

Honors Biology Semester 2 Final Exam Review Guide

As the final exam approaches, so should your preparation for the test. You should review all old exams given this semester: Cell Cycle, DNA, Genetics, Evolution. Also, you should review topics related to the Human Body. This guide is only the start, it should not be the end all, be all review guide!

The Cell Cycle

1. Define the cell cycle. _____
2. What is the correct order of the phases of the cell cycle?
3. Given the phases of the cell cycle (Interphase, Prophase, Metaphase, Anaphase, Telophase and Cytokinesis) draw the movement of chromatin/chromosome in each. Also know how many chromosomes are in each phase.
4. Describe the process of mitosis and meiosis. What are the similarities and differences with the processes?

<u>Similarities of Mitosis/Meiosis</u>
<u>Differences of Mitosis/Meiosis</u>

5. Asexual reproduction is more similar to mitosis or meiosis? _____
6. In animals, when does meiosis occur? _____
7. What is crossing over? What is the outcome when it comes to the process of meiosis?
8. What is a karyotype? How can a karyotype be used to identify a male or female? A chromosomal abnormality?

DNA and RNA Structure

9. Be able to identify each of the following in a diagram: Phosphate, Deoxyribose, Ribose, Thymine, Hydrogen Bonds, Guanine, Uracil.
10. If DNA is represented by a "ladder", the steps, or middle part of that ladder would represent by what?
11. How does the sequence of bases on one strand of DNA control the sequence of bases on the second strand?
12. DNA is found in the what section of the cell?
13. One strand of DNA molecule is arranged in the following order: -adenine - guanine - thymine – cytosine-. In what order is the other strand?
14. RNA is found in what part of the cell?
15. What components make up a nucleotide?

16. Which of the following represent a difference between DNA and RNA?

17. Given the following structures (DNA, nucleus, chromosome, nucleotide, nitrogenous base) place each in the correct order according to decreasing size of structures?

Protein Synthesis

18. The code of mRNA is directly dependent upon what?

For the next 3 items, match the statement with the correct term.

- 19. Contains the anticodon and transports the amino acid.
 - 20. This is the enzyme used in the process of transcription.
 - 21. This step of protein synthesis takes place at the ribosome.
- a. Translation
 - b. RNA Polymerase
 - c. tRNA
 - d. Transcription

22. Which of the following does **NOT** happen in protein synthesis?

- a. tRNA and mRNA complement each other at the ribosome
- b. DNA replicates
- c. mRNA is synthesized
- d. tRNA bonds with an amino acid

23. The codon of _____ and the anticodon of _____ are complimentary.

For the next 3 items, refer to the following strand of DNA and the mRNA codon chart below.

-TAC GTC GTA GGT AGT-

24. The complementary strand of DNA for the strand shown above would be:

25. Know how to translate a segment of DNA into an amino acid sequence.

Examine the diagram below illustrating core concepts of DNA dogma, and then respond to the next two items.



26. Which letter represents transcription? Which letter represents translation?

Uses this information for the next item. Listed below are four possible stages in the production of protein molecules within a cell.

- 1 - Transfer RNA molecules bring amino acids to the ribosome.
- 2 - DNA molecules serve as templates for messenger RNA molecules.
- 3 - Messenger RNA molecules move to ribosomes.
- 4 - A chain of amino acids forms on the ribosome.

27. Which sequence best represents the correct order of these stages?

Genetics

28. The genetic makeup of an organism for a hereditary characteristic is referred to as what?

29. If you cross two pea plants, both heterozygous for purple color, then the recessive white trait should appear how often?

30. Black fur is dominant over white fur in guinea pigs. What genotype do the parents of a group of offspring that are 50% black and 50% white have? (B= black, b = white)

31. In the test cross $AaBb \times aabb$, the genotype ratio of the offspring would be what?

32. In a cross between a homozygous black dog and a homozygous white dog, all the resulting offspring are gray. What color of offspring would you expect if you crossed two of the gray dogs from the F1 generation?

33. List the possible genotypes that would be possible given the following blood typing phenotypes: Type A, Type B, Type AB, and Type O.

34. Review your knowledge of family trees and how to assign genotypes.

35. Review your knowledge of X-linked genetics and how such traits are passed to the next generation.

36. Understand the difference between complete dominance, incomplete dominance, codominance and polygenic traits.

37. Define an allele.

38. Chromosomes that are the same size, shape and contain genes that code for the same kind of information are defined as?

