A supplementary guide to assist students with sample questions from previous exams
A NOTE TO STUDENTS

It has been my experience that acquiring knowledge is achieved more efficiently through active learning. Writing, drawing, gesturing, verbalizing, organizing, outlining, etc., may all be interpreted as active learning techniques. Perhaps the best technique for learning is through question and answer. Sometimes we learn by making a mistake and being corrected. Some of the biggest mistakes I have made on exams are the most remembered. Perhaps you have made a mistake on an exam and shortly thereafter, felt that you could have gotten the right answer. Wouldn’t it be great if you could do that before the exam?

Sample questions can provide students with a better idea of what type of questions to expect on actual exams taken during the semester. The sample questions provided in this packet are being provided to help students study for BIO 1114 (General Biology) exams. However, these sample questions should be used as a study guide and not as the sole source for exam preparation. For best performance on exams, it is recommended that you review your notes and the book thoroughly and THEN test your knowledge using these practice exams.

There are three samples provided in this packet for each of the four lecture exams you will be taking in BIO 1114 (General Biology). This is to provide you with multiple opportunities to simulate the exam experience before taking the actual exam. These exams are designed to take about 45 minutes - the same amount of time allotted for each exam you will be taking in class. There are no examples of the final exam.

While some of the sample questions may be very similar to those you encounter in lecture exams, be careful. The wording of questions may be changed enough to cause a different answer. The key is to understand the question in order to get the right answer.

Jim Bidlack, Ph.D.
University of Central Oklahoma
EXAM I
General Biology 1114
(Dr. Bidlack)

NAME __________________________

Social Security No. _______________________

Section (10:30 or 11:30) __________________

50 questions @ 2 pts. each = 100 pts. total

Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

1. The level of organization of life discussed in lecture which is placed at or follows the level, molecule, and precedes organelle is: a) atom b) tissue c) protein d) cell e) population

2. Smallest unit of life that can exist as a separate entity is a) a multicellular organism b) an organ c) an atom d) a cell e) an enzyme

3. An example of homeostasis is a) ability to make progeny without sexual reproduction b) interaction between an angry cat and a mad dog c) maintenance of body temperature d) survival of the fittest e) entropy


5. Darwin's Theory supports all of the following EXCEPT a) thought-invoked mutations b) mutations which improve chances of survival c) heritable variation d) differential reproduction e) survival of the fittest

6. The copperhead snake (Agkistrodon contortrix) belongs to which Phylum? a) Reptilia b) Chordata c) Animalia d) Mammalia e) Carnivora

7. Members of the Kingdom Monera are distinguished from all the other Kingdoms because they are a) autotrophic b) heterotrophic c) photosynthetic d) procaryotic e) eucaryotic

8. Organisms which are multicellular, eucaryotic, heterotrophic, and often plant or meat eaters are classified in which Kingdom a) Animalia b) Protista c) Fungi d) Plantae e) Monera

9. Elements are composed of all of the following EXCEPT a) electrons b) photons c) neutrons d) protons e) charged particles

10. The type of bond described as a sharing of electrons is a) covalent b) ionic c) hydrogen d) Van der Waal e) salt

11. An abundance of ions in a chemical system which provide resistance to change in pH is an example of what chemical phenomena? a) solubility b) buffering capacity c) ion availability d) oxidation-reduction e) none of the above

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12. Addition of weak acid or base to purple cabbage (water-soluble) extract results in a color change because a) chlorophyll is sensitive to pH b) chlorophyll is sensitive to the redox potential of the surrounding solution c) anthocyanin is sensitive to pH d) proteins in cabbage denature upon addition of acid or base e) it doesn't really change color

13. A solution with an $H^+$ concentration of $10^{-8.97}$ is a) acidic b) basic c) neutral

14. The reaction, acetaldehyde + $2H^+$ + 2 electrons $\rightarrow$ ethanol, represents a) an oxidation of acetaldehyde b) a reduction of acetaldehyde

15. Chemicals can be found in which portion of the cell? a) cell wall b) nucleolus c) lysosome d) chloroplast e) everywhere

16. A characteristic of plant and animal eucaryotes which make them unique from prokaryotes is a) presence of chloroplasts b) absence of a cell wall c) a true nucleus d) absence of DNA e) presence of DNA

Questions 17-21: Write the letter to the left of the item which corresponds to the figure depicted below:

17. Nucleolus
18. Chloroplast
19. Mitochondrion
20. Golgi apparatus (dictyosome)
21. Endoplasmic reticulum
22. Plants can generally be distinguished from animals because they have a) chloroplasts b) a nuclear envelope c) a cell wall d) a and c only e) a, b, and c

23. An organelle which functions as the primary site of cellular respiration is the a) nucleus b) nucleolus c) chloroplast d) mitochondrion e) endoplasmic reticulum

24. Starch and cellulose are composed of a) glucose b) fructose c) a and b d) ribose e) all of the above

25. Porphyrins are molecules which play a major role in a) photosynthesis (chlorophyll) b) oxygen transport (hemoglobin) c) fat storage (glycerol) d) a and b e) all of the above

26. Which class of biological molecules are distinguished from the others because they contain peptide bonds? a) proteins b) carbohydrates c) lipids d) porphyrins e) nucleic acids

Questions 27-32: Write the letter to the left of the item which corresponds to the structure or compound name depicted below:

27. Starch
28. Cellulose
29. Lipid
30. Protein
31. Nucleic acid
32. Chlorophyll

A)

B)

C)

D) (FATTY ACID) C=O - CH₂
(FATTY ACID) C=O - C-H

E) THYMINE

F)
33. Which of the following combinations is (are) considered to be acceptable for pairing in the DNA molecule? a) purine with purine b) adenine with guanine c) pyrimidine with pyrimidine d) thymine with cytosine e) adenine with thymine


