



MIDTERM
COLLECTED
QUESTIONS
OF Metabolism 019

1-The conversion of glucose to fructose

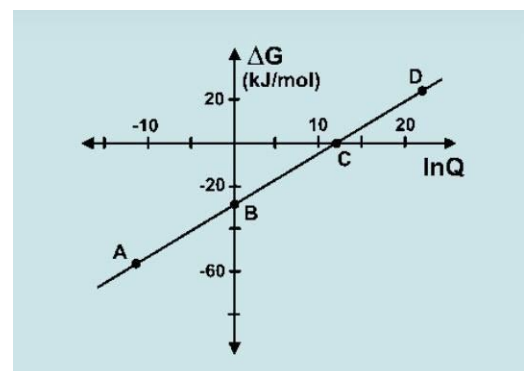
- a. requires NADPH.
- b. requires glucokinase.
- c. involves reduction to sorbitol.
- d. occurs by isomerization reaction.
- e. proceeds through CDP-fructose.

2-The Na⁺ monosaccharide cotransporter.

- a. uses ATP to drive the transport of sodium with glucose.
- b. is present in plasma membrane of hepatocytes.
- c. is insulin dependent.
- d. transfers glucose from high to low concentration by facilitated diffusion.
- e. is involved in glucose reabsorption in proximal tubules.

3-Assuming Q is the ratio of product to reactant concentrations; which of the following graph points represents accurately the equilibrium point?

- a. Point A
- b. Point C
- c. Point D
- d. Cannot be known from the information given, so can be any of the above points
- e. Point B



4-Fructose poisoning results from deficiency of

- a. Phosphofructokinase.
- b. Sucrase isomaltase.

- c. Triose kinase.
- d. Aldolase B.
- e. Fructokinase

5-A patient presents with blood in the urine (hematuria). You wish to assess whether this patient has a hemoglobinuria or a myoglobinuria (hemoglobin or myoglobin in urine). A blood test for one of these proteins should help you to arrive at the correct conclusion.

- a. Hemoglobin
- b. Transferrin
- c. CRP
- d. α 1-antitrypsin
- e. Haptoglobin

6-One of the following enzymes catalyzes a common step between glycolysis and gluconeogenesis

- a. Pyruvate carboxylase.
- b. pyruvate kinase.
- c. glucose 6-phosphatase.
- d. Phosphofructokinase.
- e. glycerate 3-phosphate kinase.

7-Release of CoA from specific compounds in the mitochondrial matrix aids directly in:

- a. Substrate level phosphorylation
- b. Oxaloacetate production
- c. Formation of NADH
- d. Formation of FADH₂
- e. Release of CO₂

8-ATP/ADP translocase is characterized by all of the following EXCEPT:

- a. If inhibited, eventually cellular respiration is inhibited
- b. Catalyzes an exergonic process
- c. Contains a single nucleotide-binding site
- d. It has similar affinities for ATP and ADP
- e. Abundant in the inner mitochondrial membrane

9-For a redox reaction experimented in the lab and involves the movement of four electrons, ΔE_o was measured to be - 0.10 V. Accordingly, the reaction at standard conditions would have a free energy difference of:

- a. 4.7 kCal/mol
- b. 0 kCal/mol
- c. 94.4 kCal/mol
- d. -9.4 kCal/mol
- e. 9.4 kCal/mol

10-The complex in electron transport chain that DOES NOT have a direct link to coenzyme Q in some form is:

- a. Cytochrome c oxidase
- b. Complex III
- c. Complex II
- d. Succinate dehydrogenase complex
- e. Complex I

11-After a traffic accident, a 34-year-old lady was admitted to the intensive care unit (ICU) for monitoring. On the second day of admission a blood sample was taken and sent to the laboratory for biochemical analyses. Her liver function and renal function test were normal. The following findings would be consistent with: Albumin 30 g/L (reference 35-45 g/L), C-reactive protein 68mg/L (reference < 10 mg/L), plasma immunoglobulin levels normal.

- a. Chronic infection
- b. Acute nutritional deficiency
- c. Liver cirrhosis
- d. Acute phase response to injury
- e. Nephrotic syndrome

12-Which of the following is TRUE considering TCA cycle?

- a. If citrate is very high in concentration, TCA cycle will run less effectively
- b. When oxidation occurs, an accompanying decarboxylation takes place
- c. The overall ΔG is considered zero at physiological conditions
- d. ADP is an allosteric activator for 2 of the three dehydrogenases included
- e. All enzymes are allocated within the mitochondrial matrix

13-The reactions in which succinate is converted to oxaloacetate are, in order:

- a. three successive oxidation reactions
- b. an oxidation, a hydration, and an oxidation
- c. an oxidation, a dehydration, and an oxidation
- d. an oxidative decarboxylation, a dehydration, and a condensation
- e. a condensation, a dehydration, and an oxidative decarboxylation

14-Consider the TCA cycle reaction that produces oxaloacetate has a $\Delta G_o = 0.1$ kCal/mol. (0.001) M of each compound is mixed & the reaction is allowed to come to equilibrium. Accordingly, which statement is CORRECT about the resulting concentration of niacins at equilibrium?

