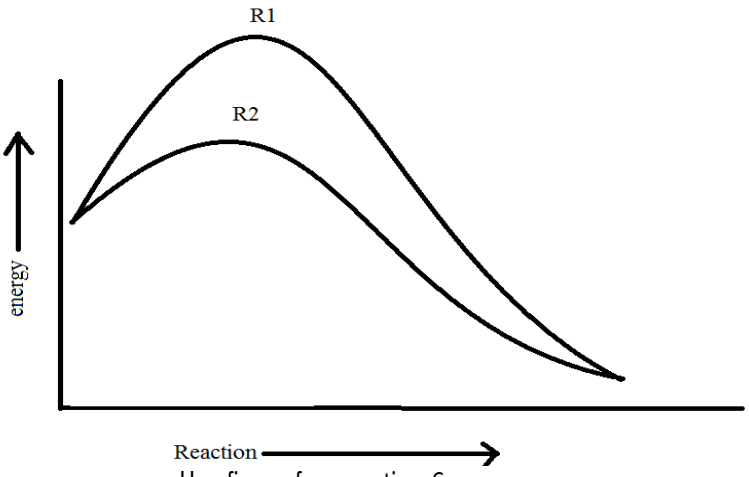
Mock Exam 2

1. Amino acids are joined together by peptide bonds to form polypeptide chains. This is an example of:
    a. Positive Feedback
    b. Anabolism
    c. Catabolism
    d. Hydrolysis
    e. Negative Feedback
2. Several muscle cells are extracted from an organism and placed in to a beaker containing a glucose solution. Which of the following would you expect to be an observation?
    a. The temperature of the solution decreases
    b. The temperature of the solution increases
    c. The volume of the solution increases
    d. The solution becomes cloudy
3. Exergonic reactions utilize _____ to do work and become _____.
    a. Kinetic energy, more stable
    b. Kinetic Energy, less stable
    c. Free Energy, less stable
    d. Free Energy, more stable
4. A reaction is carried out without an enzyme and then with an enzyme. What would you expect the difference to be, if any, between the two reactions?
    a. Change in E_a
    b. Change in ΔG
    c. No change
    d. Change in reactant concentration
    e. Change in product concentration
5. How does the shape of an enzyme change when its substrate binds?
    a. The enzyme undergoes a complete shape change
    b. Nothing, the enzyme and substrate fit together like a lock and key
    c. The enzyme molds around its substrate
    d. The polypeptide chains that comprise the enzyme unwind



Use figure for question 6

6. Which of the reaction curves shown has a higher ΔG?
    a. Reaction 1 because it has a higher maximum energy
    b. Reaction 1 because there is a greater difference between the transition state energy and the product energy
    c. Reaction 2 because it has a lesser difference between the transition state energy and the product energy
    d. Reaction 2 because the energy of its transition state is lower in energy than the transition state of Reaction 1
    e. Neither reaction1 nor 2
7. The concentration of an enzyme before a reaction is 0.001 M. What would be the concentration of the enzyme after the reaction?
    a. 0.0001
    b. 0.002
    c. 0.001
    d. The concentration would increase exponentially
8. Succinylcholine is structurally identical to acetylcholine. When succinylcholine is added to a mixture containing acetylcholine and the enzyme that hydrolyzes the compound, the rate of acetylcholine hydrolysis greatly decreases. The best example for this observation is:
    a. Succinylcholine is an allosteric regulator
    b. The activation energy required for the hydrolysis of Succinylcholine is lower than that of Acetylcholine
    c. Succinylcholine is a non-competitive inhibitor
    d. Succinylcholine is a competitive inhibitor
    e. The presence of Succinylcholine converts Acetylcholine into Succinylcholine
9. T/F Allosteric enzymes oscillate between two forms via competitive inhibitors
10. Reducing agents:
    a. Accept electrons
    b. Donate electrons
    c. Cannot be oxidized
    d. Gain a negative charge
    e. None of the above
11. How does Glycolysis differ from the electron transport chain (ETC)?
    a. Glycolysis transfers electrons between carrier molecules while the ETC does not utilize electron carriers
    b. Glycolysis produces no net ATP while the ETC nets ATP and NADH
    c. Glycolysis produces ATP by utilizing phosphates in compounds while the ETC utilizes electron carriers to produce ATP
    d. There is no difference, both processes utilize oxidative phosphorylation
    e. None of the above
12. Which types of enzymes play an important role in substrate-level phosphorylation?
    a. Kinases
    b. Isomerases
    c. Mutases
    d. Enolases

