replication of DNA

76. Scientists can use genetic information to identify people because it is unique to each person. Which specific characteristic is unique to an individual?
   a. The shape of the DNA molecules in cells
   b. The number of chromosomes in each cell
   c. The sequence of DNA nucleotides in cells
   d. The size of each chromosome in a cell

77. Which factor most affects the order of amino acids in a protein?
   a. The DNA located in the nucleus of the cell
   b. The cell in which the protein is located
   c. The amount of ATP available for the cell’s use
   d. The area in a cell where proteins are produced

78. One strand of DNA could be as long as a football field if it were stretched out lengthwise. One of the factors allowing DNA to fit inside the nucleus of a cell is its ability to
   a. Break apart into separate genes
   b. Extend to form a very long, thin molecules
   c. Coil tightly around associated proteins
   d. Denature from the effect of an enzyme

79. Mustard gas removes guanine from DNA. This can cause serious multiple pathologies because guanine
   a. Is one of the nitrogenous bases of DNA
   b. Forms all the connections between the bases of DNA
   c. Supports the structure of ribosomes
   d. Produces energy for the transfer of genetic information

80. Dutch Elm Disease is a destructive fungal infection that kills elm trees. Some elms are more resistant to the disease than other elms. Which best explains this difference?
   a. Resistant trees form a symbiotic relationship with the fungus
   b. Resistant trees gain resistant properties from the soil
   c. Resistant trees have beneficial variations of some genes
   d. Resistant trees produce more frequent mutations

81. Scientists are using genetic engineering to develop a wheat crop that is resistant to a particular kind of moth. How would they determine if the plants are moth-resistant?
   a. Determine the length of the moth reproductive cycle in normal wheat
   b. Determine whether moths in test wheat can be controlled with chemical sprays
   c. Monitor numbers of moth species infesting normal wheat
   d. Monitor moth populations in fields planted with test and normal wheat.
82. A geneticist studying fruit flies hypothesizes that short wings are a recessive trait coded for by a single gene. Which observation is most likely to have led her to form this hypothesis?
   a. Flies have wing lengths ranging from very long to very short
   b. Flies with long wings are less likely to survive
   c. Flies with long wings can produce offspring with short wings
   d. Flies with short wings prefer to mate with flies with long wings

83. When you cross TT x Tt - what proportion of the offspring will be homozygous recessive for tallness?
   a. 100%
   b. 50%
   c. 25%
   d. 0%

84. In a plant that has red flowers, red flower color, R is completely dominant to white flower color, r. If the plant is heterozygous for flower color, which alleles will be carried by the gametes it produces?
   a. R and r
   b. R only
   c. R only
   d. Rr only

85. In squash plants, yellow fruit (Y) is dominant to white fruit (y). If two plants heterozygous for yellow fruit are crossed, what are the possible genotypes of their offspring?
   a. Yy only
   b. YY, yy only
   c. Yy, yy only
   d. YY, Yy, yy only

86. The inheritance of short wings in Drosophila fruit flies is an X-linked, recessive trait. Which would most likely result if a short-winged female mates with a long-winged male?
   a. All offspring will be short-winged
   b. All females will be long-winged and all males will be short-winged
   c. All females will be short-winged and all males will be long-winged.
d. Half of the males and females will be short-winged and half will be long-winged.

___87. In snapdragons, the combined expression of both alleles for flower color produces a new phenotype that is pink. This illustrates incomplete dominance. The Punnett square shows that both the white and red snapdragons are homozygous. Which of the following would be the correct product from a cross between two heterozygous (pink) snapdragons?

a. 2 red, 1 pink, 1 white  
b. 1 red, 2 pink, 1 white  
c. 3 red, 1 white  
d. 1 red, 1 pink, 2 white

___88. The diagram shows a DNA fingerprint from a daughter horse, the mother horse and four possible fathers. Which horse is most likely the father?

a. Horse 1  
b. Horse 2  
c. Horse 3  
d. Horse 4

___89. Which technique is used to produce a DNA fingerprint?

a. PCR  
b. Plasmid  
c. Gel electrophoresis  
d. DNA replication

___90. Which technique is used to alter bacteria in such a way that they produce human insulin?

a. Recombinant DNA formation  
b. Genetic screening  
c. DNA replication  
d. Hydrolysis

