2.B-C Formative FRQs

1.

Regulatory (control) mechanisms in organisms are necessary for survival. Choose **THREE** of the following examples and explain how each is **regulated**.

(i) Flowering in plants

(ii) Water balance in plants

(iii) Water balance in terrestrial vertebrates

(iv) Body temperature in terrestrial vertebrates

2.

Prokaryotes are found throughout the biosphere. Answer two of the following.

a) Provide three examples of adaptations found in various prokaryotes. Explain how these three adaptations have ensured the success of prokaryotes.

b) Discuss how prokaryotes early in Earth's history altered environments on Earth.

c) Discuss three ways in which prokaryotes continue to have ecological impact today.

3.

Homeostasis, maintaining a steady-state internal environment, is a characteristic of all living organisms. Choose three of the following physiological parameters and for each, describe how homeostasis is maintained in an organism of your choice. Be sure to indicate what animal you have chosen for each parameter. You may use the same animal or different animals for your three descriptions.

- Blood-glucose levels
- Body temperature
- pH of the blood
- Osmotic concentration of the blood
- Neuron resting-membrane potential

4.

Membranes are essential components of all cells.

(a) **Identify** THREE macromolecules that are components of the plasma membrane in a eukaryotic cell and **discuss** the structure and function of each.

(b) **Explain** how membranes participate in THREE of the following biological processes:

- Muscle contraction
- Fertilization of an egg
- Chemiosmotic production of ATP
- Intercellular signaling

5.

Homeostatic maintenance of optimal blood glucose levels has been intensively studied in vertebrate organisms.

(a) Pancreatic hormones regulate blood glucose levels. **Identify** TWO pancreatic hormones and **describe** the effect of each hormone on blood glucose levels.

(b) For ONE of the hormones you identified in (a), **identify** ONE target cell and **discuss** the mechanism by which the hormone can alter activity in that target cell. **Include** in your discussion a description of reception, cellular transduction, and response.

(c) **Compare** the cell-signaling mechanisms of steroid hormones and protein hormones.