35. Enzymes function a) as suppliers of energy b) by lowering the activation energy of a reaction c) as catalysts d) b and c e) all of the above

36. Which of the following can change enzyme activity? a) pH b) temperature c) an allosteric site d) presence or absence of cofactors e) a and b only f) a, b, c, and d

37. The universal “currency” of free energy in the cell is a) glucose b) DNA c) RNA d) CO₂ e) ATP

38. In photosynthesis, light energy is converted into _______ (and) _______, which is used to fix _______ (to form) _______.
   a) Sugars and ATP; NADPH to form Carbohydrates
   b) Protons and Neutrons; ATP to form NADH
   c) ATP and NADPH; CO₂ to form Carbohydrates
   d) Photons and ATP; O₂ to form Water
   e) Energy and Water; ATP to form Carbohydrates

39. When chlorophyll captures a unit of light energy it a) becomes excited b) fixes CO₂ c) oxidizes glucose d) degrades e) produces ATP

40. Cyclic and non-cyclic photophosphorylation can be distinguished from each other on the basis of a) ATP production b) NADPH production c) a and b d) none of the above

41. Use of energy from non-cyclic photophosphorylation to fix CO₂ into carbohydrates is known as a) the TCA cycle b) the Krebs cycle c) glycolysis d) the dark reactions of photosynthesis e) the light reactions of photosynthesis

42. Why is photosynthesis important? a) it harvests light energy and uses it to fix CO₂ into foodstuffs for other organisms b) it provides oxygen for respiratory organisms c) it is essential for life on earth d) a and b only e) a, b, and c

43. After photosynthesis, carbohydrates are often directed through what sequence of events to obtain a good supply of ATP? a) oxidative phosphorylation, reduction, glycolysis b) glycolysis, Krebs cycle, oxidative phosphorylation c) Krebs cycle, glycolysis, oxidative phosphorylation d) glycolysis, oxidative phosphorylation, Krebs cycle e) glycolysis, reduction, Krebs cycle

44. Which of the following is not a component of respiration? a) oxidative phosphorylation b) Calvin cycle c) citric acid cycle d) glycolysis e) Krebs cycle

45. Respiration occurs in what part(s) of the cell? a) cytosol b) mitochondrion c) chloroplast d) a and b e) b and c f) a, b, and c
46. Why is ethanol production a poor alternative for cellular respiration? 
   a) ethanol makes the cell sluggish  
   b) ATP yield from glucose is relatively low when ethanol is 
      produced  
   c) cells cannot metabolize ethanol  
   d) ethanol can spontaneously burst into 
      flames when oxygen is present  
   e) none of the above

47. Oxidative phosphorylation is important to metabolism because it 
   a) phosphorylates proteins to give them energy  
   b) provides an alternative to cyclic photophosphorylation  
   c) couples electron transport and an H⁺ gradient to make ATP  
   d) releases oxygen

48. Where is CO₂ released in respiration? 
   a) glycolysis  
   b) Krebs cycle  
   c) somewhere between glycolysis and Krebs cycle  
   d) b and c  
   e) a, b, and c

48. Which of the following organisms "respire?" 
   a) plants  
   b) animals  
   c) a and b  
   d) neither a nor b

50. Scientists perform this last step as a part of the scientific method 
   a) repeat the test  
   b) make a conclusion  
   c) examine alternative hypotheses  
   d) predict what will happen  
   e) summarize the data
EXAM I  
General Biology 1114  
(Dr. Bidlack)  

NAME ____________________________  
Social Security No. __________________  
Section _________________________  

MULTIPLE CHOICE AND MATCHING (86%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

MATCHING (14%): Match the letter corresponding to the metabolic title, metabolite, or metabolic event depicted in the figure.

SECTION I: MULTIPLE CHOICE AND MATCHING (43 questions at 2 points each = 86 points).

1. The level of organization of life discussed in lecture which follows the level, organ, and precedes tissue is: A) organ B) organ system C) molecule D) cell E) atom

2. According to the definition of life, a virus is A) living B) non-living

3. Genetic material responsible for inheritance and transmission from parent to offspring is called A) water B) enzyme C) Rubisco D) DNA E) glucose

4. What aspect of life is responsible for energy transfer and is defined as the summation of a cell's chemical processes? A) metabolism B) reproduction C) oxidation D) photosynthesis E) mitosis

5. Smallest unit of life that can exist as a separate entity is A) a multicellular organism B) an organ C) an atom D) a cell E) an enzyme

6. Another name for hypothesis is A) question B) induction C) deduction D) test E) conclusion F) a and c only


8. Man, dog, and rabbit belong to A) Kingdom Animalia B) Phylum Chordata C) Class Mammalia D) Order Carnivora E) a and b only F) a, b, and c only G) a, b, c, and d

9. The scientific name of the redbud tree is: A) C. canadensis B) C. canadensis C) Cercis canadensis D) Cercis canadensis E) Cercis canadensis F) a, b, and c only G) a, b, c, d and e

10. Organisms that are almost always photosynthetic autotrophs are members of the Kingdom A) Monera B) Protista C) Fungi D) Plantae E) Animalia

11. The Kingdom Protista can include A) worms B) bacteria C) slime molds D) some algae E) a and c only F) a, b, and c only G) c and d only H) a, c, and e only
12. The type of bond in which a partial negative charge of oxygen is attracted to a partial positive charge of hydrogen is called: A) salt B) Van der Waals C) covalent D) hydrogen E) ionic

13. What element(s) constitute(s) 96% of human weight? A) hydrogen B) nitrogen C) oxygen D) carbon E) a and c only F) a and b only G) a and d only

14. A solution with an $H^+$ concentration of $10^{-4.23}$ is A) acidic B) basic C) neutral

15. The reaction, acetaldehyde $+ 2H^+ + 2$ electrons $\rightarrow$ ethanol, represents A) an oxidation of ethanol B) a reduction of ethanol

16. Which of the following is (are) NOT important for cell metabolism? A) molybdenum B) zinc C) magnesium D) helium E) a and c only F) b and d only

17. A characteristic of plant and animal eucaryotes which make them unique from procaryotes is A) presence of chloroplasts B) absence of a cell wall C) a true nucleus D) absence of DNA E) presence of DNA

Questions 18-23: Write the letter to the left of the item which corresponds to the figure depicted below. Answers may be used only once; not all answers are used.

