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- B) As one molecule of FADH_2 oxidized, 2 molecules of ATP are produced
 C) NADH and FADH_2 are important cofactors in cellular respiration
 D) The final electron acceptors of aerobic respiration are oxygen molecules
 E) None of the above
21. Which one of the following is incorrect?
 A) Genetics is the study of heredity
 B) DNA stores genetic information
 C) Genes are segments of DNA that codes for specific protein
 D) Phenotypic characters influenced by the interaction of genes and environments
 E) None of the above
22. Which of the following enzymes are responsible to unzip and open the helix DNA during DNA re
 A) Ligases
 B) Helicases
 C) DNA polymerases I
 D) Primases
 E) All of the above
23. Which of the following occurs during prophase?
 A) Chromosomes align at the center of the cell
 B) Separation of sister chromatids
 C) Nuclear envelope reappears
 D) Chromosomes become condense
 E) Spindle apparatus is disappeared
24. Which of the following mutation occurs when one base is replaced by other base in the DNA base
 A) Deletion
 B) Addition
 C) Substitution
 D) A and C
 E) None of the above
25. In a cross between a homozygous dominant parent and a homozygous recessive parent, what is the
 offspring having the dominant phenotype?
 A) 25% B) 50% C) 75% D) 100% E) None of the above

Part IV. Fill the following blank spaces with appropriate words or phrases (1 point each)

1. _____ is type of molecule that causes enzymes to lose their activity either tempo
 permanently.
 2. _____ is a process which takes place inside cells to release energy by breakin
 the presence of oxygen.

Part V. Give correct definition for the following biological terms on the separate sheet provide

- Anabolism
- Substrate level phosphorylation
- Oxidative phosphorylation
- Biosynthesis
- Codons and anticodons

Part VI. Write the correct answer for the following questions briefly (1 point each).

- What is the difference between light dependent and light independent reactions of photosynthesis?
- List the three phases of catabolism within the cells.
- What could be the blood group of the child born from a mother with blood group A and a father with blood group B? (If couples are heterozygous)



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- A) Metabolism refers to chemical reactions within each cell
 B) Metabolism provides energy for vital processes
 C) Metabolism synthesizes new organic materials
 D) Photosynthesis is an example of metabolism
 E) None of the above
3. All of the followings are true about C4 plants that undergo C4 pathway except—
 A) They fix carbon and produce 4C compound at first
 B) They closed their stomata at the day time to capture CO₂
 C) They undergo photosynthesis pathway only in mesophyll cells
 D) They are plants that live in hot areas
 E) All are true
4. How many ATP molecules are produced with complete catabolism per glucose molecule in glycolysis?
 A) 36 B) 38 C) 24 D) 4 E) 2
5. One of the following cellular structures is the site for breaking down of glucose into pyruvate
 A) Plasma membrane D) Mitochondrion
 B) Nucleus E) Golgi apparatus
 C) Cytoplasm
6. Which one of the following enzymes contains only proteins?
 A) Holoenzymes D) Co-enzymes
 B) Simple enzymes E) None of the above
 C) Metalloenzymes
7. Which of the following is not correct about DNA replication?
 A) DNA replication is bidirectional
 B) It occurs at the appropriate time in the life of the cell
 C) The nucleotides are added in 3' to 5' direction during DNA replication
 D) DNA replicates semi-conservatively
 E) None of the above
8. The process in which ribonucleic acid (RNA) is synthesized from DNA is called—
 A) Translation D) A and C
 B) Replication E) None of the above
 C) Transcription
9. Which of the following statement is true about enzymes?
 A) Enzymes can be consumed during reaction
 B) Increasing the substrate concentration has no effect on the enzymes activity
 C) All enzymes can function at the same pH and temperature
 D) Enzymes lower activation energy
 E) All of the above
10. Which one of the following bond joins the two strands of DNA molecule?
 A) Hydrogen bond D) Ionic bond
 B) Peptide bond E) None of the above
 C) Glycosidic bond
11. Which of the following enzyme is involved in regulating of glycolysis process in the cell?
 A) Aldolase D) Enolase
 B) Phosphohexose isomerase E) All of the above
 C) Hexokinase



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12. The following lists are steps of enzymatic reaction. Based on the given information, which one is the correct sequence of biochemical reaction?

