1. What is the primary function of the enzyme ATP synthase in cellular respiration?
A) To synthesize ATP from ADP and Pi
B) To hydrolyze ATP to ADP and Pi
C) To transport electrons through the electron transport chain
D) To convert glucose to pyruvate

Answer: A) To synthesize ATP from ADP and Pi

2. Which of the following biomolecules is synthesized from the amino acid tyrosine?
A) Epinephrine
B) Insulin
C) Glucagon
D) Somatostatin

Answer: A) Epinephrine

3. What is the name of the process by which glucose is converted to pyruvate in the absence of oxygen?
A) Glycolysis
B) Fermentation
C) Oxidative phosphorylation
D) Pentose phosphate pathway

Answer: B) Fermentation

4. Which of the following statements about enzyme kinetics is TRUE?
A) Vmax is the maximum velocity of the reaction at substrate saturation
B) Km is the substrate concentration at which the reaction velocity is half of Vmax
C) Enzymes increase the equilibrium constant of a reaction
D) Both A and B

Answer: D) Both A and B

5. What is the primary function of the citric acid cycle (Krebs cycle)?
A) To generate ATP from ADP and Pi
B) To synthesize glucose from pyruvate
C) To produce NADH and FADH2
D) To convert acetyl-CoA to citrate

Answer: C) To produce NADH and FADH2

6. Which of the following biomolecules is a precursor for the synthesis of steroid hormones?
A) Cholesterol

B) Phosphatidylcholine
C) Sphingomyelin
D) Triacylglycerol

Answer: A) Cholesterol

7. What is the name of the process by which fatty acids are broken down into acetyl-CoA units?
A) Beta-oxidation
B) Fatty acid synthesis
C) Lipolysis
D) Ketogenesis

Answer: A) Beta-oxidation

8. Which of the following statements about DNA replication is TRUE?
A) DNA replication is a semiconservative process
B) DNA replication occurs in the 5' to 3' direction
C) DNA replication requires an RNA primer
D) All of the above

Answer: D) All of the above

9. What is the primary function of the enzyme DNA polymerase in DNA replication?
A) To unwind the DNA double helix
B) To synthesize RNA primers
C) To add nucleotides to the growing DNA strand
D) To proofread and edit the newly synthesized DNA

Answer: C) To add nucleotides to the growing DNA strand

10. Which of the following biomolecules is a key regulator of glycolysis?
A) ATP
B) Citrate
C) Fructose-2,6-bisphosphate
D) All of the above

Answer: D) All of the above