

Course No: PHARM 2315  
Course Title: Biochemistry  
Date: 10/01/2018  
No. of Questions: (5)  
Time: TWO hours  
Using Calculator (Yes)

University of Palestine



Final Exam  
Third Semester 2017/2018  
Total Grade: 50 Marks

Instructors Name: Dr. Hassan Ramadan

Student No.: \_\_\_\_\_  
Student Name: \_\_\_\_\_  
College Name: \_\_\_\_\_  
Dep./Specialist: \_\_\_\_\_  
Using Dictionary (No)

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**Question (1) Put the sign (✓) against the right sentences and the sign (X) against the wrong sentences: (10 Marks)**

- (.....) Phospholipids and sterols are major structural elements of biological membranes.
- (.....) Ceramide is the structural parent of all sphingolipids.
- (.....) *Trans* fatty acids are produced during hydrogenation of fish or vegetable oils.
- (.....) 1,25-dihydroxycholecalciferol regulates calcium uptake in the intestine and calcium levels in kidney and bone.
- (.....) The cellular Oxidation of fatty acids to CO<sub>2</sub> and H<sub>2</sub>O is highly exergonic
- (.....) Sphingomyelins like glycerophospholipids and galactolipids they contain glycerol.
- (.....) Phospholipase C is hydrolytic enzyme catalyzes the breakdown of ester bond at C<sub>1</sub> of triglyceride.
- (.....) Cholesterol, the major sterol in animal tissues, is amphipathic, with a polar head group (the hydroxyl group at C-3) and a nonpolar hydrocarbon body.
- (.....) Condensation of acetyl-CoA with oxaloacetate to form citrate, catalyzed by pyruvate dehydrogenase.
- (.....) The base of a nucleotide is joined covalently at N-9 of pyrimidines and N-1 of purines.
- (.....) Triacylglycerols are composed of 3 fatty acids each in ester linkage with a single glycerol.
- (.....) RNA is a polymer of deoxyribonucleoside monophosphates covalently linked by 3'→5' phosphodiester bonds.
- (.....) Vertebrate heart tissue is uniquely enriched in ether lipids; about half of the heart phospholipids are plasmalogens.
- (.....) Overproduction of leukotrienes causes asthmatic attacks.
- (.....) Eicosanoids are paracrine hormones, substances that act only on cells near the point of hormone synthesis.
- (.....) Tay-Sachs disease, in which ganglioside GM<sub>2</sub> accumulates in the brain and spleen due to lack of the enzyme sphingomyelinase.
- (.....) Warfarin is a synthetic compound that inhibits the formation of active prothrombin
- (.....) Actinomycin D exerts their cytotoxic effect by intercalating into the narrow groove of the DNA double helix.
- (.....) DNA polymerase II fills up gaps between Okazaki fragments to form lagging strands
- (.....) DNA that contains high concentrations of A and T denatures at a higher temperature than G- and C-rich DNA.

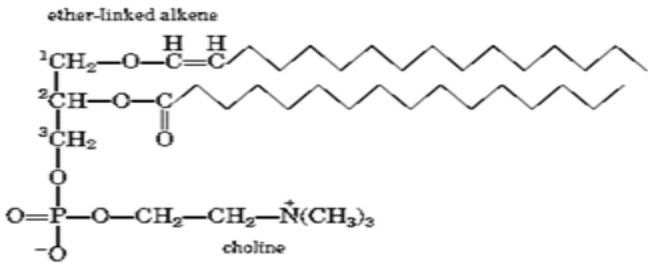
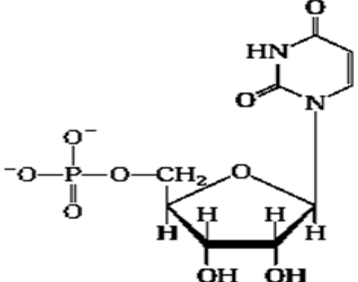
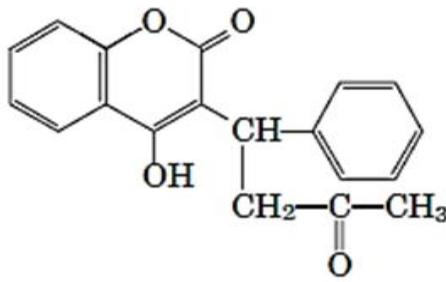
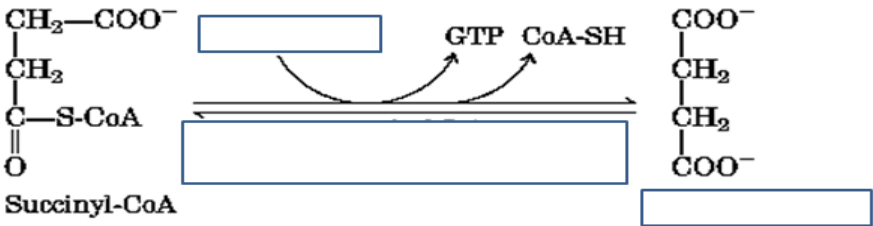
**Question (2) Select and circle the correct answer from the following:(15Marks)**

