

Course No: PHRM 2315  
Course Title: Biochemistry-I  
Date: 10/01/2018  
No. of Questions: (5)  
Time: 2 hours  
Using Calculator (No)

University of Palestine



Final Exam For First Sem.  
2017/2018  
Total Grade:

Instructor Name: Dr. Iyad ALQOUQA  
Student No.: \_\_\_\_\_  
Student Name: \_\_\_\_\_  
College Name: \_\_\_\_\_  
Dep. / Specialist: \_\_\_\_\_  
Using Dictionary (No)

**Question One:**

**24 Marks**

Put the sign (✓) against the right sentences and the sign (✗) against the wrong sentences

- ( ) Cellulose have glucose residues joined together by  $\alpha$ -1,4 glucosidic linkage while amylose joined by  $\beta$ -1,4 glucosidic bond.
- ( ) Agarose is a homopolysaccharide found in the cell walls of some seaweed.
- ( ) Most Enzymes are protein biocatalyst increasing the rate of reaction by affecting reaction equilibrium.
- ( ) Allosteric enzymes do not follow Michaelis Mentin equation and shows sigmoidal curve.
- ( ) The cofactors that binds non-tightly with enzymes are called prosthetic groups.
- ( ) The formation of a peptide bond between two amino acids is an example of a condensation reaction.
- ( ) Per one turn of an  $\alpha$  helix, there is 2.6 amino acids.
- ( ) In an  $\alpha$  helix, the R groups on the amino acid residues stack within the interior of the helix
- ( ) Activation or inactivation of certain key regulatory enzymes is accomplished by covalent modification of the amino acid phenylalanine.
- ( ) Vitamins A, C, D and K are fat soluble vitamins.
- ( ) Phosphoglycerate kinase catalyzes a step in glycolysis that results in the formation of ATP.
- ( ) Pyruvate kinase couples the free energy of phosphoenolpyruvate cleavage to the synthesis of ATP during the formation of pyruvate.
- ( ) In the liver, fructokinase is used to phosphorylate fructose to fructose -6- phosphate
- ( ) In non-competitive inhibitor, the velocity of reaction is changed while the  $K_m$  is constant.
- ( ) glucokinase is important step that commits glucose to glycolysis.
- ( ) Sterols are commonly found in bacterial membranes.
- ( ) Intermediates in the citric acid cycle can be used as precursors in the biosynthesis pathways
- ( ) The process by which ATP is formed from ADP in glycolysis is referred to as substrate-level phosphorylation.
- ( ) The coenzyme not involved in the formation of acetyl-CoA from pyruvate is TPP.
- ( ) The enzyme pyruvate carboxylase is present in cytosol.
- ( ) Triacontanoylpalmitate is the major component of beeswax.
- ( ) The main function of the pentose phosphate pathway is to supply pentoses and NADPH.
- ( ) Calcitriol is the inactive form of vitamin D3.
- ( ) Bile acids are synthesized from fatty acids.

**Question Two:**

**26 Marks**

Choose the correct answer and encircle it.

- The only carbohydrate which is not having a chiral carbon atom is  
A. Erythrose      B. Glyceraldehyde      C. Dihydroxyacetone      D. Erythrulose
- A keto hexose will have \_\_\_\_\_ stereoisomers  
A. 4      B. 6      C. 8      D. 10

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3. **The anaerobic conversion of 1 mol of glucose to 2 mol of lactate by fermentation is accompanied by a net gain of:**  
A. 1 mol of ATP      B. 1 mol of NADH      C. 2 mol of ATP      D. 2 mol of NADH
4. **Which of the following statements is not true concerning glycolysis in anaerobic muscle?**  
A. Fructose 1,6-bisphosphatase is one of the enzymes of the pathway.  
B. It is an endergonic process.  
C. It results in synthesis of NADH.  
D. Its rate is slowed by a high [ATP]/[ADP] ratio.
5. **Glycolysis in the erythrocyte produces pyruvate that is further metabolized to:**  
A. ethanol      B. glucose      C. hemoglobin      D. lactate
6. **Which of these cofactors participates directly in most of the oxidation-reduction reactions in the fermentation of glucose to lactate?**  
A. ADP      B. ATP      C. NAD<sup>+</sup>/NADH      D. FAD/FADH<sub>2</sub>
7. **The steps of glycolysis between glyceraldehyde 3-phosphate and 3-phosphoglycerate involve all of the following except:**  
A. ATP synthesis.      B. catalysis by phosphoglycerate kinase  
C. oxidation of NADH to NAD<sup>+</sup>.      D. the formation of 1,3-bisphosphoglycerate.
8. **The first reaction in glycolysis that results in the formation of an energy-rich compound**  
A. glyceraldehyde 3-phosphate dehydrogenase.      B. hexokinase  
C. phosphofructokinase-1      D. phosphoglycerate kinase.
9. **Glycogen is converted to monosaccharide units by:**  
A. glucose-6-phosphatase.      B. glycogen phosphorylase.      C. glycogen synthase.      D. glycogenase.
10. **All of the following enzymes involved in the flow of carbon from glucose to lactate (glycolysis) are also involved in the reversal of this flow (gluconeogenesis) except:**  
A. 3-phosphoglycerate kinase.      B. aldolase  
C. enolase.      D. phosphofructokinase-1.
11. **Which of the following statements about the pentose phosphate pathway is correct?**  
A. It generates 36 mol of ATP per mole of glucose consumed.  
B. It is a reductive pathway; it consumes NADH.  
C. It is present in plants, but not in animals.  
D. It provides precursors for the synthesis of nucleotides

