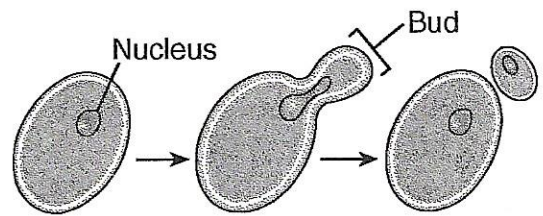


Name: _____

- 1) Homeostasis is maintained in a single-celled organism by the interaction of
 - A) organs
 - B) tissues
 - C) organelles
 - D) systems
- 2) Which cell structure is correctly paired with its primary function?
 - A) ribosome — protein synthesis
 - B) mitochondrion — movement
 - C) vacuole — cell division
 - D) nucleus — storage of nutrients
- 3) Which of the following sequences represents the levels of biological organization from smallest to largest?
 - A) organelle → organ system → cell → organism → tissue → organ
 - B) organ system → organ → organism → cell → tissue → organelle
 - C) organelle → cell → tissue → organ → organ system → organism
 - D) organism → cell → tissue → organelle → organ system → organ
- 4) Asexual reproduction produces offspring that each contain
 - A) a unique combination of genetic information
 - B) less genetic information than either parent
 - C) genetic information from two parents
 - D) genetic information from one parent

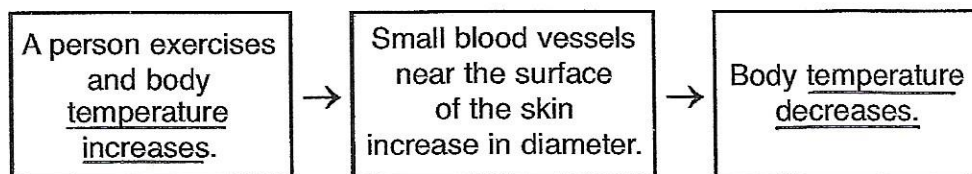
- 5) The diagram below illustrates asexual reproduction in yeast.



Yeast produce offspring that usually have

- A) organelles that are not found in the parent
 - B) genes that are identical to those of the parent
 - C) half of the genetic information of the parent
 - D) genes that are different from those of the parent
- 6) Sexual reproduction in a species usually results in
 - A) offspring genetically identical to the parent
 - B) a decrease in biodiversity
 - C) an increase in the chromosome number in the offspring
 - D) recombination of genes
 - 7) A substance is most likely to diffuse into a cell when
 - A) the pH of the substance is greater than the pH of the cell
 - B) it is enclosed in an organelle such as a vacuole
 - C) it is a large organic food molecule such as protein or starch
 - D) the concentration of the substance is greater outside the cell than inside

- 8) The diagram below represents an activity that occurs in the human body.



This diagram *best* illustrates

- A) active transport
- B) maintenance of homeostasis
- C) differentiation
- D) synthesis of nutrients

9. Name 2 reasons

10. why Sexual is different from Asexual reproduction.

Base your answers to questions 1 through 3 on the information below and on your knowledge of biology.

Telomere Tales

The number of times a human body cell reproduces is dependent on the length of its special chromosome tips. These tips, which are known as telomeres, act as cell division clocks. With each division, the length of the telomere shortens until a critical length is reached, signaling cell reproduction to stop. Knowledge of telomeres could be used in cancer diagnosis, in understanding diseases of aging, and in providing information that would lead to the survival of transplanted organs.

As most body cells divide, their telomeres shorten and, in turn, the overall chromosome length is reduced. However, tissues such as bone marrow and most cancer cells lengthen their shrinking chromosome tips with the help of an enzyme, telomerase. As a result, the chromosomes of these rapidly dividing cells never reach critical length, and the cells continue to reproduce.

Transplantation speeds up the aging process in donor cells. The telomeres of transplanted cells are shorter than those in normal bone marrow cells. If telomerase is inserted into donor cells, the donor tissues may live longer. This procedure would greatly benefit organ transplants and the treatment of patients who have HIV (the virus that causes AIDS). For example, blood-forming cells could be removed from these patients early in the disease, cultured with telomerase to extend their telomeres, and then returned to the bodies of the patients as their blood cell counts fall.

1. State one way telomerase could be used to treat patients who have HIV. (2 points)
2. Explain how the knowledge of telomerase may lead to an effective treatment for cancer. (2 points)
3. State the relationship between the presence of telomerase, telomere length, and the number of cell divisions. (6 points)