

2.D Formative FRQs

1.

An important defense against diseases in vertebrate animals is the ability to eliminate, inactivate, or destroy foreign substances and organisms. **Explain** how the immune system achieves THREE of the following:

- Provides an immediate nonspecific immune response
- Activates T and B cells in response to an infection
- Responds to a later exposure to the same infectious agent
- Distinguishes self from nonself

2.

The evolution of circulatory systems allowed larger and more-complex animals to arise.

- (a) **Describe** the respiratory and digestive systems' specialized structures that facilitate the movement of oxygen and glucose into the circulatory system of mammals.
- (b) **Explain** how oxygen and glucose are transported within the circulatory system of mammals.
- (c) **Explain** the transfer of oxygen and glucose from the blood and into the active cells of mammals.

3.

The defenses of the human body to the entry and establishment of a pathogen (disease-causing organism) can be divided into nonspecific responses and specific responses.

- (a) **Explain** how THREE types of nonspecific defenses can prevent the entry and/or establishment of a pathogen in a person's body.
- (b) **Discuss** how the immune system responds to an initial pathogenic exposure, and how this initial exposure can lead to a quicker response following a second exposure to the same pathogen.
- (c) **Explain** the biological mechanisms that lead to the rejection of transplanted organs.

2.D Formative FRQs

4.

Many organisms require a continuing source of oxygen for respiration. **Discuss** important structural and physiological adaptations for oxygen uptake in **THREE** of the following:

- a paramecium
- a tree
- a fish
- a mammal

5.

Organisms utilize a diversity of methods to obtain proper nutrition.

(a) Some organisms digest food intracellularly, while others digest food extracellularly.

- **Identify** ONE nonvertebrate organism that digests food intracellularly and **describe** the process.
- **Identify** ONE nonvertebrate organism that digests food extracellularly and **describe** the process.

(b) **Describe** TWO structural features of the human stomach and/or small intestine. For each, **explain** how the structure relates to the function.

(c) Plants have a variety of mechanisms for obtaining nutrients. **Describe** TWO plant structures and **explain** how each structure is utilized in nutrient uptake.

6.

Communication occurs among the cells in a multicellular organism. Choose **THREE** of the following examples of cell-to-cell communication, and for each example, **describe** the communication that occurs and the types of responses that result from this communication.

- Communication between two plant cells
- Communication between two immune-system cells
- Communication **either** between a neuron and another neuron, **or** between a neuron and a muscle cell
- Communication between a specific endocrine-gland cell and its target cell

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7.

Death is a natural and necessary part of life cycles at all levels of organization.

- (a) Discuss **TWO** examples of how cell death affects the development and functioning of a multicellular organism.
- (b) Discuss **ONE** example of how substances are degraded and reused in cells.
- (c) Discuss the evolutionary significance of death.

8.

Organisms rarely exist alone in the natural environment. The following are five examples of symbiotic relationships.

- Plant root nodules
- Digestion of cellulose
- Epiphytic plants
- AIDS (acquired immune deficiency syndrome)
- Anthrax

Choose FOUR of the above and for each example chosen,

- (a) **identify** the participants involved in the symbiosis and describe the symbiotic relationship, and
- (b) **discuss** the specific benefit or detriment, if any, that each participant receives from the relationship.