BIO 303 MIDTERM SOLVED

1) Vo is expressed_____ volume. **(Total),**

2) Study of fermentation is called____ **(Fermentology)**

3) If K.eq is_____ delta GO is positive. **(Less than 1.0)**

4) When the products of a reaction are less complex and more disordered than the reactants, the reaction is said to proceed with a _____ **(Gain in entropy)**

5) RNA is a polymer of_____ **(Ribonucleotides)**

6) RNA molecule is a single strand _____to only one of the two strands of a gene **(Complementary)**

7) Is essentially expensive but essential glycolysis _____ **(Gluconeogensis)**

8) Gluconeogensis and glycolysis shared.... Reversible steps_____ **(3)**

9) In surface technique which of the following are used_____ **(Both liquid and solid)**

10) The reaction catalysed by DNA photolyase is an example of_____ **(Free-radical reactions)**

11) In biochemistry and pharmacology, a ligand meant by_____ **(Binding)**

12) Arthur Harden and William Young tested their hypothesis on_____ enzymes, products, substrate **(All)**

13) Lipases hydrolyzing enzymes of_____ **(Lipid)**

14) IUB Classification of Enzymes Aldolases is ____ **(Aldehyde)**

15) NAD and NADH are differ due to____ **(Phosphate)**

16) Oxidation reduction reaction Loss or gain of _____ **(Electron)**

17) Two strands of DNA are_____ to each other. **(Ant parallel)**

18) 80% of RNA is_____ **(Ribosomal RNA)**

19) Transformation of RNA into DNA is also known as_____ **(Reverse Transcription)**

20) Ligand binds at_____ site. **(Binding)**

21) Animals use chemical fuel as_____ **(Heat and motion)**

22) _____is placed in liquid medium. **(Submersion)**

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Subjective

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17) Define 1st law of thermodynamics. (2)

The first law is the principle of the conservation of energy: it states that "for any physical or chemical change, the total amount of energy in the universe remains constant; energy may change form or it may be transported from one region to another, but it cannot be created or destroyed."

18) Write two ketone bodies in cell body. (2)

Acetoacetate and –hydroxybutyrate

19) What are Thioalcohals? 2

Kinases: enzymes that catalyze phosphoryl group transfer ..e g hexokinase transfers Phosphoryl group from ATP to glucose in glycolysis. Thioalcohols (thiols): the oxygen atom of an alcohol is replaced with a sulfur atom

20) How ribonucleotides held together? 2

The ribonucleotides are held together by 3´- 5´ phosphodiester bonds.

21) Write 5th step of glycolysis and name of enzymes. (3)

• step 1: The first step in glycolysis is phosphorylation of glucose at the hydroxyl group on C-6 by a family of enzymes called hexokinases to form glucose-6- phosphate (G6P).

• step 2: The D-glucose 6-phosphate thus formed is converted to D-fructose 6- phosphate,

• step 3: which is again phosphorylated, this time at C-1, to yield D-fructose 1,6- bisphosphate • For both phosphorylations, ATP is the phosphoryl group donor.

• step 4: Fructose 1,6-bisphosphate is split to yield two three-carbon molecules, dihydroxyacetone phosphate and glyceraldehyde 3-phosphate (step 4); this is the "lysis" step that gives the pathway its name.

• step 5: The dihydroxyacetone phosphate is isomerized to a second molecule of glyceraldehyde 3-phosphate (step 5), ending the first phase of glycolysis.

22) What are lyases? Give example. (3)

Theses enzymes catalyze the addition of NH_3, H_2O or CO_2 to double bonds or the removal of these groups leaving behind double bonds. Lyases are included in a separate class because they catalyze these reactions by means other than hydrolysis or oxidation, for example Ennolase and Fumarate.