- a. $[NAD^+] \geq [NADH]$
- b. $[NAD^+] > [NADH]$
- c. $[NAD^+] < [NADH]$
- d. $[NAD^+] = [NADH]$
- e. Cannot be determined from the information provided

15-Lactate synthase

- a. requires lactalbumin in males.
- b. requires ATP as a source of energy.
- c. is not normally expressed in males.
- d. uses UDP-galactose as a substrate.
- e. is present only in lactating mammary glands.

16-Which one of the following reaction would you expect to be exergonic?

- a. Decarboxylation
- b. Condensation
- c. Transamination
- d. Carboxylation
- e. Phosphorylation

17-Which statement is CORRECT considering ATP generation in the electron transport chain?

- a. Entry of protons occurs through the F₀ piece into the mitochondrial matrix.
- b. The F₀ piece of the ATP synthase is composed of one subunit.

- c. The F₁ piece of the ATP synthase is composed of one subunit.
- d. The F₀ piece of the ATP synthase binds ADP and Pi tightly before ATP synthesis occurs.
- e. Conformational changes are minimal in the F₀ piece compared to the F₁ piece.

18-During oxidative decarboxylation of α -ketoglutarate, the following happens:

- a. Oxidation of an acetate group
- b. Addition of Coenzyme A to a 2-carbon fragment
- c. Oxidation of NADH
- d. Removal of 2 CO₂ molecules
- e. Oxidation of 2 thiol groups by FAD

19-The Cori cycle involves:

- a. release of lactate by liver.
- b. release of glucose from muscle.
- c. reduction of pyruvate to lactate in the liver.
- d. release of pyruvate by the muscle.
- e. synthesis of glucose from lactate.

20-Uncoupling in mitochondria refers to:

- a. Stopping ATP synthesis but not stopping electron flow
- b. Increasing the pH value inside the mitochondrial matrix
- c. Blocking NADH electrons from entering the electron transport system
- d. Interruption of electron flow
- e. Stopping electron flow but not stopping ATP synthesis

21-The high NADH/NAD⁺ ratio caused by alcohol intoxication inhibits:

- a. gluconeogenesis.
- b. hexokinase.
- c. glycolysis.
- d. glycogen degradation.
- e. conversion of pyruvate to lactate.

22-One of the following enzymes is common between gluconeogenesis and production of glucose from liver glycogen.

- a. glucose 6- phosphatase.
- b. phosphorylase.
- c. phosphoglucose isomerase.
- d. hexokinase.
- e. fructose 2,6 bisphosphatase.

23-After performing a serum electrophoresis, you noticed a dramatic decrease in all bands on the gel. This would indicate:

- a. Multiple myeloma
- b. Analbuminemia
- c. Kidney failure
- d. Liver cirrhosis
- e. Inflammation

24-B glycosidic bond is found in

- a. isomaltose.
- b. maltose.
- c. maltotriose.

d. amylopectin.

e. lactose.

25-The products of glycolysis under aerobic conditions in the muscle are

a. pyruvate, NADPH and ATP.

b. lactate, NADH and ATP.

c. lactate and ATP.

d. pyruvate, NADH and ATP.

e. lactate, NADPH and ATP.

26-The active form of glucose required by glycogen synthase is

a. UDP-Glucose.

b. Glucose 6-Phosphate.

c. Glucose 1-Phosphate.

d. UTP-Glucose.

e. ADP-Glucose

27-Which of the following proteins you would expect to run faster (compared to others) in gel electrophoresis?

a. Hemoglobin

b. Prealbumin

c. α 1-antitrypsin

d. Haptoglobin

e. Albumin

28-The immediate product(s) of glycogen degradation by glycogen phosphorylase in the liver is(are)

- a. glucose 1,6- biphosphate.
- b. glucose 1-phosphate.
- c. glucose 6-phosphate.
- d. glucose.
- e. all answers are true.

29-The glucose transporter GLUT4

- a. is found in the pancreatic cells.
- b. is found in liver cells.
- c. can transport glucose against concentration gradient.
- d. is actually fructose transporter.
- e. is insulin sensitive.

30-Glycolysis is inhibited by

- a. Hydrogen ions.
- b. phosphorylation of glyceraldehyde 3- phosphate dehydrogenase.
- c. high ADP/ATP ratio.
- d. fructose 2,6 biphosphate.
- e. dephosphorylation of pyruvate kinase.

Answers

1	C	11	D	21	C
2	E	12	A	22	A
3	B	13	B	23	C
4	D	14	B	24	E
5	E	15	D	25	D
6	E	16	A	26	A
7	A	17	A	27	B
8	B	18	E	28	B
9	D	19	E	29	E
10	A	20	A	30	A

GOOD LUCK