13. What role does phosphofructokinase play in Glycolysis?
    a. It converts molecules into their isomers
    b. It is an allosteric regulator
    c. It transfers phosphate groups
    d. Both A & B
    e. Both B & C
14. Which molecule contains the most chemical energy?
    a. Fructose 6-phosphate
    b. Glucose-6-phosphate
    c. 1,3-bisphosphoglycerate
    d. Glyceraldehyde 3-phosphate
15. During the conversion of glyceraldehyde 3-phosphate (G3P) to 1,3-bisphosphoglycerate:
    a. NAD^+ is oxidized to NADH and the sugar is oxidized
    b. NAD^+ is reduced to NADH and the sugar is oxidized
    c. Electrons are lost as water
    d. ATP is used to add a phosphate group to G3P
16. What would happen to cellular respiration if coenzyme A could not be synthesized?
    a. Glucose could not be broken down
    b. Glycolysis could not occur
    c. The Citric Acid Cycle could not occur
    d. The electron transport chain could not occur
    e. All of the above
17. Citrate is formed from the union of:
    a. Malate and Acetyl CoA
    b. Oxaloacetate and Acetyl CoA
    c. Pyruvate and Malate
    d. Pyruvate and Oxaloacetate
18. YOU DON'T HAVE TO KNOW THIS: How many ATP could be produced from the oxidation of ONE Acetyl CoA molecule
    a. 10
    b. 1
    c. 7.5
    d. 8.5
    e. 12
19. What changes occur between isocitrate and alpha-ketoglutarate?
    a. NADH and ATP are produced
    b. NADH and CO2 are produced
    c. Only CO2 is produced
    d. Only NADH is produced
20. A genetic mutation blocks the formation of cristae in the mitochondria. Which process would be affected?
    a. Glycolysis
    b. Citric Acid Cycle
    c. Transition reaction
    d. Electron Transport Chain
    e. All of the above

21. What would happen if the second complex of the electron transport chain was eliminated?
    a. NADH would not be able to bind
    b. $FADH_2$ would not be able to bind
    c. There would be an increase in the amount of ATP created
    d. The electron transport chain would not function at all
22. Fats and proteins can also be used to harness energy. How do these molecules enter cellular respiration?
    a. As G3P
    b. As a pyruvate molecule
    c. They can enter as more than one type of molecule
    d. Acetyl Co-A
23. A cell is actively undergoing cellular respiration. There is not much need for ATP so it begins to accumulate in the cell. How will this affect cellular respiration?
    a. Because ATP is readily available, it will be used to break down glucose and make more ATP
    b. Phosphofructokinase increases its affinity for fructose 6-phosphate
    c. Phosphofructokinase decreases its affinity for fructose 6-phosphate
    d. The active site for hexokinase is blocked, prohibiting the binding of glucose
24. What would happen if a plant lacked its stomata?
    a. The plant would not lose water to evaporation, therefore photosynthetic output would increase
    b. The plant would not lose oxygen through the stomata, therefore photosynthetic activity would increase
    c. The plant would not be able to get CO2, therefore photosynthetic activity would decrease
    d. The plant would not be able to get O2, therefore photosynthetic activity would decrease
    e. The plant would not be able to absorb light therefore photosynthetic activity would decrease
25. You have the ability to design a new type of plant. Which of the following would allow the plant to produce the most amount of energy?
    a. Photosystem I absorbs wavelength 750
    b. Photosystem I absorbs wavelength 380
    c. Plastoquinone absorbs wavelength 750
    d. Plastoquinone absorbs wavelength 380
26. How is the "electron hole" created in a photosystem?
    a. Water is split and the oxygen is released
    b. Electrons are removed from the primary acceptor and transported to the electron transport chain
    c. The absorption of light in photosystem I causes photosystem II to become more positive, creating a hole
    d. Electrons are transferred from chlorophyll a to the primary acceptor
27. While cellular respiration uses _____ to drive the synthesis of ATP, photosynthesis utilizes _____.
    a. Hydrogen ion gradient, the splitting of water
    b. Hydrogen ion gradient, hydrogen ion gradient
    c. Splitting of water, splitting of water
    d. NADH, FADH2

