

Read each question carefully and ask if a question seems unclear. If possible, answer each question in the space provided, but you may continue on the back. If you use a drawing as part of your answer, be sure to also include a written explanation. The questions have specific answers, although for some, more than one answer is possible. To receive full credit you must clearly and fully answer the question being asked. If you add incorrect extraneous information, points will be deducted. The points for each question are noted in parentheses totaling 60 points. Exams in non-permanent ink will **not** be eligible for a regrade.

1. Would poor proofreading by DNA polymerase or poor mismatch repair be a more serious problem? Why? (10 pts)

*Mismatch repair. It happens after proofreading and is the last chance to fix mutations.*

2. Fireflies produce light, and that light allows them to attract a mate, but it also makes it easier for predators to see them. A firefly that cannot emit light is born. Would you predict that there would be an increase in non-light emitting fireflies in future generations? Why or why not? (10 pts)

*No. Without emitting light, the firefly will have reduced ability to reproduce, although maybe a longer life, but reproductive success is evolutionary success.*

3. After an infection, a few B-cells have shorter telomeres while the rest of the B-cells' telomeres have not changed in length. Why? (10 pts)

*Only a very few B-cells recognize a pathogen. The few activated B-cells will divide, shortening their telomeres.*

4. Why would the flu vaccine offer **no** protection against the flu to someone with AIDS? (10 pts)

*For a vaccine to work, the bodies immune system must be able to respond and make memory cells. AIDS reduces helper T-cells, and reduces the immune system's ability to respond to a stimulus.*

5. Are phytoalexins more similar to B-cells or T-cells? Why? (10 pts)

*B-cells. Phytoalexins target pathogens and destroy them. B-cells produce antibodies that target pathogens for destruction. T-cells only destroy the bodies own abnormal cells.*

6. Would woody or non-woody (herbaceous) plants be least affected by lignin reductions? Why? (10 pts)

*Non-woody. Lignin makes the cell walls of xylem waterproof and strong. Woody plants need strong, waterproof xylem to transport water over long distances and as support for the large number of leaves. Non-woody plants are smaller and therefore do not need the same amount of support.*