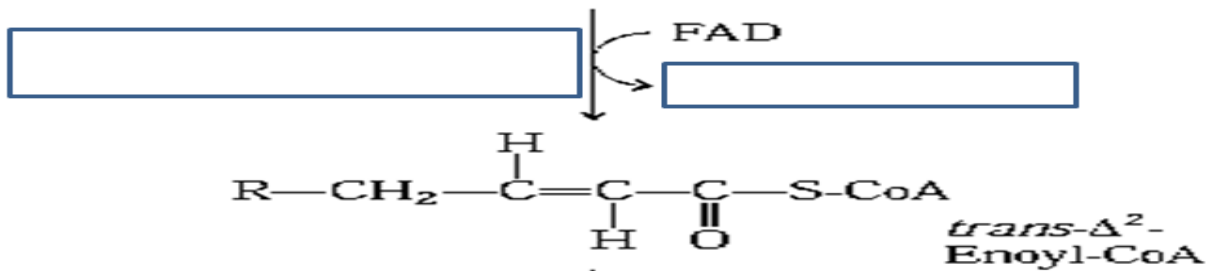
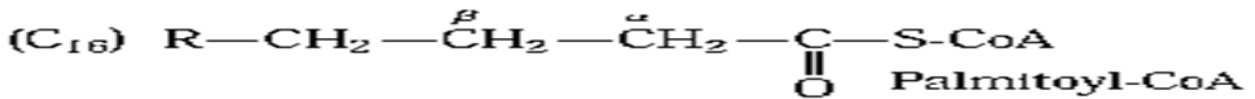
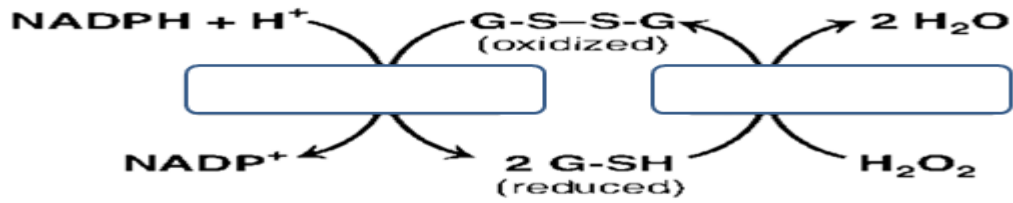
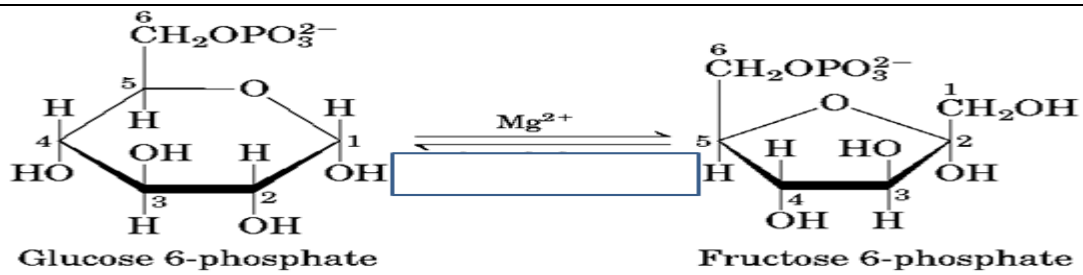
<b>1-</b>	<b>A purine nucleotide is</b>		
(a)	AMP	(b)	UMP
(c)	CMP	(d)	TMP
<b>2-</b>	<b>The number of double bonds in Linolenic acid is</b>		
(a)	3	(b)	4
(c)	5	(d)	12
<b>3-</b>	<b>An example of a saturated fatty acid is</b>		
(a)	Palmitic acid	(b)	Linolenic acid
(c)	Linoleic acid	(d)	Oleic acid
<b>4-</b>	<b>Glycosphingolipids are a combination of</b>		
(a)	Ceramide with one or more sugar residues	(b)	Glycerol with galactose
(c)	Sphingosine with galactose	(d)	Sphingosine with phosphoric acid
<b>5-</b>	<b>All the following have 18 carbon atoms except</b>		
(a)	Palmitic acid	(b)	Linoleic acid
(c)	Linolenic acid	(d)	Stearic acid
<b>6-</b>	<b>Dietary fats after absorption appear in the blood as</b>		
(a)	Chylomicron	(b)	VLDL
(c)	LDL	(d)	HDL
<b>7-</b>	<b>Free fatty acids are transported from adipose tissues to other cells in the blood</b>		
(a)	In unbound free salts	(b)	Combined with albumin
(c)	Combined with $\beta$ -lipoprotein	(d)	Combined with fatty acid binding protein
<b>8-</b>	<b>Niemann-Pick disease is caused by a rare genetic defect in the enzyme:</b>		
(a)	Sphingomyelinase	(b)	Glucocerebrosidase
(c)	Galactocerosidase	(d)	None of these
<b>9-</b>	<b>The enzymes of <math>\beta</math>-oxidation of are found in</b>		
(a)	Cytosol	(b)	Mitochondria
(c)	Golgi apparatus	(d)	Nucleus
<b>10</b>	<b>Which of the following contains a five-carbon ring originating from the chain of arachidonic acid.</b>		
(a)	Prostaglandins	(b)	Thromboxanes
(c)	Leukotrienes	(d)	None of these
<b>11-</b>	<b>The lipoprotein richest in cholesterol is</b>		
(a)	Chylomicrons	(b)	LDL
(c)	VLDL	(d)	HDL
<b>12-</b>	<b>Which of the following is omega-3 polyunsaturated fatty acid?</b>		
(a)	Oleic acid	(b)	Linolenic acid
(c)	Linoleic acid	(d)	None of these
<b>13-</b>	<b>The chemical name of guanine is</b>		
(a)	2,4-Dioxy-5-methylpyrimidine	(b)	2-Amino-6-oxypurine
(c)	2-Oxy-4-aminopyrimidine	(d)	2, 4-Dioxypyrimidine
<b>14-</b>	<b>The carbon of the pentose in ester linkage with the phosphate in a nucleotide</b>		