1. Enzyme-substrate complex formed
2. Enzyme recycled
3. Substrate transformed into products
4. Substrate approaches to enzyme active site
5. Products released

- A) 4, 1, 3, 2, 5
B) 4, 2, 1, 3, 5
C) 4, 1, 3, 5, 2
D) 4, 1, 3, 2, 5
E) 5, 4, 2, 1, 3

13. Which of the following is not true regarding ATP generation in electron transport chain?

- A) ATP is generated when hydrogen ions are pumped into mitochondrial matrix by ATP synthase
- B) It is a stage in cellular respiration in which most of ATP molecules are produced
- C) ATP is generated by substrate level phosphorylation in the system
- D) It is the system which consists of an array of protein complexes inserted in the inner of mitochondrial membrane
- E) None of the above

14. The citric acid cycle oxidizes pyruvate and some of the intermediates in the pathway are used as starting materials for biosynthesis of many molecules. This means the citric acid cycle is _____

- A) Anabolic pathway only
- B) Catabolic pathway only
- C) Anabolic pathway
- D) Amphibolic pathway
- E) None of the above

15. What does the term optimum mean for enzyme temperature?

- A) The lowest temperature at which the enzyme works
- B) The temperature which gives the highest enzyme activity
- C) The highest temperature before denaturing occurs
- D) Moderate temperature at which moderate enzyme activity
- E) None

16. Which one of the following metabolic disorder is caused by defects in fatty acid oxidation?

- A) Albinism
- B) Gaucher's disease
- C) Diabetes insipidus
- D) Forber's disease
- E) None of the above

17. Which one of the following is incorrect?

- A) Competitive inhibitors compete with the substrates for the active sites of enzymes
- B) Noncompetitive inhibitors do not compete for active site of enzymes with substrates
- C) Activator molecules bound to an allosteric site and induce enzyme reaction at the active site
- D) A and B
- E) None of the above

18. Which one of the following is incorrect?

- A) Fats are reactants of cellular respiration
- B) Proteins are reactants of cellular respiration
- C) Carbohydrates are reactants of cellular respiration
- D) Minerals are reactants of cellular respiration
- E) None of the above

19. If one strand of DNA is 5' CAGGTTACG 3' the complementary strand will be

- A) 5' GTCCAATGC 3'
- B) 3' GTCCTTACG 5'
- C) 3' CAGGTTACG 5'
- D) 3' GTCCTTACG 5'
- E) 3' GTCCAATGC 5'

20. Which of the following is incorrect?

- A) As one molecule of NADH oxidized, 3 molecules of ATP are produced



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Department of Biology
General Biology (Biol-1012) Final Exam (50%) for second semester 2012 E.C. freshman in
natural sciences and natural science teaching.
Date of exam: 23th of Megabit, 2013 E.C.
Name ZENEBE Baye ID No. 170349 Section 1A Sign _____

PART I Write "TRUE" if the statement is correct and "FALSE" if it is incorrect on the provided (1 point each).

1. All metabolic reactions occur in the cytosol of all cells.
2. DNA replication occurs inside the cytoplasm of eukaryotic cells.
3. Carbohydrates are synthesized from ATP, NADPH, H^+ and CO_2 during light dependent reaction of photosynthesis.
4. A total of two molecules of net ATP are produced per glucose during glycolysis.
5. Metabolic reactions are taking part in assembling of macromolecules into cellular structures.
6. Glucose is an immediate source of energy for cells at work.
7. Metabolites are the reactants and products of anabolic and catabolic chemical reactions.
8. All known biologically catalytic enzymes are proteins with no exceptions.
9. Isoenzymes are enzymes which differ in amino acid sequence but catalyze the same chemical reaction.
10. In metabolic pathway the substrate of catabolic reaction may serve as the product of anabolic reaction.

Part II Match the followings from column "B" to "A" and write the letter of your choice on the provided (1 point each).

- | A | B |
|----------------------|---|
| 1. Carbon fixation | A. Conversion of most of G3P to ribulose 1,5-bisphosphate |
| 2. Reduction | B. Incorporate CO_2 molecules into ribulose 1,5-bisphosphate |
| 3. Regeneration | C. Conversion of 3-phosphoglycerate to glyceraldehyde-3-phosphate |
| 4. Glycolysis | D. Generate energy through proton gradient and by ATP synthase |
| 5. Citric acid cycle | E. Generate energy through the oxidation of acetate |
| | F. Glucose is metabolized to 3C units |

Part III. Choose the best answer and write the letter of your choice on the answer sheet (1 point each).

1. Which one of the following statement is correct about Catabolism?
 - A) The process that builds more complex compound
 - B) The process that requires energy
 - C) It can be a process like glycogen becoming glucose
 - D) A and B
 - E) None of the above
2. Which one of the following is incorrect?



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