Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**LE Exam 2**

*Directions* (1–16): 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. The diagram below represents the measurement of a biological specimen.



What is the approximate length of the specimen in millimeters?

(1) 25 mm (3) 35 mm

(2) 30 mm (4) 40 mm

|  |  |
| --- | --- |
| A student is opening and closing clothespins as part of a lab activity. The student begins  to experience muscle fatigue, and the rate at  which the student is opening and closing the clothespins slows.  2. The fatigue is due to  (1) an increase of metabolic waste products in  the muscles  (2) an increase in the pulse rate of the student  (3) a decrease of metabolic waste products in the muscles  (4) a decrease in the pulse rate of the student  3. In order for the muscle fatigue to end, the  muscle cells must be provided with  (1) oxygen (3) carbon dioxide  (2) nitrogen (4) amino acids | 4. 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.  5. In a cell, protein synthesis is the primary function of  (1) ribosomes (3) chloroplasts  (2) mitochondria (4) vacuoles  6. What is the main function of a vacuole in a cell?  (1) storage (3) synthesis of molecules (2) coordination (4) release of energy  . |

7. The diagram below represents a compound light microscope. Several parts have been labeled.



In order to make an image brighter, which labeled part of the microscope would most likely be adjusted?

(1) *A* (3) *C*

(2) *B* (4) *D*

8. In an experiment to determine the effect of exercise on pulse rate, a student checks his pulse rate before and after exercising for several minutes. The purpose of checking his pulse rate before exercising is that it

(1) serves as the conclusion for the experiment

(2) is needed to justify the sample size

(3) serves as a control for the experiment

(4) is needed to formulate a hypothesis

9. 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.

10. 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

*Base your answers to questions 11 through 13 on the information below and on your knowledge of biology.*

An experiment was carried out to answer the question “Does the pH of water affect the growth of radish plants?” Two groups of ten radish plants were set up. One group was watered with water having a pH of 3.0, and the other group was watered with water having a pH of 7.0. Both groups of plants received the same amount and intensity of light, the same amount of water, and they were grown in the same type of soil. The heights of the radish plants were measured every 2 days for a period of 2 weeks.

11. Which sentence is a possible hypothesis that was tested in this experiment?

(1) Does the pH of water affect the growth of radish plants?

(2) Will the amount of water alter the heights of the radish plants?

(3) The temperature of the water will affect the heights of the radish plants.

(4) The pH of the water will affect the heights of the radish plants.

12. What was the dependent variable in this experiment?

(1) heights of the plants (3) temperature of the water

(2) pH of the water (4) type of soil

13. Which activity might help to increase the validity of this experiment?

(1) repeating the experiment several times

(2) using two different types of radish seeds in each group

(3) using the same pH for both groups of plants

(4) placing one set of plants in sunlight and one in darkness

14. 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.

15. 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.



16. 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.

17. 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*

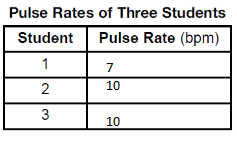


18. Identify one organelle in the cell above and then state the function of the organelle.

*Base your answers to question 19 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.



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

*Base your answers to question 20 on the information below and on your knowledge of biology.*

Ticks, such as deer ticks and dog ticks, feed on the blood of humans and other animals.

Part of the feeding process involves the tick injecting its saliva to help make blood flow.

In the process, they sometimes spread disease organisms to their host. Sometimes ticks get on clothing, and can remain there for a few days before actually biting their host.

A scientist found that ticks might be able to survive even when exposed to hot water and detergent in a washing machine.

Students designed the experiment below to test how well ticks survive a hot-water washing machine cycle with detergent. Note that some details of the design are incorrect.



20. Identify *one* error in the students’ design in the shaded area of the table and explain how the students should change the experiment to correct the error. [1]

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



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

*Base your answer to question 22–24 on the passage below and on your knowledge of biology.*

**Green Tea & Acne**

Green tea might be an effective treatment for acne, according to a study by researchers from Memorial Medical Center in the Philippines, reported by United Press International (UPI). The study showed that 3 percent green tea cream is comparable to 4 percent benzoyl peroxide in the treatment of moderate to severe acne.

Green tea has been shown to fight bacteria, reduce inflammation and decrease hormone activity — three characteristics that make the ancient tea an excellent candidate for an acne therapy. In the study, one group of subjects applied benzoyl peroxide cream twice daily for 12 weeks and another used green tea extract cream twice daily for the same period.

Patients received identical bottles of cream and were unaware of the type of treatment they were assigned. The researchers noted the green tea cream seemed to lighten patients’ [acne] and improve the overall appearance of their complexion.

The preliminary data suggest green tea extract cream causes fewer side effects than benzoyl peroxide treatment. Patients in the green tea group reported fewer cases of dry skin, itching and allergic responses. Azucena Arguelles, MD, a private practice dermatologist from Mountain View, CA, told UPI that the findings, while promising, are not yet substantial enough to change clinical practice.

*Advance for Nurses*, Nov. 10, 2003, “Green Tea & Acne,” [www.advanceweb.com](http://www.advanceweb.com)

22–24 Explain how this experiment can be used to develop a new treatment for acne. In your answer, be sure to:

• identify the organism targeted by green tea [1]

• identify *one* advantage of using green tea extract instead of benzoyl peroxide cream to treat acne [1]

• state *one* reason why, even though the findings are promising, they are “not yet substantial enough to change clinical practice” [1]

*Base your answers to questions 25 and 26 on the information and data table below and on your knowledge of biology.*

**Yellowstone Park Wolf Update**

For the first time in nearly 70 years, the howl of the wolf is being echoed throughout Yellowstone National Park. Canis lupus, the gray wolf, one of the largest and most complex of the canine species, has been successfully reintroduced into the Yellowstone ecosystem. In mid-January 1995, 14 wolves from many separate packs were captured in Canada and then transported into Yellowstone Park and placed into three one acre pens.…

Source: <http://www.yellowstone-bearman.com/w-update.html>

After the wolves were given time to establish a new pack structure, the packs were released into the wild. The number of wolf pups was counted each year for four years. The data are shown in the table below.



Directions (25-26): Using the information in the data table, construct a bar graph on the grid, following the directions below.

25. Mark an appropriate scale, without any breaks, on the axis labeled “Number of Pups.” [1]

26. Construct vertical bars to represent the data. Shade in each bar. [1]

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LE test 1

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6. 13. \_\_\_\_\_\_\_\_\_\_
7. 14. \_\_\_\_\_\_\_\_\_\_

17. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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18. letter:\_\_\_\_\_\_\_\_\_\_\_\_\_ organelle: \_\_\_\_\_\_\_\_\_\_\_\_

Function:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. \_\_\_\_\_\_\_\_\_\_\_\_bpm

20. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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22 – 24. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**TURN OVER**

**GRAPH IS ON THE BACK**

25 – 26.