18. Processing of DNA to make RNA (transcription)

19. Protein synthesis

20. Cellular respiration and ATP formation

21. Regulation of substances moving in and out of cell

22. Intracellular digestion (break-down of unwanted materials)

23. Packaging of proteins for eventual transport
24. Plants can generally be distinguished from animals because they have A) chloroplasts B) a nuclear envelope C) a cell wall D) a and c only E) a, b, and c

25. Starch and cellulose are composed of A) glucose B) fructose C) ribose D) a and b only E) a, b, and c

Questions 26-33: Write the letter to the left of the item which corresponds to the structure or compound name depicted below. Answers may be used only once; not all answers are used.

26. Sucrose
27. Cellulose
28. α-D-Glucose
29. Peptide bond
30. B(1→4) linkage
31. Chlorophyll
32. Phospholipid
33. Phenolic

B

A

C

D

E

F

G

H

I

J

K

L

M

N

10
34. What is another name for a protein that catalyzes metabolic reactions? A)sugar B)sucrose C)ATP D)cofactor E)enzyme

35. Which of the following combinations is considered to be acceptable for pairing in the DNA molecule? A)purine with purine B)adenine with guanine C)pyrimidine with pyrimidine D)thymine with cytosine E)adenine with thymine


37. The universal "currency" of free energy in the cell is A)glucose B)DNA C)RNA D)CO₂ E)ATP

38. In photosynthesis, light energy is converted into ______ (and) _______, which is used to fix ______ (to form) ______.
   A) Sugars and ATP; NADPH to form Carbohydrates
   B) Protons and Neutrons; ATP to form NADH
   C) ATP and NADPH; CO₂ to form Carbohydrates
   D) Photons and ATP; O₂ to form Water
   E) Energy and Water; ATP to form Carbohydrates

39. When chlorophyll captures a unit of light energy it A)becomes excited B)fixes CO₂ C)oxidizes glucose D)degrades E)produces ATP

40. Cyclic and non-cyclic photophosphorylation can be distinguished from each other on the basis of A)ATP production B)NADPH production C)a and b D)neither a nor b

41. Use of energy from non-cyclic photophosphorylation to fix CO₂ into carbohydrates is known as A)the TCA cycle B)the Krebs cycle C)glycolysis D)the dark reactions of photosynthesis E)the light reactions of photosynthesis

42. Why is photosynthesis important? A)it harvests light energy and uses it to fix CO₂ into foodstuffs for other organisms B)it provides oxygen for respiratory organisms C)it is essential for life on earth D)a and b only E)a, b, and c

43. What sequence of events is essential for enabling hereditary material to make you "do the things you do"? A)RNA makes DNA makes protein B)protein makes DNA makes RNA C)DNA makes RNA makes protein D)RNA makes protein makes DNA E)DNA makes protein makes RNA
SECTION II. MATCHING (14 questions at 1 point each = 14 total points). More than one answer may be correct for each question.

1. Glycolysis
2. Calvin cycle
3. Krebs cycle (also called TCA)
4. Non-cyclic photophosphorylation
5. ATP
6. NADPH
7. FADH$_2$
8. CO$_2$ (carbon dioxide)
9. O$_2$ (oxygen)
10. H$_2$O (water)
11. 3-PGA (3-phosphoglyceraldehyde)
12. DHAP (dihydroxyacetone phosphate)
13. RUBISCO (ribulose biphosphate carboxylase / oxygenase)
14. MDH (malate dehydrogenase)
MULTIPLE CHOICE AND MATCHING (100%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

1. Which of the following is (are) living? A)rock B)frog C)bacterium D)virus E)b and c only F)b and d only

2. Genetic material responsible for inheritance and transmission from parent to offspring is called A)DNA B)enzyme C)RUBISCO D)ATP E)glucose

3. Cyclic and non-cyclic photophosphorylation can be distinguished from each other on the basis of A)ATP production B)NADPH production C)a and b D)neither a nor b

4. Respiration occurs in what part(s) of an animal cell? A)cytoplasm B)mitochondrion C)chloroplast D)a and b only E)b and c only F)a, b, and c

5. Smallest unit of life that can exist as a separate entity is A)a multicellular organism B)an organ C)an atom D)a cell E)an enzyme

6. What term associated with pH means "resistance to change?" A)acidity B)basicity C)stubborn D)buffering capacity E)redox potential F)oxidation

7. A cell which lacks a true nucleus is called A)impossible B)eucaryotic C)autotrophic D)heterotrophic E)procaryotic

8. What organelle is responsible for photosynthesis? A)golgi apparatus B)nucleus C)chloroplast D)mitochondrion E)ribosome

9. Polar substances are _______; nonpolar substances are _______.
   A)hydrophilic; also hydrophilic
   B)hydrophilic; hydrophobic
   C)hydrophobic; also hydrophobic
   D)hydrophobic; hydrophilic

