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 **LE Exam 5**

*Directions* (1–22): For *each* statement or question, record on your separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question.

|  |  |
| --- | --- |
| 1. In the binomial system of nomenclature, which two classification groups provide the scientific name of an organism? 1) kingdom and phylum2) phylum and species3) kingdom and genus4) genus and species2. All of the following are true regarding cells except?1) All cells have genetic material2) All cells have cell walls3) All cells have plasma membranes4) All cells can divide to form new cells3. What is a similarity between all bacteria and plants?1) They both have a nucleus2) They are both composed of cells3) They both have chloroplasts4) They both lack a cell wall4.Even though identical twins have the samegenetic material, they may develop slightlydifferent characteristics because1) each twin receives different chromosomesfrom the egg2) one twin may only have genes from thefather3) gene expression may be influenced by factors that switch genes on and off4) a gene mutation may have occurred before the zygote divided10. Which statement best describes a human chromosome? 1) It is made of amino acid subunits that form genes. 2) It contains genes that may code for the production of enzymes. 3) It is normally passed to the next generation through a placenta. 4) It varies in function from one generation to the next. | 5. Which cell structures are correctly paired with their functions?(1) The mitochondria produce enzymes, and ribosomes transport them.(2) The ribosomes make proteins, and the nucleus stores genetic information.(3) The cell membrane makes enzymes, and cytoplasm transports them.(4) The vacuole stores genetic information, and chloroplasts make proteins.6. In a cell, protein synthesis is the primary function of (1) ribosomes (3) chloroplasts (2) mitochondria (4) vacuoles7. What is the main function of a vacuole in a cell?(1) storage (3) synthesis of molecules (2) coordination (4) release of energy. 8. Which molecule can diffuse from the digestivetract into the human bloodstream without first being digested? 1) protein 3) fat 2) starch 4) glucose9. In order to enter cells and be useful to the body, starch must be 1) absorbed through the skin 2) broken down into fats and water 3) digested into simple sugars 4) converted to carbon dioxide and ATP11. The diagram below represents the bandingpattern for human chromosome 11, with some of the bands labeled.  The bands represent 1) proteins 3) starches 2) genes 4) enzymes |

12. Corn seeds with identical genetic information were planted on two adjacent farms. The corn plants on one farm were well fertilized and grew large, while the plants on the other farm were not given fertilizer and did not grow as large. The best explanation for these observations is that

 1) crops grow differently in different climates

 2) the corn plants all contained mutated genes that made them grow

 3) environmental conditions affect gene expression

 4) the plants on one farm had different genes from the plants on the other farm

13. As male children get older, some begin to closely resemble their fathers and have no resemblance to their mothers. Which statement best explains this observation?

 1) Several sperm fertilized the egg, so the fertilized egg contained more genes from their father.

 2) More genes are inherited from the sperm cell of their father than from the egg cell of their mother, so most traits will be like those of their father.

 3) More genes from their father are expressed in traits that can be seen, and more genes from their mother are expressed in traits that cannot be seen, such as blood type or enzyme function.

 4) Genes from their father are stronger than genes from their mother, so the genes from their mother are not expressed.

14. Muscle cells in athletes often have more mitochondria than muscle cells in nonathletes. Based on this observation, it can be inferred that the muscle cells in athletes

1) have a smaller demand for cell proteins than the muscle cells of nonathletes

2) reproduce less frequently than the muscle cells of nonathletes

3) have nuclei containing more DNA than nuclei in the muscle cells of nonathletes

4) have a greater demand for energy than the muscle cells of nonathletes

15. Cell membranes are said to be selectively permeable. Which statement best explains what selectively permeable means?

(1) The cell membrane prevents any harmful substance from entering the cell.

(2) The cell membrane lets certain substances enter the cell and keeps certain substances out of the cell.

(3) The cell membrane allows only large molecules to diffuse into the cell.

(4) The cell membrane has pores that let only water and glucose into the cell and carbon dioxide out.

16. Base your answer to the following question on the diagram below shows how a coverslip should be lowered onto some single-celled organisms during the preparation of a wet mount.

 

Why is this a preferred procedure?

1) The coverslip will prevent the slide from breaking.

2) The organisms will be more evenly distributed.

3) The possibility of breaking the coverslip is reduced.

4) The possibility of trapping air bubbles is reduced.

17. What cellular structure must oxygen cross to get from the outside to the inside of an animal cell?

 1) The nucleus 3) The cytoplasm

 2) The cell membrane 4) The cell wall

18. Base your answer to the following question on the diagram below which represents the fluid-mosaic model of a cell membrane.

 

The arrow points to a component of the membrane that is best described as a

1) sugar floating in lipids 3) protein floating in lipids

2) lipid floating in proteins 4) lipid floating in sugars

Base your answer to the following question on the passage below and on your knowledge of biology.