	<b>structure is</b>		
(a)	C <sub>3</sub>	(b)	C <sub>4</sub>
(c)	C <sub>5</sub>	(d)	C <sub>1</sub>
<b>15-</b>	<b>In glycerophospholipids, a polyunsaturated fatty acid is commonly attached to which of the following carbon atom of glycerol?</b>		
(a)	Carbon 2	(b)	Carbon 1
(c)	Both (A) and (B)	(d)	None of these
<b>16-</b>	<b>The sugar moiety present in RNA is</b>		
(a)	Ribulose	(b)	Arabinose
(c)	Ribose	(d)	Deoxyribose
<b>17-</b>	<b>Double helical structure model of the DNA was proposed by</b>		
(a)	King and Wooten	(b)	Peter Mitchell
(c)	Watson and Crick	(d)	Pauling and Corey
<b>18-</b>	<b>Oxidation of odd-number fatty acids (propionate 3C) produces</b>		
(a)	Succinate	(b)	Fumarate
(c)	Succinyl-CoA	(d)	Acetoacetyl-CoA
<b>19-</b>	<b>Ketone bodies are synthesized in</b>		
(a)	Adipose tissue	(b)	Muscles
(c)	Brain	(d)	Liver
<b>20-</b>	<b>An enzyme required for the synthesis of ketone bodies is</b>		
(a)	HMG CoA synthase	(b)	Acetyl CoA carboxylase
(c)	Pyruvate dehydrogenase	(d)	HMG CoA reductase
<b>21-</b>	<b>Before entering the Krebs cycle, pyruvate is converted to</b>		
(a)	Glucose.	(b)	Oxaloacetate.
(c)	H <sub>2</sub> O and CO <sub>2</sub> .	(d)	Acetyl-CoA
<b>22-</b>	<b>A single "turn" of the Krebs cycle will yield</b>		
(a)	1 ATP, 2 NADH, and 1 FADH <sub>2</sub>	(b)	1 ATP, 2 NADH, and 1 FADH <sub>2</sub>
(c)	1 ATP, 3 NADH, and 1 FADH <sub>2</sub>	(d)	1 ATP, 3 NADH, and 2 FADH <sub>2</sub>
<b>23-</b>	<b>Okazaki fragments are small bits of</b>		
(a)	RNA only	(b)	DNA only
(c)	RNA with DNA heads	(d)	DNA with RNA heads
<b>24-</b>	<b>The initial reaction of the Krebs cycle involves the addition of a</b>		
(a)	2-carbon molecule to a 4-carbon molecule	(b)	2-carbon molecule to a 5-carbon molecule
(c)	2-carbon molecule to a 6-carbon molecule	(d)	3-carbon molecule to a 4-carbon molecule
<b>25-</b>	<b>The backbone of phospholipids is</b>		
(a)	L-glycerol 1-phosphate	(b)	L-glycerol 3-phosphate
(c)	D-glycerol 3-phosphate	(d)	<i>sn</i> -glycerol 1-phosphate
<b>26-</b>	<b>Nucleic acid show strong absorption at one of the wavelength:</b>		
(a)	260 nm	(b)	280 nm
(c)	360 nm	(d)	220 nm
<b>27-</b>	<b>In electron transport chain, which of the following complexes pump protons into intermembrane space of mitochondria except</b>		
(a)	Succinate dehydrogenase	(b)	Cytochrome bc <sub>1</sub>
(c)	NADH dehydrogenase	(d)	Cytochrome c oxidase