10. Name the CLASS to which both dog and man belong A)primates B)carnivora C)mammalia D)chordata E)animalia

11. Organisms that are procaryotic belong to the Kingdom A)Monera B)Protista C)Fungi D)Plantae E)Animalia
12. The type of bond common in salts in which opposite charges attract is called A) repulsion-attraction  B) Van der Waal  C) covalent  D) hydrogen  E) ionic

13. The Calvin-Benson cycle begins when A) light is available  B) light is not available  C) carbon dioxide is attached to RuBP  D) electrons leave a photosystem

14. What element(s) constitute(s) 75 to 85% of a cell's weight? A) hydrogen  B) nitrogen  C) oxygen  D) chromium  E) a and c only  F) a and b only  G) a and d only  H) a, c and d only

I) b, c, and d only

Questions 15-19: Write the letter to the left of the item which corresponds to the figure depicted below. Answers may be used only once.

15. Mitochondrion

16. Plasma membrane

17. Lysosome

18. Golgi complex (Dictyosome)

19. Nucleus

20. What type of cell is depicted in the above figure? A) eucaryotic  B) procaryotic  C) plant  D) animal  E) a and c only  F) a and d only  G) b and c only  H) b and d only
21. What color is anthocyanin extracted from purple cabbage when excess base is added? A) green B) purple C) blue D) black E) white

22. Entropy is a term used to explain which Law of Thermodynamics? A) first B) second C) third D) fourth E) fifth

23. Starch and cellulose are composed of A) glucose B) fructose C) ribose D) a and b only E) a, b, and c

Questions 24-31: Write the letter to the left of the item which corresponds to the structure or compound name depicted below. Answers may be used only once; not all answers are used.

24. Amylase can be used to break this linkage

25. Many of these linked together through peptide bonds form a protein

26. Nucleic acid in RNA

27. Sucrose

28. \( \beta (1 \rightarrow 4) \) linkage

29. Chlorophyll

30. Phospholipid

31. Cellulose

Diagram D shows the structure of a nucleotide, and Diagram E shows the covalent bond between the nucleotide and the sugar.

Diagram F shows a peptide bond, and Diagram G shows the structure of a zwitterion.

Diagram J shows the structure of an amino acid with a charged group.

Diagram I shows the structure of a sugar, and Diagram H shows the structure of a nucleoside.
32. What is another name for a protein that catalyzes metabolic reactions? A) sugar B)sucrose C) ATP D) cofactor E) enzyme

Questions 33-35: Write the letter to the left of the item which corresponds to that which is depicted below. Answers may be used only once.

33. Active site
34. Allosteric site
35. Substrate

36. The level of organization of life discussed in lecture which follows the level, molecule, and precedes organelle is: A) atom B) protein C) cell D) subatomic particle E) organ

37. The definition of life includes the sum properties of all of the following EXCEPT A) growth B) irritability C) color D) reproduction E) movement F) metabolism

38. When chlorophyll captures a unit of light energy it A) becomes excited B) fixes CO₂ C) oxidizes glucose D) degrades E) produces ATP

39. In photosynthesis, light energy is converted into ________ (and) ________, which is used to fix ________ (to form) ________.
A) Sugars and ATP; NADPH to form Carbohydrates
B) Photons and ATP; O₂ to form Water
C) Energy and Water; ATP to form Carbohydrates
D) Protons and Neutrons; ATP to form NADH
E) ATP and NADPH; CO₂ to form Carbohydrates

40. What is the most abundant and thought to be one of the most important enzyme on Earth? A) malate dehydrogenase (MDH) B) α-ketoglutarate dehydrogenase (α-KGDH) C) ribulose bisphosphate carboxylase/oxygenase (RUBISCO) D) phosphoenolpyruvate (PEP) carboxylase E) biology getanAase (BGAA)

41. Why is lactic acid a poor alternative for cellular respiration? A) lactic acid makes the cell sluggish B) cells cannot metabolize lactic acid C) ATP yield from lactic acid is low D) lactic acid can spontaneously form milk and clog cell membranes E) none of the above

42. What metabolite is the product of glycolysis? A) DHAP B) 3-PGAL C) CO₂ D) pyruvate E) citric acid
43. Which of the following organisms *respire?*  
A) plants  
B) animals  
C) a and b  
D) neither a nor b

44. What sequence of events is essential for enabling hereditary material to make you "do the things you do?"  
A) RNA makes DNA makes protein  
B) protein makes DNA makes RNA  
C) DNA makes RNA makes protein  
D) RNA makes protein makes DNA  
E) DNA makes protein makes RNA

45. That each of us has great, great, great, great, grandmothers and grandfathers is an example of a unique property of life known as  
A) metabolism  
B) homeostasis  
C) reproduction  
D) organization

46. What sequence of events best defines the scientific method?  
A) test, question, deduction, induction, repeat, conclude, alternative hypothesis  
B) induction, question, test, deduction, repeat, conclude, alternative hypothesis  
C) induction, question, test, deduction, repeat, alternative hypothesis, conclude  
D) question, induction, deduction, test, repeat, conclude, alternative hypothesis  
E) test, induction, question, deduction, repeat, conclude, alternative hypothesis

47. The passive movement of a substance *through channel proteins* as it follows its concentration gradient across a cell membrane is called  
A) osmosis  
B) active transport  
C) diffusion  
D) facilitated diffusion

48. Which of the following is *not* an aspect of metabolism?  
A) breaking down large molecules into simpler ones  
B) constructing large molecules from simpler ones  
C) acquiring energy  
D) using energy  
E) none of the above

49. The reaction, acetaldehyde + NADH + 2H⁺ + 2 electrons → ethanol + NAD⁺  
represents  
A) an oxidation of acetaldehyde  
B) a reduction of acetaldehyde

50. The flow of _______ through channel proteins in the inner mitochondrial membrane provide the energy to couple ADP and inorganic phosphate to form ATP.  
A) electrons  
B) hydrogen ions  
C) NADH  
D) FADH₂
EXAM II
General Biology 1114
(Dr. Bidlack)

NAME ________________________________
Social Security No. ____________________
Section (10:30 or 11:30) ________________

MULTIPLE CHOICE, MATCHING, and TRUE/FALSE (90%): Read each question carefully and
write the letter of the best or most appropriate answer in the space to the left of each question. You
MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible
letters will be counted as incorrect. There is only one right answer for each question.

