

- 1)** Concentration of all of the following molecules directly regulates the activity of glycogen synthase EXCEPT:
- Glucose
 - Glucose-6-phosphate
 - AMP
 - ATP
- 2)** Biotin is important in gluconeogenesis for all of these reasons EXCEPT:
- Its necessary to add CO₂ to certain intermediates in this pathway
 - CO₂ becomes one or more of the 6 carbons in the glucose products
 - Biotin is capable of binding covalently to CO₂
 - Biotin helps synthesize an important precursor of phosphoenolpyruvate
- 3)** One of the principal sources of NADPH in erythrocytes is :
- Conversion of glucose-6-P to lactate
 - The conversion of glucose-6-P into pentose-5-P
 - Oxidative phosphorylation
 - The citric acid cycle
- 4)** The reaction: fructose-1,6-bisphosphate → fructose-6-P is catalyzed by the enzyme:
- Phosphofructokinase
 - Fructose-1,6-bisphosphatase
 - Triose phosphate isomerase
 - Fructose-6-phosphate
- 5)** The reaction of fructose-1,6-bisphosphate to give glyceraldehydes-3-phosphate and dihydroxyacetone phosphate is an example of:
- A reverse aldolase condensation
 - Hydrolysis
 - Oxidation
 - Dehydration

6) When glycogen synthase is phosphorylated:

- a. Its activity decreased
- b. Its activity increased
- c. Its activity unaffected
- d. That enzyme doesn't get phosphorylated

7) Gluconeogenesis differ from glycolysis because:

- a. The irreversible steps of glycolysis are bypassed
- b. Different enzymes are involved
- c. Biotin is required for gluconeogenesis and not for glycolysis
- d. All of the above

8) In the Cori cycle:

- a. Lactic acid is transported from the liver to muscle by the blood
- b. Lactic acid is transported from the liver to the kidneys by the blood
- c. Glycolysis takes place in muscles and gluconeogenesis in the liver
- d. Glycolysis takes place in liver and gluconeogenesis in the muscles

9) The oxidative reactions in pentose phosphate pathway:

- a. Produce NADPH rather than NADH
- b. Require biotin
- c. Require Coenzyme A
- d. Require thiamine pyrophosphate

10) The enzyme fructose-2,6-bisphosphatase and phosphofructokinase-2 are present as a protein dimer, then:

- a. They are activated together
- b. They are inhibited together
- c. The first is activated by phosphorylation and the other is inactivated
- d. The first is inactivated by phosphorylation and the other is activated

- 11) Which of the following statements is CORRECT?
- Lactate is oxidized to pyruvate in skeletal muscle cells
 - Lactate is oxidized to pyruvate in liver cells
 - Lactate is oxidized to pyruvate in citric acid cycle
 - Lactate is oxidized to pyruvate in the electron transport chain
- 12) Which of the following statements is CORRECT?
- Increased concentration of fructose-2,6-bisphosphate stimulate glycolysis
 - Increased concentration of fructose-2,6-bisphosphate stimulate gluconeogenesis
 - Increased activity of fructose-2,6-bisphosphatase stimulate glycolysis
 - Increased activity of fructose-2,6-bisphosphatase inhibit gluconeogenesis
- 13) 2-phosphoglycerate conversion to 3-phosphoglycerate occurs in:
- Krebs cycle
 - Gluconeogenesis
 - Glycolysis
 - Urea cycle
- 14) How many ATP and GTP are required for synthesis of one molecule of glucose via gluconeogenesis?
- 4GTP + 2ATP
 - 2GTP + 2ATP
 - 4GTP + 4ATP
 - 2GTP + 4ATP
- 15) Glycogen is mainly found in :
- Liver and muscles
 - Liver and brain
 - Muscle and brain
 - Liver, muscle and brain

- 16) The enzyme glycogen phosphorylase catalyzes a reaction in:
- The formation of glycogen from glucose
 - Glycogen breakdown
 - Gluconeogenesis
 - The pentose phosphate pathway
- 17) Transketolase catalyzes the transfer of a:
- 2C group to a ketose
 - 2C group to an aldose
 - 3C group to a ketose
 - 3C group to an aldose
- 18) What kind of enzymes catalyzes the reaction $\text{ribose-5P} \rightarrow \text{ribulose-5-P}$?
- Transketolase
 - Epimerase
 - Transaldolase
 - Isomerase
- 19) Which of the following enzymes is allosterically inhibited by ATP?
- Pyruvate dehydrogenase complex
 - Succinyl-CoA synthetase
 - Succinate dehydrogenase
 - Fumarase
- 20) One principal source of NADPH is:
- The pentose phosphate pathway
 - Gluconeogenesis
 - Oxidative phosphorylation
 - The citric acid cycle