<b>28-</b>	<b>Cori's cycle transfers</b>	
(a)	Glucose from muscles to liver	(b) Lactate from muscles to liver
(c)	Lactate from liver to muscles	(d) Pyruvate from liver to muscles
<b>29-</b>	<b>Congenital galactosaemia can lead to</b>	
(a)	Mental retardation	(b) Premature cataract
(c)	Death	(d) All of the above
<b>30-</b>	<b>In the process of transcription, the flow of genetic information is from</b>	
(a)	DNA to RNA	(b) DNA to protein
(c)	RNA to protein	(d) DNA to DNA

**Question (3) Name or draw the structural formula of the following molecules :(10 Marks)**

<p style="text-align: center;"><b>Tristearin</b></p>	<p style="text-align: center;"><b>Oleic acid(C<sub>18</sub>:1)</b></p>
	<p style="text-align: center;"><b>Thymine</b></p>
	
	



**Question (4) Answer the following questions (A)+(B):(5 Marks)**

(A) Two base pairs taken from two pieces of nucleic acids are shown below. Identify the bases shown in the figure (you can use one-letter abbreviations) and the type of nucleic acid.



(B) MATCHING. Choose the item in column 2 that best matches each item in column 1.

Match the following

	Column 1	Column 2
1-	Glycolysis	the production of glucose from non carbohydrate sources
2-	Gluconeogenesis	the conversion of glucose into carbohydrate molecules containing phosphate groups and five carbon atoms
3-	Glycogenolysis	the conversion of glucose into pyruvate
4-	Pentose phosphate pathway	the conversion of glycogen into glucose
5-	Glycogenesis	the conversion of glucose into glycogen

**Question (5) Answer the following questions (A)+(B)+(C)+(D): (10 Marks)**

(A) A deficiency of one of the key enzymes required for the entry of fructose into intermediary metabolic pathways can result in (hereditary fructose intolerance, **HFI**), **Write down the characteristics of the hereditary fructose intolerance.**

1-	
2-	
3-	
4-	
5-	

(B) Erwin Chargaff and his colleagues studied the DNA molecules of different organisms, led Chargaff to the conclusions. **Write down these conclusions?**

1-	
2-	
3-	
4-	

(C) Using the net equation to explain why **gluconeogenesis** is considered energetically expensive, but essential?

(D) **How many turns** of the fatty acid oxidation cycle are required for complete oxidation of **arachidic acid** (  $C_{20}:0$ ) to acetyl-CoA? And calculate how many ATPs will be produced from its complete oxidation to  $CO_2 + H_2O$  ?

**End of Questions**

*Good Luck*