SHORT ANSWER (10%): Provide a complete answer with the appropriate words or symbols
to receive credit.

SECTION I: MULTIPLE CHOICE (45 questions at 2 points each = 90 points).

_____ 1. Two scientists recognized for deducing the double helical structure of DNA are A)
Oswald and Avery B) Franklin and Pauling C) Griffith and Pauling D) Wilkins and
Avery E) Watson and Crick

_____ 2. Linus Pauling is recognized for A) winning a two Nobel prizes B) deducing the double
helical nature of DNA C) hypothesizing a DNA triple helix D) a and c E) a, b, and c

_____ 3. An ornithologist, who had a "what is life?" approach to science, and who later
became a prominent figure in deducing the structure of DNA is A) James Watson B)
Linus Pauling C) Rosalind Franklin D) Fred Griffith E) Salvador Luria

_____ 4. DNA can be composed of all of the following EXCEPT A) phosphates B) purines C)
glucose D) thymine E) deoxyribose

_____ 5. Semiconservative replication refers to A) translation B) transcription C) synthesis of
two daughter DNA stands from two mother DNA strands D) protein synthesis E) a and d

_____ 6. Bonds which hold strands of DNA together in the double helix are called A) covalent
B) ionic C) hydrogen D) nucleotide E) nucleoside

_____ 7. How many sites does DNA replication begin on in bacteria and viruses? A) millions
B) thousands C) hundreds D) one E) DNA does not replicate in procaryotes

_____ 8. What enzymes catalyze the step-by-step addition of units to the DNA chain and
proofread newly synthesized strands? A) Okazaki B) DNA polymerases C) non-
catalytic D) synthases E) RNA polymerases

_____ 9. A phenomenon associated with unwinding DNA that results in "kinks" and double
coils in the chain is called A) complex coiling B) double coiling C) supercoiling D)
backcoiling E) kinking

_____ 10. In order for replication to proceed properly, DNA must be unwound by the enzyme A)
helicase B) unwindase C) gyrase D) catalase E) replicase

90
11. RNA contains all of the following EXCEPT A) thymine B) adenine C) uracil D) cytosine E) guanine

12. A type of RNA associated with matching proteins with triplets on chain is called A) matching RNA B) messenger RNA C) transfer RNA D) ribosomal RNA E) protein RNA

13. Transcription differs from DNA replication because A) RNA polymerases function instead of DNA polymerases B) several strands of RNA can be synthesized at one time as opposed to a single strand of DNA C) only one strand of DNA is transcribed while replication involves both strands of DNA D) a and b E) a, b, and c

14. A promoter in transcription is usually associated with the base sequence, A) AUG B) TATA C) ATAT D) cap E) ATAT

15. Translation takes place A) on the ribosomes B) in the endoplasmic reticulum C) in the nucleus D) in the golgi apparatus E) a and b

16. Translation takes place A) on the ribosomes B) in the nucleus C) in the cell wall D) in the golgi apparatus E) in the middle lamella

17. The proper sequence of events in translation is A) Initiation, transcription, termination B) chain elongation, Initiation, termination C) initiation, chain elongation, chain termination D) Initiation, transcription, chain elongation E) transcription, chain elongation, chain termination

18. A section of DNA which encodes a specific trait is called a(n) A) chromosome B) initiator C) gene D) activator E) protein

Choose from the figures below (A, B, C, and D) to answer questions 19 through 21:

19. Deoxyribose

20. A nucleoside

21. A nucleotide

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B) ![Deoxyribose](image)

C) ![Nucleoside](image)

D) ![Nucleotide](image)
22. The proper sequence of events in transcription is (M = modification, P = promotion, R = release, T = transcription) A) M-P-R-T B) R-T-M-P C) P-T-R-M D) R-P-T-M E) P-M-R-T

23. Transcript modification in eucaryotes involves A) exon removal B) intron removal C) cap D) tail E) a and c F) b, c, and d

Use the letters corresponding to items on the operon model depicted below to answer questions 24 through 27:

24. Regulator gene
25. Repressor
26. Operator
27. Promoter

28. A type of natural recombination which refers to genes that "jump" from one region of DNA to another is called A) transposition B) rearrangement C) crossing over D) mutation E) microinjection

29. Targeted DNA manipulation by recombinant DNA technology has potential to A) alter proteins of interest in living organisms B) transfer DNA encoding unique traits from one organism to another organism C) remove undesirable traits from living organisms D) a and b only E) a, b, and c

30. Which phase of the cell cycle is NOT a part of mitosis? A) anaphase B) interphase C) telophase D) metaphase E) prophase

31. Cytokinesis is associated with which phase(s) of the cell cycle? A) interphase B) late anaphase C) telophase D) a and b E) b and c

32. The phase in which homologous chromosomes line up on an equatorial plane in different combinations is called A) telophase I B) telophase II C) metaphase I D) metaphase II E) anaphase II
33. In plants, meiosis directly produces A) egg and sperm B) ovary and pollen C) gametes D) megaspores and microspores E) a and c

