

## Types of Multiple-Choice Questions

### 1. Knowledge

Which of the following are materials for photosynthesis?

- a. Water, heat, sunlight
- b. Carbon dioxide, sunlight, oxygen
- c. Water, carbon dioxide, sunlight
- d. Sunlight, oxygen, carbohydrates
- e. Water, carbon dioxide, carbohydrates

### 2. Comprehension

If a living cell similar to those found on earth was found on another planet where there was no molecular oxygen, which cell part would most likely be absent?

- a. Cell membrane
- b. Nucleus
- c. Mitochondria
- d. Ribosome
- e. Chromosomes

### 3. Application

Phenylketonuria (PKU) is an autosomal recessive condition. About one in every fifty individuals is heterozygous for the gene but shows no symptoms of the disorder. If you select a symptom-free male and a symptom-free female at random, what is the probability that they could have a child afflicted with PKU?

- a.  $(.02)(.02)(.25) = 0.0001 = 0.01\%$ , or about 1/10,000
- b.  $(.02)(.02) = 0.0004 = 0.04\%$ , or about 1/2,500
- c.  $(1)(50)(2) = 100\%$ , or all
- d.  $(1)(50)(0) = 0$ , or none
- e.  $1/50 = 2\%$ , or 2/100

#### 4. Analysis

Mitochondria are called the powerhouses of the cell because they make energy available for cellular metabolism. Which of the following observations is most cogent in supporting this concept of mitochondrial function?

- a. ATP occurs in the mitochondria
- b. Mitochondria have a double membrane
- c. The enzymes of the Krebs cycle, and molecules required for terminal respiration, are found in mitochondria
- d. Mitochondria are found in almost all kinds of plant and animal cells
- e. Mitochondria abound in muscle tissue

#### 5. Evaluation

Disregarding the relative feasibility of the following procedures, which of these lines of research is likely to provide us with the most valid and direct evidence as to evolutionary relations among different species?

- a. Analysis of the chemistry of store food in female gametes
- b. Analysis of the enzymes of the Krebs cycle
- c. Observations of the form and arrangement of the endoplasmic reticulum
- d. Comparison of details of the molecular structure of DNA
- e. Determination of the total percent protein in the cells