- 21)** Which of the following enzymes found in the mitochondria?
- Hexokinase
 - Pyruvate kinase
 - Glucose-6-phosphatase
 - Pyruvate carboxylase
- 22)** Which of the following statements about pyruvate kinase is TRUE?
- Its inhibited by fructose-1,6-bisphosphate
 - Its activated by ATP
 - Its inhibited by alanine
 - Its activated by phosphorylation
- 23)** Gluconeogenesis is the synthesis of:
- Glucose from non-carbohydrate precursors
 - Glycogen from glucose
 - Pyruvate from glucose
 - Fatty acids from glucose
- 24)** What kind of enzymes catalyzes the reaction ribulose-5-P → Xylulose-5-P :
- Transketolase
 - Epimerase
 - Transaldolase
 - Isomerase
- 25)** Which of the following is both an allosteric inhibitor of glycogen phosphorylase and activator of glycogen synthase?
- ATP
 - Glucose-6-phosphate
 - AMP
 - Glucose

2.6) The second intermediate formed from glucose in the pentose phosphate pathway is:

- a. 6-phosphogluconate
- b. Xylalose-5-phosphate
- c. Fructose-6-phosphate
- d. Ribulose-5-phosphate

2.7) Which of the following statements regarding formation of glucose-1-phosphate from glycogen is NOT CORRECT?

- a. It triggered by low blood glucose
- b. It requires ATP hydrolysis
- c. It is catalyzed by glycogen phosphorylase enzyme
- d. It involves cleavage of an alpha (1→4) bond

2.8) In the glycogen synthesis pathway:

- a. Glucose-6-phosphate first interact with UTP to give UDP-glucose
- b. Glucose first interact with UTP to give UDP-glucose
- c. Glucose-1-phosphate first interact with UTP to give UDP-glucose
- d. Glucose first interact with UDP to give UDP-glucose

2.9) Conversion of pyruvate to phosphoenolpyruvate require the hydrolysis of:

- a. One ATP
- b. Two ATP
- c. One ATP and one GTP
- d. Two GTP

3.0) Which of the following statements is NOT correct regarding pentose phosphate pathway?

- a. An alternative pathway to glycolysis
- b. Produce NADPH
- c. Produce pentose sugars
- d. Generate 2ATP molecules per glucose molecule

- 31) Which of the following enzymes catalyzes a reversible reaction in glycolysis?
- Hexokinase
 - Phosphofructokinase
 - Enolase
 - Pyruvate kinase
- 32) Increased production of lactate in muscle cells:
- Stimulate gluconeogenesis in muscle cells
 - Stimulate gluconeogenesis in liver cells
 - Stimulate glycolysis in muscle cells
 - Stimulate glycolysis in liver cells
- 33) Which of the following pathways occurs partly in the endoplasmic reticulum?
- Glycolysis
 - Gluconeogenesis
 - The pentose phosphate pathway
 - The citric acid cycle
- 34) Transketolase resemble which of the following enzymes in its requirements of both magnesium and TPP for its activity?
- Pyruvate kinase
 - Pyruvate dehydrogenase
 - Pyruvate decarboxylase
 - Pyruvate carboxylase
- 35) Which of the following is INCORRECT about gluconeogenesis?
- It occurs only in liver cells
 - It refers to the synthesis of glucose from small non-carbohydrate precursors
 - Its stimulated by high concentration of fructose-2,6-bisphosphate
 - It occurs in three cellular locations (cytosol, mitochondria; and ER)

6) Starting from glucose and UTP and ATP, How many high energy phosphate bonds are broken to add glucose to glycogen molecule.

- a. 1
- b. 2
- c. 3
- d. 4

37) Advantages that glycogen provides to muscle cells in which it is stored all the following Except:-

- a. it is available for quick energy needs
- b. it requires no energy to metabolize glucose residues for metabolism
- c. it gives anaerobic metabolism a boost
- d. it draws more water into the cell than glucose would.

- 1 A
- 2 B
- 3 B
- 4 B
- 5 A chapter 17
- 6 A
- 7 D
- 8 C
- 9 A
- 10 C
- 11 B
- 12 A
- 13 B
- 14 D
- 15 A
- 16 B
- 17 B
- 18 D
- 19 A chapter 19
- 20 A
- 21 D
- 22 C
- 23 A
- 24 B
- 25 B
- 26 A
- 27 B
- 28 C
- 29 C
- 30 D
- 31 C
- 32 B
- 33 B
- 34 C
- 35 C
- 36 C
- 37 D

9