34. Sex chromosomes are A) brother chromatids B) homologous C) sister chromatids D) centromeres E) kinetochores

35. What type of cell division leads to variation of species? a) fission b) meiosis I c) meiosis II d) interkinesis e) mitosis

36. If "A" designates the dominant allele (free ear lobes) and "a" designates the recessive allele (fused ear lobes), then what does the allelic combination "Aa" designate? A) one ear fused and the other ear free B) both ears fused C) both ears free D) both ears partially free

37. When two heterozygous (Aa) individuals mate to produce offspring, the result is A) 50% homozygous & dominant, 50% homozygous & recessive B) 25% homozygous & dominant, 50% heterozygous (expressing dominant), 25% homozygous & recessive C) 50% homozygous & dominant, 25% heterozygous (expressing dominant), 25% homozygous & recessive D) 33% homozygous & dominant, 33% heterozygous (expressing dominant), 33% homozygous & recessive

38. Epistasis is associated with A) one gene pair masking expression of another B) expression of a gene on some unrelated phenotypic trait C) climate affecting expression of a gene D) sickle-cell anemia E) b and d

39. The following statement, "individuals do not evolve; populations do," is A) true B) false

40. Who worked with mice and bacteria to show that instruction from a dead cell could successfully be transferred to a live cell? A) James Watson B) Fred Griffith C) Linus Pauling D) Rosalind Franklin E) Maurice Wilkins

41. Random fluctuation in allele frequencies as a result of random chance is called A) gene flow B) genetic drift C) mutation D) natural selection

42. Five (5) homologous chromosomes can line up in how many different combinations during meiosis? A) 10 B) 5 C) 16 D) 32 E) 64

43. Phenotype is A) the same a genotype B) an interaction between genotype and environment C) amount of phenylalanine in an organism D) observable aspects of an individual E) b and d

44. What molecule(s) contain(s) the genetic information which makes you a unique individual? A) protein B) enzymes C) DNA D) glucose E) a and b

45. A set of three nucleotides in mRNA is called A) a triplet B) a codon C) and anticodon D) DNA E) confusing
SECTION II. FILL-IN-THE-BLANK (3 questions at 1 point each = 3 total points)

1. transcription => 2. translation =>

METABOLISM

SECTION III. Depicted below is a DNA molecule which needs to be transcribed and translated. Transcribe this molecule and then use the table on the next page to translate it into an abbreviated protein product (7 total points).

5' ATG GGT GAC GAT CCA GAT TAG 3'
3' TAC CCA CTG CTA GGT CTA ATC 5'

RNA: 5' ___________________________ 3'

Protein: ___________________________
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Figure 16.8 The genetic code by which an mRNA molecule, with its linear array of codons, is transcribed from a gene region of DNA.
EXAM II  
General Biology 1114  
(Dr. Bidlack)

NAME ____________________________  
Social Security No. ___________________  
Section ____________________________

FILL-IN-THE-BLANK (20%): Provide an accurate answer for each question by choosing from the list of terms provided.

MULTIPLE CHOICE, MATCHING, and TRUE/FALSE (70%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

SHORT ANSWER (10%): Provide a complete answer with the appropriate words or symbols to receive credit.

SECTION I: FILL-IN-THE-BLANK (10 questions at 2 points each = 20 points). Choose from the following terms:

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<thead>
<tr>
<th>Fred Griffith</th>
<th>Deoxyribose</th>
<th>Helicase</th>
<th>DNA Polymerase</th>
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<td>James Watson</td>
<td>Ribose</td>
<td>Gyrase</td>
<td>RNA Polymerase</td>
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<td>Francis Crick</td>
<td>Phosphate</td>
<td>mRNA</td>
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<td>Linus Pauling</td>
<td>Base (A,T,G, or C)</td>
<td>rRNA</td>
<td>Guanine</td>
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<td>Maurice Wilkins</td>
<td>Helix</td>
<td>tRNA</td>
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SECTION II: MULTIPLE CHOICE, MATCHING, AND TRUE/FALSE (35 questions at 2 points each = 70 points).

1. The most brilliant and productive physical chemist of the century who won a Nobel Prize for the nature of the chemical bond and a Nobel Peace Prize for a march against atomic explosives is A)Francis Crick B)Saddam Hussein C)Rosalind Franklin D)Linus Pauling E)Cecile Starr

2. Production of two half-old mother strands and two half-new daughter strands is A)observed in DNA replication B)called semiconservative replication C)enabled by several DNA replicating enzymes D)a and b only E)a, b, and c

3. Okazaki fragments A)enable elongation to proceed in the proper direction on the "other" strand B)open the DNA double helix C)remove positive supercoiling D)a and b only E)a, b, and c

4. Bonds which hold strands of DNA together in the double helix are called A)Okazaki B)nucleoside C)covalent D)hydrogen E)nucleotide F)phosphate

5. How many sites does DNA replication usually begin on in bacteria? A)DNA does not replicate in procaryotes B)one C)two D)hundreds E)millions

6. What enzymes catalyze step-by-step addition of base units to the DNA chain and proofread newly synthesized strands? A)synthases B)non-catalytic C)helicas D)RNA polymerases E)DNA polymerases

Use the figure depicted below to answer questions 7 through 9:

7. Position where a hydroxyl group (OH) is removed to make deoxyribose

8. Position where a base is attached to make a sugar into a nucleoside

9. Position where one or more phosphate group(s) are attached to convert a nucleoside into a nucleotide

10. Transcription differs from DNA replication because A)RNA polymerases function instead of DNA polymerases B)only one strand of DNA is transcribed while replication involves both strands of DNA C)only one strand of RNA can be synthesized in transcription while millions of DNA are always synthesized in replication D)a and b only E)a, b, and c
11. RNA contains all of the following EXCEPT A) uracil  B) adenine  C) cytosine  D) thymine  E) guanine