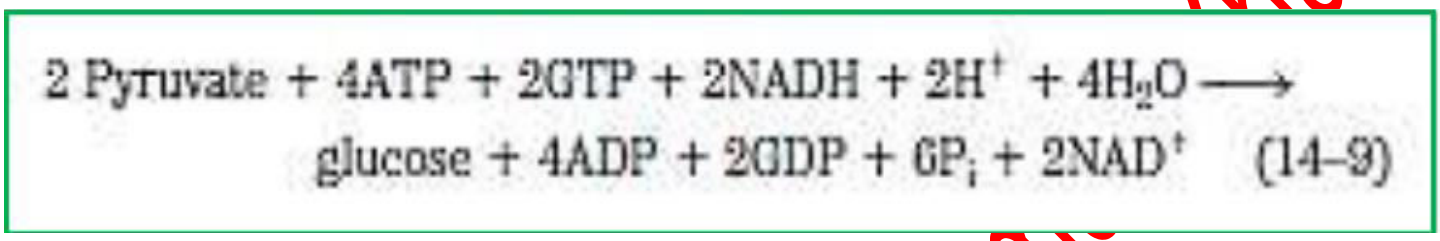
23) What is the net yield of ATP per molecule of glucose and How? 3

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The net yield is two molecules of ATP per molecule of glucose, because two molecules of ATP were invested in the preparatory phase.

• Pyruvate is the end product of the second phase of glycolysis. For each glucose molecule, two ATP are consumed in the preparatory phase and four ATP are produced in the payoff phase, this gives a net yield of two ATP per molecule of glucose converted to pyruvate. Each phosphoryl group, represented here as P, has two negative charges

24) Write equation of gluconeogenesis? 3



25) Difference between DNA and RNA 5 steps? (5)

Differences between DNA and RNA

Although sharing many features with DNA, RNA possesses several specific differences.

Size: They are considerably smaller than DNA

Sugar: In RNA, the sugar moiety to which the phosphates and purine and pyrimidine bases are attached is ribose rather than the 2'-deoxyribose of DNA.

Pyrimidine: The pyrimidine components of RNA differ from those of DNA.

Instead of thymine, RNA contains the ribonucleotide of uracil.

Thymine is present in the rare case of tRNA

Single Strand: RNA typically exists as a single strand whereas DNA exists as a double-stranded helical molecule.

26) What are thioesters? (5)

• Thioesters contain a sulfur atom in the position occupied by an oxygen.

• Thioesters have large, negative standard free energy change of hydrolysis.

• Hydrolysis of acetyl-coenzyme A.. important in metabolism and has a large, negative, standard free energy of hydrolysis.

• The acyl group in these compounds is activated for trans-acylation, condensation or oxidation-reduction reactions.

• Hydrolysis of the ester bond generates a carboxylic acid

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• ΔG' 0 = -31,4 kj/mol for acetyl-CoA hydrolysis

Acetyl coenzyme A is one of many thioesters

27) Write steps of synthesis of Phosphoenolpyruvate from Pyruvate? 5

Conversion of Pyruvate to Phosphoenolpyruvate:

• The first of the bypass reactions in gluconeogenesis is the conversion of pyruvate to phosphoenolpyruvate (PEP).

• This reaction cannot occur by simple reversal of the pyruvate kinase reaction

• Instead, the phosphorylation of pyruvate is achieved by a sequence of reactions that in eukaryotes requires 2 enzymes in both the cytosol and mitochondria.

• Pyruvate is first transported from the cytosol into mitochondria or is generated from alanine within mitochondria by transamination, in which the alpha -amino group is transferred from alanine (leaving pyruvate) to an alpha-keto carboxylic acid

• In mitochondria, pyruvate is converted to oxaloacetate in a biotin (coenzyme)-requiring reaction catalyzed by pyruvate carboxylase, a mitochondrial enzyme.

Pyruvate carboxylase is the first regulatory enzyme in the gluconeogenic pathway

• Pyruvate carboxylase requires acetyl-CoA as a positive effector. (Acetyl-CoA is produced by fatty acid oxidation)

• The mitochondrial membrane has no transporter for oxaloacetate, before export to the cytosol the oxaloacetate formed from pyruvate must be reduced to malate by mitochondrial malate dehydrogenase, at the expense of NADH

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