___91. Human blood type expresses both multiple alleles and codominance. What are the chances that a heterozygous Type A woman and a homozygous Type O man will produce a homozygous Type O child?
<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Allelic Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>I^A I^A or I^A i</td>
</tr>
<tr>
<td>Type B</td>
<td>I^B I^B or I^B i</td>
</tr>
<tr>
<td>Type AB</td>
<td>I^A I^B</td>
</tr>
<tr>
<td>Type O</td>
<td>ii</td>
</tr>
</tbody>
</table>

92. In pea plants, tallness is dominant over shortness. If 50% of one generation of pea plants are short, what were the probable genotypes of the parents?
   a. TT x tt
   b. Tt x Tt
   c. Tt x tt
   d. tt x tt

93. The pedigree chart represents the inheritance of color blindness through three generations. Barbara is expecting another child. What is the probability that the new baby will be colorblind?
   a. 0%
   b. 25%
   c. 50%
   d. 100%

94. What would be the appropriate diagnosis for a person with this karyotype?
   a. Female, monosomy X
   b. Male, trisomy 13
   c. Female, trisomy 21
   d. Male, fragile X

95. Fur on the extremities of certain animals will be darker because the enzyme for melanin production will operate at cooler
temperatures but is sensitive to heat on the rest of the body. The black fur patch on the back of this rabbit is an example of:

a. The environment influencing phenotype
b. The environment influencing genotype
c. An acquired characteristic
d. A transgenic organism

96. Which of the following is evidence to support the idea that two different species might have a common ancestor?

a. Their fossils were discovered in the same location
b. Many of their genes are the same
c. Their methods of respiration are alike
d. They use the same means of locomotion

97. The information in the table supports which conclusion?

a. Frogs are more closely related to monkeys than to sea anemones
b. Frogs, monkeys and sea anemones are classified into different kingdoms
c. Sea anemones are more complex than frogs or monkeys
d. Sea anemones and monkeys are adapted to similar environments

98. The table indicates the number of amino acids that differ in the amino acid sequence of the hemoglobin from selected organisms when compared to human hemoglobin. On the basis of this information, which organism would be classified as most closely related to humans?

a. Lamprey
b. Frog
c. Dog
d. Macaque
99. What did the work of these scientists contribute to the study of biology?
   a. It disproved the theory of spontaneous generation
   b. It supported hypotheses about the origin of life
   c. It provided an alternative to the cell theory of life
   d. It explained the method by which natural selection occurs.

100. Which graph best illustrates the expected change in the finch population if the environment changes to favor small beaks?
101. Charles Darwin proposed his theory of evolution based on observations of nature. Which observation that contributed to his theory is illustrated by this population of beetles?
   a. Environmental resources are limited
   b. Populations remain stable over time
   c. Individuals within a population may vary widely
   d. Species produce more offspring than can survive

102. Which statement is best supported by the phylogenetic tree shown?
   a. Species V is still alive today and is the oldest species
   b. Species W is still developing from a prior species
   c. Species X, Y and Z became extinct 20 million years ago
   d. Species W first came into existence 10 million years ago

103. An understanding of which of these best enabled scientists to determine the approximate ages of fossils?
   a. Physics
   b. Genetics
   c. Gravity
   d. Radioactivity

104. Over many generations, unrelated or distantly related species may come to resemble each other due to
   a. Similar environmental factors
   b. Similar genetic mutations
   c. Homologous structural adaptations
   d. Competition with each other

105. A large population of cockroaches was sprayed with an insecticide. A few of the cockroaches survived and produced a population of cockroaches that was resistant to this spray. What can best be inferred from this example?
   a. A species will adapt no matter what the environment
   b. The environment has no effect on the survival of an organism
   c. Insecticides cause mutations that are passed on to the next generation
   d. Individuals with favorable mutations survive and reproduce