12. Transcription takes place A) on the ribosomes  B) in the nucleolus  C) in the nucleus  D) in the golgi apparatus  E) b and c only

13. A promoter in transcription is usually associated with the base sequence A) AUG  B) AAAAAAAAAA  C) TATA  D) cap  E) TTTTTTTTT

14. The proper sequence of events in transcription is A) modification, release, promotion, synthesis  B) release, modification, synthesis, promotion  C) promotion, synthesis, modification, release  D) modification, promotion, synthesis, release  E) promotion, synthesis, release, modification

Use the figure depicted below to match items with terms in questions 15 through 20:

15. Ribosomal subunit
16. messenger RNA
17. transfer RNA
18. Newly-translated protein
19. Nucleus
20. Cytoplasm

21. Synthesis of protein is also referred to as A) translation  B) replication  C) transcription  D) catalysis  E) b and d only  F) b, c, and d only

22. The proper sequence to events in translation is A) initiation, transcription, termination  B) elongation, initiation, termination  C) initiation, chain elongation, termination  D) initiation, transcription, chain elongation  E) transcription, chain elongation, termination
23. Adjacent amino acids become aligned and form peptide bonds during A) transcription  B) chain termination  C) initiation  D) chain elongation  E) a and b only

24. A type of RNA responsible for matching proteins with triplets on a chain is called A) transfer RNA  B) messenger RNA  C) matching RNA  D) ribosomal RNA  E) DNA RNA

25. A section of DNA that encodes for a specific trait is called a(n)  A) activator  B) operon  C) protein  D) gene  E) chromosome

Use letters corresponding to items on the operon model depicted below to answer questions 26 through 27:

26. Operator

27. Activator protein

28. Which of the following is (are) (a) form(s) of natural variation? A) crossing over B) transposition C) recombination D) a and c only E) a and b only F) a, b, and c

29. A diploid cell undergoing mitosis and the cell cycle results in A) two haploid cells B) one haploid cell C) two diploid cells D) one diploid cell

30. Cytokinesis is associated with which phase(s) of the cell cycle? A) interphase  B) late anaphase  C) telophase  D) a and b only  E) b and c only

31. The phase of meiosis in which homologous chromosomes line up on an equilateral plane in different combinations is called A) anaphase I  B) metaphase II  C) prophase I  D) prophase II  E) metaphase I

32. What type of cell division leads to variation of species? A) meiosis I  B) meiosis II  C) fission  D) interkinesis  E) mitosis

33. Phenotype is A) interaction of genotype and environment  B) how the organism looks  C) amount of phenylalanine in an organism  D) a and b only  E) a, b, and c

34. When a heterozygous (Aa) male mates with a homozygous dominant female (AA), the result is A) All offspring demonstrate dominant traits  B) 50% of the offspring demonstrate dominant traits and 50% demonstrate recessive traits  C) 75% of the offspring demonstrate dominant traits and 25% demonstrate recessive traits  D) All offspring demonstrate recessive traits

35. Speciation due to structure of reproductive organs is called A) behavioral  B) mechanical  C) gamete isolation  D) hybrid inviability  E) time isolation
SECTION III. SHORT ANSWER (10 points)

Depicted below is a DNA molecule that needs to be transcribed and translated. Transcribe this molecule and then use the table on the next page to translate it into an abbreviated protein product.

5' ATG TTA CCG ATC TAG 3'
3' TAC AAT GGC TAG ATC 5'

RNA: 5' ___________________________ 3'

Protein: ___________________________
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Figure 16.8  The genetic code by which an mRNA molecule, with its linear array of codons, is transcribed from a gene, region
EXAM II
General Biology 1114
(Dr. Bidlack)

NAME ____________________________
Social Security No. __________________
Section ________________________

MULTIPLE CHOICE, MATCHING, and TRUE/FALSE (36%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

SHORT ANSWER (14%): Provide a complete answer with the appropriate words or symbols to receive credit.

SECTION I: MULTIPLE CHOICE, MATCHING, AND TRUE/FALSE (43 questions at 2 points each = 66 points).

1. Who was the crystallographer hired in part by Maurice Wilkins that provided essential evidence for deducing the structure of DNA? A) Oswald Avery B) Rosalind Franklin C) James Watson D) Fred Griffith

2. What was one of James Watson's main interests while attending the University of Chicago as an undergraduate? A) ants B) worms C) birds D) lizards E) cows

3. Who shared the Nobel Prize with Watson and Crick for deducing the structure and replication of DNA? A) Rosalind Franklin B) Linus Pauling C) George Bush D) Maurice Wilkins E) Oswald Avery

4. What are the three main components of the DNA molecule? A) sugar, base, and phosphate B) deoxyribose, base, phosphate C) ribose, base, phosphate D) sugar, hydrogen bonds, water E) a and b only F) a and c only

Questions 5 through 9: Match terms related to protein building appropriately.

