

Part I – match the stage of mitosis with its description, record your answer on the scantron.

- | | |
|---|--------------|
| _____ 1. The chromosomes line up across the center of the cell. | a. Telophase |
| _____ 2. The chromosomes become visible. The centrioles take up positions on opposite sides of the nucleus. | b. Prophase |
| _____ 3. The chromosomes separate and begin to move to opposite sides of the cell. | c. Metaphase |
| _____ 4. A nuclear envelope re-forms around each cluster of chromosomes. | d. Anaphase |

Part II – multiple choice, record answer on scantron

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|--|--|
| 5. The two main stages of cell division are called
a. mitosis and interphase
b. synthesis and cytokinesis
c. the M phase and S phase
d. mitosis and cytokinesis | except the tissue around an embryo?
a. totipotent
b. pluripotent
c. multipotent
d. differentiated |
| 6. In eukaryotic cells, the timing of the cell cycle is regulated by
a. centrioles
b. cyclins
c. spindle fibers
d. the nuclear envelope | 12. For a cell to divide successfully, it must first
a. form a new cell plate or cell membrane
b. divide its cytoplasm and organelles
c. increase its number of chromosomes
d. copy its genetic information |
| 7. The amount of energy stored in a molecule of ATP compared to the amount stored in a molecule of glucose is
a. greater
b. less
c. the same
d. variable, depending on conditions | 13. The cell cycle in a eukaryotic cell is divided into
a. prophase, anaphase, and telophase
b. interphase, metaphase, and cytokinesis
c. interphase, mitosis, and cytokinesis
d. interphase, anaphase, and telophase |
| 8. Cancer is a disorder in which some cells have lost the ability to control their
a. size
b. spindle fibers
c. growth rate
d. surface area | 14. In plant cells, what forms midway between the divided nuclei during cytokinesis?
a. nuclear membrane
b. centromere
c. cell plate
d. cell membrane |
| 9. Compared to small cells, large cells have more trouble
a. dividing
b. producing daughter cells
c. storing materials and products
d. moving needed materials in and waste products out | 15. Per molecule of glucose, how does carbon dioxide gas production compare in cellular respiration and alcoholic fermentation?
a. they are the same
b. respiration produces 2x the carbon dioxide gas
c. respiration produces 3x the carbon dioxide gas
d. respiration produces 4x the carbon dioxide gas |
| 10. For a 2.0% solution of NaHCO_3 in 50mL of water, how many grams of baking soda would you need?
a. 0.5g
b. 1.0g
c. 2.0g
d. 4.0g | 16. When a cell divides and becomes smaller, its
a. volume decreases, but its surface area stays the same
b. surface area stays the same, but its volume decreases
c. volume decreases more than its surface area
d. surface area decreases more than its volume |
| 11. Which type of cell can differentiate into everything | 17. Which of the following happens when a cell divides?
a. Each daughter cell receives its own copy of the parent |

cell's DNA

- b. The cell's volume increases
- c. It becomes more difficult for the cell to get rid of wastes
- d. It becomes more difficult for the cell to get enough oxygen and nutrients.

18. When during the cell cycle are chromosomes visible?

- a. only during interphase
- b. only when they are being replicated
- c. only during the G1 phase
- d. only during mitosis

19. Which of these is a product of the electron transport chain?

- a. oxygen
- b. water
- c. glucose
- d. carbon dioxide

20. During which phase in the cell cycle does mitosis happen?

- a. G1 phase
- b. G2 phase
- c. M phase
- d. S phase

21. What is the role of spindle fibers during mitosis?

- a. They break down the nuclear membrane
- b. They duplicate the DNA
- c. They make the chromosomes visible
- d. They help separate the chromosomes

22. Prokaryotic cell division is called

- a. binary fission
- b. nuclear fission
- c. sister chromatid division
- d. mitotic division

23. In order to make fingers on the hand of a developing fetus, some cells undergo programmed cell death, which is known as

- a. apoptosis
- b. cytokinesis
- c. differentiation
- d. interphase

24. Which are products of the light independent reactions?

- a. oxygen only.
- b. sugars only.
- c. ATP and oxygen.
- d. ADP and sugars.

25. Why are multipotent stem cells important?

- a. They have specialized DNA
- b. They are incapable of becoming cancer cells
- c. They have the potential to undergo cell division
- d. They have the potential to develop into other cell types.

26. Which of the following is a possible future benefit of stem cell research?

- a. developing a cure for AIDS
- b. reversing the effects of a high-fat diet
- c. reversing damage from a spinal injury
- d. increasing a person's height

Part III – true or false, record your answer on the scantron.

27. During metaphase spindle fibers are attached to the ends of the chromatids. (T/F)

28. Malignant tumors damage healthy tissue and can spread to other parts of the body. (T/F)

29. Chromatin consists of supercoils of DNA wrapped around histone proteins. (T/F)

30. The first stage of mitosis is interphase. (T/F)

Part III – lab practical

Write the name of the cell cycle phase you see in the microscope:

Microscope	Cell cycle phase
A	
B	
C	
D	
E	

Part IV – short answer.

27. List the stages of mitosis in order (4 points)

28. How do cancer cells differ from normal cells? (complete sentences; 4 points)

29. Why would it be important for medicine if we could easily change a cell from your body into a pluripotent stem cell? Give an example of a possible treatment. (complete sentences; 4 points)

30. (3 points) Humans have 46 chromosomes. Please write the total number of chromosomes in a human cell during these phases of the cell cycle:

G1: _____

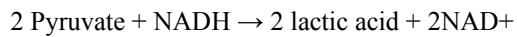
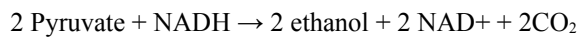
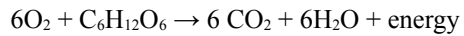
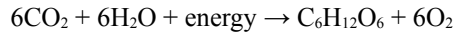
G2: _____

Anaphase: _____

Bonus (5 points): *E. coli* is a bacterium that can divide every half hour under optimal growth conditions. What is the minimum number of hours an *E. coli* cell requires to divide into 1000 cells? Show your work.

Reference page

Equations:



Definition of % solution: 1% = 1g/100mL