106. When lions prey on a herd of antelopes, some antelopes are killed and some escape. Which part of Darwin’s concept of natural selection might be used to describe this situation?
a. Acquired characteristics  
b. Survival of the fittest  
c. Descent with modification  
d. Reproductive isolation

107. Hawaiian honeycreepers are a group of birds with similar body shape and size. However, they vary greatly in color and beak shape. Each species occupies its own niche and is adapted to the foods available in its niche. The evolution from a common ancestor is an example of
   a. Divergent evolution  
   b. Cross-pollination  
   c. Vegetative propagation  
   d. Convergent evolution

108. The flying squirrel of North America closely resembles the flying phalanger of Australia. They are similar in size and have long bushy tails and skin folds that allow them to glide through the air. The squirrel is a placental mammal, while the phalanger is a marsupial. These close resemblances, even though genetically and geographically separated by great distances, can be best explained by
   a. Convergent evolution  
   b. Divergent evolution  
   c. Spontaneous generation  
   d. Vestigial structures

109. Vincent wanted to confirm the statement that the enzyme pepsin is needed in addition to hydrochloric acid to digest protein in the stomach. He placed equal amounts of albumin (egg white protein) and equal amounts of dilute hydrochloric acid in each of four test tubes. Then he added a pinch of pepsin to test tubes C and D. He placed all four test tubes in a warm place overnight. The next day, two of the test tubes were milky white. What is the variable in the experiment described here?
   a. Concentration of hydrochloric acid  
   b. Presence of pepsin  
   c. Location of the tubes  
   d. Amount of albumin

110. The most abundant compound in living things is
   a. Carbon dioxide  
   b. Water  
   c. Sodium chloride
111. A covalent bond is formed by
   a. Sharing electrons
   b. Transferring electrons
   c. Losing electrons
   d. Gaining electrons

112. The diagram below represents a portion of an organic molecule.

   ![Diagram of organic molecule]

   In the diagram above, what is represented by the following?
   a. Simple sugar
   b. Polypeptide
   c. Nucleotide
   d. Codon

113. Which are the four most abundant elements in living cells?
   a. Carbon, oxygen nitrogen, sulfur
   b. Carbon, oxygen, hydrogen, nitrogen
   c. Carbon, oxygen, sulfur, phosphorus
   d. Carbon, sulfur, hydrogen, magnesium

114. The effect of pH on a certain enzyme is shown in the graph below.

   ![Graph of enzyme action vs. pH]

   a. Above 10
   b. Between 8 and 10
   c. Between 5 and 7
   d. Below 5
115. Which compound represents a carbohydrate?
   - C

116. Which compound represents the basic unit of both a DNA molecule and an RNA molecule?

117. Which compound would be linked together by peptide bonds?
   - D

118. An element found in all proteins but not in carbohydrates or lipids is
   a. Carbon
   b. Oxygen
   c. Nitrogen
   d. Hydrogen

119. Which nitrogenous base is found in RNA but not in DNA
   a. Adenine
   b. Cytosine
   c. Thymine
   d. Uracil

120. Which compounds are produced in human muscle cells as a result of the oxidation of glucose in the absence of oxygen?
   a. Lipase and water
   b. Sucrose and carbondioxide
   c. Ethyl acohol and ATP
   d. Lactic acid and ATP

121. If a student tested the gas bubbles collected in the test tube, what would she find they are made of?
   a. Carbon dioxide
   b. Nitrogen gas
   c. Oxygen
   d. Carbon monoxide

122. Photosynthesis uses sunlight to convert water and carbon dioxide into
   a. Oxygen
   b. High energy sugars and starches
   c. ATP and oxygen
   d. Oxygen and high energy sugars and starches

123. Most plants appear green because they contain
   a. High energy sugars
   b. Mitochondria
c. Chlorophyll
d. Centrioles

124. What is the correct equation for cellular respiration?
a. \( \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Energy} \)
b. \( \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + \text{Energy} \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} \)
c. \( 6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + \text{Energy} \)
d. \( 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \)

125. Cellular respiration releases energy by breaking down
a. Food molecules
b. ATP
c. Carbon dioxide
d. Water

126.