e. Glucose, light

28. Cyclic electron flow differs from linear in that:
    a. Cyclic flow only produces NADPH
    b. Linear flow only produces ATP
    c. Cyclic flow only utilizes photosystem I
    d. Cyclic flow uses a different type of chlorophyll a molecule
29. Why are C_4 plants more suited for hot, dry climates than C_3 plants?
    a. They do not close their stomata in hot, dry weather
    b. They evolved in cold weather but migrated to the tropics, where they are now more suitable
    c. They suspend photosynthesis in the heat
    d. They keep fixing carbon dioxide even when the concentration of carbon dioxide in the leaf is low
30. A pair of sister chromatids represents:
    a. Two chromosomes
    b. Two copies of the same DNA
    c. Two copies of different DNA
    d. One copy of the entire genetic code
31. You are staining cells in various stages of the cell cycle. You notice that one cell has a much darker, denser area than the rest of the cells. What part of the cycle is this cell in?
    a. G_1
    b. S
    c. G_2
    d. G_0
32. A mutant liver cell begins mitosis with 14 chromosomes. How many sister chromatids will be present during metaphase?
    a. 28
    b. 14
    c. 7
    d. 21
33. Which phase of mitosis is characterized by "v" shaped chromosomes?
    a. Prophase
    b. Metaphase
    c. Anaphase
    d. Telophase
    e. Interphase
34. Which of the following does not occur during mitosis?
    a. Replication of chromosomes
    b. Migration of chromosomes to opposite poles
    c. Separation of chromatids
    d. Alignment of chromosomes along the cells equator
35. Under the microscope you observe a cell (of unknown type) undergoing mitosis. You see vesicles forming between the two cells. Which type of cell is this?
    a. Animal Cell
    b. Bacterial Cell
    c. Viral Cell

d. Plant Cell
e. You cannot determine the cell's identity from the information provided

36. What consequence would the cell have if the concentration of cyclin was greatly decreased after the G_2 checkpoint?
    a. The cell could not enter mitosis
    b. The cell would enter G_o phase
    c. The cell would be stopped after the S phase
    d. There would be no consequence
37. Which would you expect to see more of during the G_1 phase?
    a. Chromatin
    b. Cdk
    c. Cyclin
    d. MPF
38. What could be a potential effect of exposing healthy cells to radiation?
    a. The cells would proliferate at an exponential rate
    b. The cells would undergo apoptosis
    c. The cells would divide, forming several layers
    d. There would be no effect
39. Under what circumstances would crossing over occur, but not contribute to genetic diversity?
    a. If the cell has too many chromosomes
    b. If the cell has too few chromosomes
    c. If the cell is a gamete
    d. If the cell is a somatic cell
    e. If all of the chromosome pairs have identical alleles
40. If a human cell has 22 autosomes and an X chromosome, it must be:
    a. An egg cell
    b. A sperm cell
    c. A zygote
    d. A & B
    e. A & C
41. When do homologous chromosomes separate?
    a. Prophase I
    b. Prophase II
    c. Anaphase I
    d. Anaphase II
    e. Telophase I
42. T/F: At the end of meiosis I, the cell is haploid
43. A chiasmata can be observed:
    a. During the S phase of interphase
    b. Metaphase I
    c. Metaphase II
    d. Prophase I
    e. The chiasmata occurs during mitosis
44. After meiosis, how do cells regain their diploid number of chromosomes?
    a. Cells undergo S phase without cellular division
    b. Cells undergo mitosis without cytokinesis

c. Fertilization combines two haploid cells
d. They don't
e. They undergo G_0 phase long enough to gain back the missing chromosomes

45. If the DNA content of a diploid cell during G_1 phase is X, what is the DNA content of the cell during metaphase I?
    a. 4X
    b. 2X
    c. X
    d. 0.5X
    e. 0.25X
46. How many chromatids make up homologous chromosomes?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 8
47. What do you have at the end of Meiosis I?
    a. 2 haploid cells
    b. 4 haploid cells
    c. 2 diploid cells
    d. 4 diploid cells
    e. 1 diploid and 1 haploid cell
48. In Meiosis, how many of the daughter cells are identical to the parent cell?
    a. 4
    b. 2
    c. 1
    d. 0
49. Meiosis occurs in:
    a. Egg cells
    b. Gametes
    c. Sperm Cells
    d. Somatic Cells
50. T/F A gamete may undergo Meiosis twice