Biological Diversity: Microevolution

39. Two organisms can be considered to be part of the same species when what event happens?

40. Define natural selection and give an example.

41. List the 5 main factors that cause change in gene pools.

42. Define gene pool.

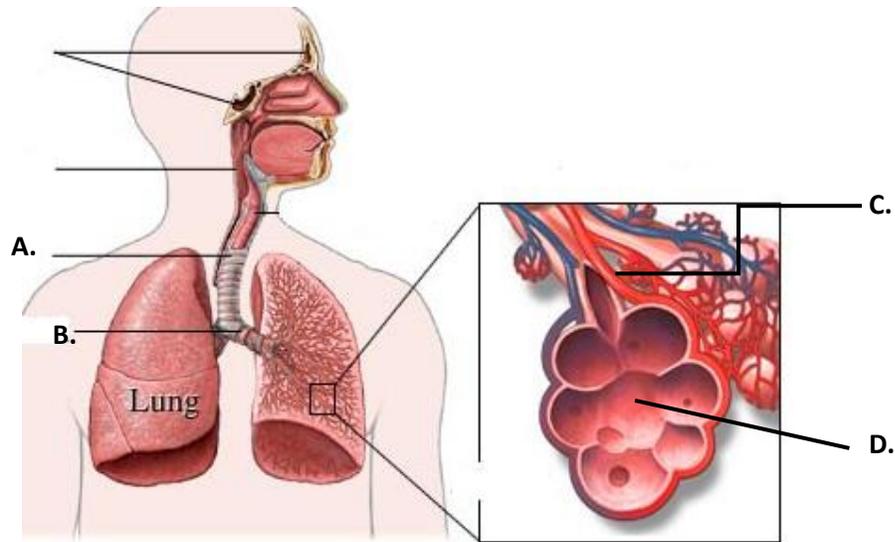
43. Define biological fitness.

44. Define artificial selection.

45. In a certain type of insect, individuals can be either gray (dominant) or brown (recessive). Assuming Hardy-Weinberg conditions, 20% of the population is brown. What percentage of the population is heterozygous?

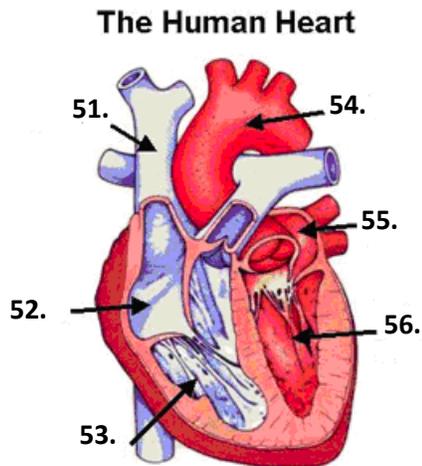
Human Body Systems/Dissection

46. Below is a picture of the respiratory system. Label each of the structures identified.



- 47. What is the name of the functional unit of the kidney?
- 48. Nitrogenous wastes are excreted by animals mainly as what products?
- 49. A major role of the kidney is to balance the amount of _____ in the bloodstream.
- 50. The human circulatory system aids in maintaining homeostasis by doing what?

Below is a diagram of a human heart. Each of its different parts is labeled with a number. For each number, determine the name of the part using the choices given.



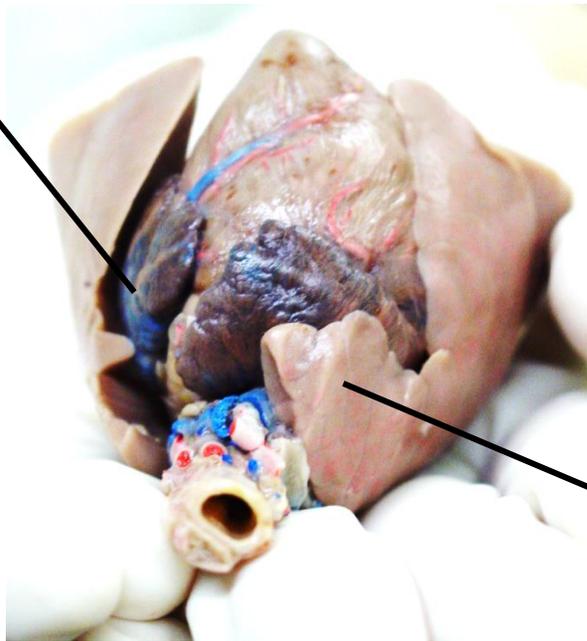
- a. Left Ventricle
- b. Right Ventricle
- c. Left Atrium
- d. Right Atrium
- e. Aorta
- ab. Vena Cava

- 57. ____ take blood away from the heart while _____ bring blood into the heart.
- 58. The site of diffusion for gases like oxygen and carbon dioxide and location for the exchange of nutrients and wastes occurs where?
- 59. The left side of the heart is larger with thicker layers of muscle because of what reason?

60. In humans, hemoglobin, is present in _____ and in individuals with one of the most common genetic disorders, called sickle cell anemia, this disease affects their _____.

61. Human fertilization (joining of sperm and egg) occurs in the _____.

Below are pictures from the pig dissection with different structures labeled with a number. Use the choices in the box below to identify each structure.



- a. Esophagus
- b. Stomach
- c. Small intestine
- d. Large intestine
- e. Right ventricle
- ab. Trachea
- ac. Left lung
- ad. Right Atrium
- ae. Left Ventricle
- bc. Liver
- bd. Left Atrium
- be. Mesentery
- cd. Right Lung
- ce. Kidney

