Biomedical Engineering

Biochemistry
Course Code : BME 291
Level : 200
Allowed Time : 2 hours
Second Semester 2016 /2017
Final term exam
50 marks

Faculty Of Engineering
20-05-2017

Model Answer of Biochemistry exam

Question (1): Complete the following sentences: **(17 marks, 0,5 mark/each)**

1- Oxidation of the last hydroxyl group of glucose leads to the production of **glucuronic acid** while the reduction of the aldehydic group of ribose leads to the production of **ribitol**

2- The branched part of starch is known as **amylopectin** while the linear part is known as **amylose**

3- The presence of bacteria in sugar media leads to the production of **dextran**

4- Cellulose is composed of **glucose** units.

5- Stearic acid is composed of **18 carbons** while caproic acid is composed of **6 carbons**.

6- Manufacture of margarine depends on **hydrogenation** of fatty acids.

7- Lecithin is hydrolysed by **lecithanse** enzyme and produces **lysolecithin** which has hemolytic action.

8- The first lipoprotein formed **is chylomicron** that is composed mainly from **dietary TG**

9- The type of lipid characterized by a carbon skeleton consisting of four fused rings is known as **sterol**

10- In alkaline solution, the **Carboxy** group of amino acid is ionized while **amino** group is ionized in acidic solution.

11- Examples of two branched amino acids are **valine, leucine and isoleucine**

12- An example of acidic amino acid **is glutaminc, aspartic** while an example of sulfur containing amino acid is **cysteine, methionine**

13- Methionine is classified as **essential** while glycine is classified as **nonessential** regarding the nutritional value.

14- The folds of secondary structure of protein result from **hydrogen** bonds while the tertiary protein structure is stabilized by other bonds such as **hydrophobic and ioninc, covalent bonds**

15- The phospholipid bilayer is composed of **hydrophylic head and hydrophobic** tail.

16- The driving force for passive transport across the cell membrane is **concentration gradient**

17- The solution that causes shrinkage in red blood cells is described as **hypertonic** regarding tonicity.

18- The protein part of holoenzyme is known as **apoenzyme** while the nonprotein part that is loosely attached to the enzyme is known as **cofactors**

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19- The backbone of polynucleotides is composed of **pentose and phosphate** linked together by **phosphodiester** bonds.

Question (2): Give the name of each of the followings: **(14 marks, 1 mark/each)**

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No.	Statement	Answer
1	Two sugar molecules that are mirror images to each others.	enantiomer
2	The sodium or potassium salts of fatty acids.	soap
3	The phospholipid composed of 3 glycerol molecules.	cardiolipin
4	A protein composed mainly of hydroxyproline and hydroxylysine.	collagen
5	Unfolding of protein structures without affecting the peptide bonds.	denaturation
6	The basic unit of structure and function in the human body.	cell
7	The type of fatty acids preferred in the cell membrane at cold temperature.	unsaturated
8	The diffusion of a solvent across a cell membrane.	osmosis
9	A carrier protein that binds two dissimilar solutes and transport them together across a membrane.	symport
10	Activation of trypsinogen in the presence of trypsin.	autocatalysis
11	The type of enzyme specificity that differentiates between cis and trans isomers.	stereospecificity
12	A molecule that is similar to the substrate and binds to enzyme active site inhibiting its activity.	Competitive inhibitor
13	The type of DNA used as vectors in recombinant DNA technology.	plasmid
14	The type of RNA that carries the genetic information from nuclear DNA to the cytosol.	mRNA

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Question (3): Choose the correct answer for statements in column A from column B and write the answer letter in answer column: **(11 marks, 1 mark/each)**

No	Column A	Answer letter		Column B
1	Disaccharide composed of glucose and galactose	I	A	Galactose
2	Unsaturated fatty acid 18:3(9,12,15)	P	B	lysine
3	Amino acid classified as glucogenic and ketogenic amino acid.	B	C	Linoleic acid
4	Muscles characterized by strong involuntary contraction.	G	D	Lactate dehydrogenase
5	Ketohexose	L	E	Induced fit theory
6	Enzyme has 5 isoenzymes	D	F	Sucrose
7	Enzyme is rigid and has fixed active site	N	G	Cardiac muscles
8	γ-Glutamyl-cysteinylglycine	H	H	Glutathione
9	Immobilized enzyme application	K	I	Lactose
10	The complementary base for adenine	Q	J	Leucine
11	The protein required for DNA folding in the nucleus.	R	K	Glucose strips
			L	Fructose
			M	Smooth muscles
			N	Lock and key theory
			O	Histidine
			P	Linolenic acid
			Q	Thymine
			R	Histone

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Question (4): Determine whether the following sentences are correct or wrong and correct the underlined words in case of wrong statements: **(4 marks, 1 mark/each)**

1- The components of the cell membrane **move in two dimensions.** **Answer: Correct**
2- Histidine is an example of amino acid with **uncharged polar side chain.** **Answer: wrong- charged polar**
3- Phosphatidic acid has **choline nitrogen base.** **Answer: Wrong- no nitrogen base**
4- A high Km value reflects **low affinity** of enzyme for substrate. **Answer: Correct**

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Question (5): Answer all the following questions: **(4marks, I mark/each)**

1- Explain why soap has detergent action. **After the nonpolar R groups in the soaps bind to lipids in the skin or clothing, the ionized carboxyl group can pull this bound lipid into the water phase.**
2- Enumerate two factors that disrupt the α-helix structure of protein. **1- Proline.** **2- Charged amino acids** **3- Amino acids with bulky side chains**
3- Enumerate two factors that control rate of diffusion across the cell membrane.

1- The steepness of the concentration gradient.

2- Temperature.

3-The surface area

4- The type of molecule or ion diffusing.

4- Explain why rate of enzyme reaction decreases after certain level of substrate concentration.

the saturation with substrate of all available binding sites on the enzyme.

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End of Questions

Examination Committee

Dr. Mohamed El-Mesery