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12. Which of the following substrates cannot contribute to net gluconeogenesis in mammalian liver?  
A. alanine      B. glutamate      C. palmitate      D. pyruvate or  $\alpha$ -ketoglutarate
13. Which of the below is not required for the oxidative decarboxylation of pyruvate to form acetyl-CoA?  
A. ATP      B. CoA-SH      C. FAD & NAD<sup>+</sup>      D. Lipoic acid
14. Malonate is a competitive inhibitor of succinate dehydrogenase. If malonate is added to a mitochondrial preparation that is oxidizing pyruvate as a substrate, which of the following compounds would you expect to decrease in concentration?  
A. Citrate      B. Fumarate      C. Isocitrate      D. Succinate.
15. All of the oxidative steps of the citric acid cycle are linked to the reduction of NAD<sup>+</sup> except the reaction catalyzed by:  
A. isocitrate dehydrogenase      B. malate dehydrogenase.  
C. succinate dehydrogenase      D. the alpha-ketoglutarate dehydrogenase complex.
16. The conversion of 1 mol of pyruvate to 3 mol of CO<sub>2</sub> via pyruvate dehydrogenase and the citric acid cycle also yields \_\_\_\_\_ mol of NADH, \_\_\_\_\_ mol of FADH<sub>2</sub>, and \_\_\_\_\_ mol of ATP (or GTP).  
A. 2; 2; 2      B. 3; 1; 1      C. 4; 1; 1      D. 4; 2; 1
17. Entry of acetyl-CoA into the citric acid cycle is decreased when:  
A. [AMP] is high.      B. the ratio of [ATP]/[ADP] is low  
C. the ratio of [ATP]/[ADP] is high.      D. the ratio of [NAD<sup>+</sup>]/[NADH] is high.
18. During seed germination, the glyoxylate pathway is important to plants because it enables them to:  
A. carry out the net synthesis of glucose from acetyl-CoA.      B. form acetyl-CoA from malate.  
C. get rid of isocitrate formed from the aconitase reaction.      D. obtain glyoxylate for pyrimidine synthesis.
19. Which of the following deoxyoligonucleotides will hybridize with a DNA containing the sequence (5')AGACTGGTC(3')?  
A. (5')CTCATTGAG(3')      B. (5')GACCAGTCT(3')  
C. (5')GAGTCAACT(3')      D. (5')TCTGACCAG(3')

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20. Which of the following is a palindromic sequence?

- A. CCTTCC      B. GAATCC      C. GGATCC      D. GTATCC  
GCAAGG      CTTAGG      CCTAGG      CATAGG

21. Which of the following is not true of all naturally occurring DNA?

- A. Deoxyribose units are connected by 3',5'-phosphodiester bonds.      B. The ratio A+T/G+C is constant for all-natural DNAs.  
C. The two complementary strands are antiparallel.      D. Two hydrogen bonds form between A and T.

22. Non-steroidal anti-inflammatory drugs (NSAIDs) like aspirin and ibuprofen act by blocking production of:

- A. biological waxes      B. prostaglandins      C. sphingolipids      D. vitamin K

23. The kinetic effect of purely competitive inhibitor of an enzyme

- A. Increases  $K_m$  without affecting  $V_{max}$       B. Decreases  $K_m$  without affecting  $V_{max}$   
C. Increases  $V_{max}$  without affecting  $K_m$       D. Decreases  $V_{max}$  without affecting  $K_m$

24. Glyceraldehyde-3-phosphate dehydrogenase belongs to what class of enzymes?

- A. oxidoreductases      B. isomerases      C. transferases      D. hydrolases

25. UDP-galactose is converted to UDP-glucose by the enzyme:

- A. galactokinase.      B. galactose-uridylyltransferase  
C. UDP-glucose-4-epimerase.      D. UDP-galactose-2-epimerase

26. In the liver, \_\_\_\_ is used to phosphorylate fructose to \_\_\_\_.

- A. phosphofructokinase-1; fructose-6-phosphate.      B. phosphofructokinase-1; fructose-1-phosphate  
C. fructokinase; fructose-6-phosphate      D. fructokinase; fructose-1-phosphate

### Question Three:

15 degree

1. Match the compounds on the left with the important roles they play listed on the right.  
(Answers are used only once.)

- (a) prostaglandins      \_\_\_\_  $Ca^{2+}$  and phosphate metabolism  
(b) sphingolipids      \_\_\_\_ necessary for sight

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- (c) thromboxane's \_\_\_\_\_ prevention of oxidative damage  
(d) vitamin A \_\_\_\_\_ important component of myelin membranes  
(e) vitamin D \_\_\_\_\_ mediates pain and inflammation  
(f) Vitamin E \_\_\_\_\_ blood clotting

2. Rank the following in order of increasing solubility in water: a triacylglycerol, a diacylglycerol, and a monoacylglycerol, all containing only palmitic acid.

3. Draw the structure of the omega-6 fatty acid 16:1

4. What chemical features distinguish a cerebroside from a ganglioside?

**Question Four:**

**15 Marks**

1. List the six major international enzyme classes and calrify the reaction they catalyze?
2. What Factor affecting the velocity of enzymatic reaction?
3. How enzymes accelerate biochemical reactions and how can be regulated?

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**Question Five :**

**20 Marks**

1. Lactose exists in two anomeric forms, but no anomeric forms of sucrose have been reported. Why?
2. Explain the biochemical basis of the human metabolic disorder called lactose intolerance.
3. Which of the enzymes represents a major regulation point in glycolysis? Which catalyzes a reaction in which ATP is produced? Which catalyzes a reaction in which NADH is produced?
4. What is the cost (in ATP equivalents) of transforming glucose to pyruvate via glycolysis and back again to glucose via gluconeogenesis?
5. Citric Acid cycle is amphibolic. Explain this statement and give examples

End of Questions—*Good Luck*