 . . . Some of the most common and deadly bacteria do their mischief by forming a sticky scum called biofilm. Individually, the microbes are easy to control, but when they organize themselves into biofilms they can become deadly, said Dr. Barbara Iglewski of the University of Rochester. . .

 bio films are actually intricately organized colonies of billions of microbes, all working in a coordinated way to defend against attack and to pump out a toxin that can be deadly.

 Once they are organized, the bacteria are highly resistant to antibiotics and even strong detergents often cannot wash them away or kill them.

 Iglewski and colleagues from Montana State University and the University of Iowa report in *Science* that they discovered how the microbes in the colonies communicate and found that once this conversation is interrupted, the deadly bugs can be easily washed away.

 Using *Pseudomonas aeruginosa*, a common bacteria that is a major infection hazard in hospitals and among cystic fibrosis patients, the researchers isolated a gene that the bacteria uses to make a communications molecule. The molecule helps the microbes organize themselves into a bio film — a complex structure that includes tubes to carry in nutrients and carry out wastes, including deadly toxins.

 In their study, the researchers showed that if the gene that makes the communications molecule was blocked, the *Pseudomonas aeruginosa* could form only wimpy [weak], unorganized colonies that could be washed away with just a soap that has no effect on a healthy colony. . . .

Adapted from: Paul Recer, “Researchers find new means to disrupt attack by microbes,”

*The Daily Gazette*, April 26, 1998.

19. Bacteria that form biofilms may be controlled most effectively by

1) antibiotics

2) detergents

3) cutting the tubes through which the bacteria communicate

4) blocking the expression of a gene that helps the colonies to organize

20. What is an advantage of a change in pulse rate after exercising?

(1) The heart needs to produce more energy to supply the active muscle cells and maintain homeostasis.

(2) An increased blood flow carries excess waste products away from the active muscle cells.

(3) The blood is removing oxygen from muscle cells that were not active and carrying it to muscle cells that are active.

(4) The blood is supplying the active muscle cells with carbon dioxide to neutralize wastes in those cells.

21. Single-celled organisms are able to maintain internal stability because they

(1) have multiple organ systems

(2) work with other cells

(3) contain structures that perform life functions

(4) carry out photosynthesis to produce food

 The diagram below represents two organisms.



22. Which statement concerning organism *A* and organism *B* is correct?

(1) Organism *A* contains organs, whereas organism *B* lacks organs.

(2) Organism *A* and organism *B* have the same organ systems.

(3) Organism *A* and organism *B* both have structures that perform life processes.

(4) Organism *A* lacks structures that help maintain dynamic equilibrium.

23. To determine the effect of fatigue on the action of muscles, each of five boys was given a 12-cm clothespin and each of five girls was given a 10-cm clothespin. The students squeezed the clothespins for 30 seconds and recorded the results. After the first trial, the girls rested and the boys jogged in place for 1 minute. A second trial was then done to determine how many times each student could squeeze the clothespin in 45 seconds. Identify *one* error in the design of this experiment. [1]

 *Base your answer to question 18 on the plant cell diagram below*

 

24. Identify one organelle in the cell above and then state the function of the organelle.

*Base your answers to question 25 on the information below and on your knowledge of biology.*

Three students took their pulse rates in beats per minute (bpm) while sitting in class.

The results are shown in the data table below.

 **Pulse Rates of Three Students**

|  |  |
| --- | --- |
| **Student** | **Pulse Rate (bpm)** |
| 1 | 10 |
| 2 | 7 |
| 3 | 7 |

25. What is the average pulse rate, in bpm, for this group of students? [1]

26. The information in the chart below represents the sex chromosome arrangement in humans and birds. Sex chromosomes contain genes involved in sex determination.

 

In humans, it is the male gamete that is responsible for determining the sex of the offspring. Identify which type of gamete determines the sex of the offspring in birds. Support your answer. [1]

The diagram below represents a cell found in some complex organisms. The enlarged section represents an organelle, labeled *X*, found in this cell.



27. Describe the function of organelle *X* and explain how it is important to the survival of the cell. (1)

*Base your answer to the following question on the diagram below and on your knowledge of biology. The diagram represents six insect species.*

 

28-29. A dichotomous key to these six species is shown above. Complete the missing information for sections 5.a. and 5.b. so that the key is complete for all six species.

Base your answer to the following question on the information below and on your knowledge of biology.

In an investigation, plants of the same species and the same initial height were exposed to a constant number of hours of light each day. The number of hours per day was different for each plant, but all other environmental factors were the same. At the conclusion of the investigation, the final height of each plant was measured. The following data were recorded:

 8 hours, 25 cm; 4 hours, 12 cm; 2 hours, 5 cm; 14 hours, 35 cm;

 12 hours, 35 cm; 10 hours, 34 cm; 6 hours, 18 cm

30.Organize the data by completing both columns in the data table provided, so that the hours of daily light exposure *increase* from the top to the bottom of the table.

31. Mark an appropriate scale on each axis.

*32.* Plot the data for final height on the grid. Surround each point with a small circle and connect the points.

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

LE test 5

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28. 5a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

29. 5b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**TURN OVER**

**CHART AND GRAPH ARE ON THE BACK**

 

 