1. Which of the following represents the most reduced form of carbon?

(A) R-CH3

(B) R-COOH

(C) R-CHO

(D) R-CH2OH

(E) CO2

2. The Km (Michaelis constant) of an enzyme for a substrate is defined operationally as

(A) half the substrate concentration at which the reaction rate is maximal

(B) the substrate concentration at which the reaction rate is half maximal

(C) the dissociation constant of the enzyme-substrate complex

(D) the dissociation constant of the enzyme-product complex

(E) the rate constant of the reaction at saturation

3. The reversible reaction in which dihydroxyacetone phosphate and glyceraldehyde 3-phosphate com- bine to form fructose 1,6-bisphosphate characterized as

(A) an aldol condensation

(B) a Grignard reaction

(C) a free-radical reaction

(D) a hydrolytic reaction

(E) a zero-order reaction

4. Dinitrophenol (DNP) uncouples mitochondrial electron transport from oxidative phosphorylation by

(A) dissipating the proton gradient
(B) inhibiting cytochrome oxidase
(C) dissociating the F0 and F1 units of the ATP synthase complex
(D) binding irreversibly to ubiquinone
(E) blocking the adenine nucleotide carrier (ATP/ADP exchanger)

5. Most of the dry mass in the trunk of a tree was originally derived from
(A) the soil
(B) light energy
(C) amino acids
(D) CO_2
(E) glucose

6. Which of the following cell compartments is associated with a protein skeleton composed of lamins?
(A) Chloroplast
(B) Basement membrane
(C) Mitochondrion
(D) Nucleus
(E) Peroxisome

7. Initiation of mitogenesis by epidermal growth factor and depolarization of the membrane of a skeletal muscle cell by acetylcholine are similar in that each
(A) involves, as an essential early step, an ion flux across the plasma-membrane receptor of the responding cell
(B) requires a ligand-mediated conformational change in a plasma-membrane receptor of the responding cell
(C) requires activation of a G protein on the cytoplasmic face of the plasma membrane in the responding cell
(D) is mediated by phosphorylation of the ligand receptor in the responding cell
(E) completes its primary task by direct activation of specific regulatory DNA sequences in the nucleus of the responding cell