5. Disrupts genetic instructions A. Interacting DNA control sites, regulatory proteins, enzymes, and hormones

6. Genetic code word B. RNAs convert genetic messages into polypeptides

7. Transcription C. Series of nucleotide bases

8. Translation D. One DNA strand serves as the template

9. Gene expression E. Gene recombination, changes in chromosome structure and number, gene mutation

30
10. What enzymes catalyze step-by-step addition of base units to the DNA chain and proofread newly synthesized strands? A) synthases B) non-catalytic C) helicases D) RNA polymerases E) DNA polymerases

11. What enzymes are needed for DNA replication? A) gyrase B) helicase C) DNA polymerase D) a and b only E) a, b, and c

12. The DNA of one species differs from others in its A) sugars B) phosphate groups C) base pair sequence D) all of the above

13. DNA replication produces A) two half-old, half-new double stranded molecules B) two double stranded molecules, one with the old strands and one with newly assembled strands C) three new double-stranded molecules, one with both strands completely new and two that are discarded D) none of the above

Questions 14 through 15: Write the letter to the left of the item which corresponds to that which is depicted below (not all answers are used):

14. Nucleotide

15. Nucleoside

16. Transfer RNA (tRNA) A) combines with proteins to form ribosomes B) carries the "blueprint" which is translated to protein C) carries proteins to the golgi apparatus D) matches proteins with triplets encoded by mRNA

17. RNA contains all of the following EXCEPT A) uracil B) adenine C) cytosine D) thymine E) guanine

18. The proper sequence of events in translation is A) initiation, transcription, termination B) chain elongation, initiation, termination C) initiation, chain elongation, termination D) initiation, chain elongation, transcription E) transcription, chain elongation, termination

19. Using the metabolic machinery of a bacterial cell to produce multiple copies of genes carried on hybrid plasmids is A) a way to create a DNA library B) bacterial conjugation C) mapping a genome D) DNA amplification

20. Transcription differs from DNA replication because A) RNA polymerases function instead of DNA polymerases B) only one strand of DNA is transcribed while replication involves both strands of DNA C) only one strand of RNA can be synthesized in transcription while millions of DNA are always synthesized in replication D) a and b only E) a, b, and c
21. Where does transcription take place? A) in the nucleus  B) in the cell membrane  C) on the ribosomes  D) in the microtubule  E) in the lysosome

22. Which sequence probably encodes a promoter region for transcription? A) AAAAAATAAAAAA  B) GCTCCTCAUGAAUGAAUG  C) TATAA  D) GCCGC  E) CCCCC

23. Which may benefit from recombinant DNA technology? A) households  B) industry  C) medicine  D) agriculture  E) all of the above

24. Which of the following is (are) NOT a transcript modification(s) demonstrated in eukaryotic organisms? A) 5' cap  B) poly-G tail  C) intron removal  D) exon removal  E) a and d only  F) b and d only

25. Where does translation take place? A) in the nucleus  B) in the mitochondrion  C) on the ribosomes  D) on the golgi apparatus  E) b and c only  F) b, c, and d only

26. Which phase is the longest phase of the cell cycle? A) telophase  B) anaphase  C) metaphase  D) prophase  E) interphase

Questions 27 through 30: Match each stage of mitosis with the following key events:

27. metaphase
   A. sister chromatids of each chromosome separate and move to opposite poles

28. prophase
   B. threadlike chromosomes condense and a microtubular spindle forms

29. telophase
   C. chromosomes decondense, daughter nuclei re-form

30. anaphase
   D. all chromosomes become aligned at spindle equator

31. In the operon model of procaryotes, which of the following precedes structural genes and serves as the binding site for RNA polymerase? A) regulator gene  B) promoter  C) operator  D) activator protein  E) repressor

32. Following mitosis, a daughter cell will end up with genetic instructions that are ____________________________ and ____________________________ chromosome number as the parent cell
   A) identical to the parent cell's; the same
   B) identical to the parent cell's; one-half the
   C) rearranged; the same
   D) rearranged; one-half the
33. An event that leads to natural variation of species in which genes jump from one region of DNA to another is called A) transposition  B) crossing over  C) synapsis  D) recombination  E) fertilization

34. In animals, the cleavage furrow is formed during A) fertilization  B) mitosis  C) cytokinesis  D) interkinesis  E) interphase

35. Crossing over A) alters the chromosome alignments at metaphase  B) occurs between sperm DNA and egg DNA at fertilization  C) leads to genetic recombination  D) occurs only rarely

36. The net result of meiosis is that the ________ chromosome number is

A) diploid; doubled  B) diploid; halved  C) haploid; doubled  D) haploid; halved

37. What type of cell division leads to variation of species? A) meiosis I  B) meiosis II  C) fission  D) interkinesis  E) mitosis

38. Alleles are A) alternative molecular forms of a gene  B) alternative molecular forms of a chromosome  C) self-fertilizing, true-breeding homozygotes  D) self-fertilizing, true-breeding heterozygotes

39. A section of DNA that encodes for a specific trait is called a(n) A) activator  B) operon  C) protein  D) gene  E) chromosome

40. The only source of new alleles is A) mutation  B) genetic drift  C) gene flow  D) natural selection  E) all of the above

41. Speciation due to structure of reproductive organs is called A) behavioral  B) mechanical  C) gamete isolation  D) hybrid inviability  E) time isolation

42. When a heterozygous (Aa) male mates with a homozygous dominant female (AA), the result is

A) All offspring demonstrate dominant traits  B) 50% of the offspring demonstrate dominant traits and 50% demonstrate recessive traits  C) 75% of the offspring demonstrate dominant traits and 25% demonstrate recessive traits  D) All offspring demonstrate recessive traits

43. Speciation is A) the extinction of a distinct population  B) the accumulation of environmental factors that cause geographic isolation  C) the process whereby different species originate  D) a means of altering gene frequencies in a population
SECTION II. FILL-IN-THE-BLANK (3 questions at 2 point each = 6 total points)

1. transcription => 2. translation => 3. translation

SECTION III. SHORT ANSWER (6 points)

Depicted below is a DNA molecule that needs to be transcribed and translated. Transcribe this molecule and then use the table on the next page to translate it into an abbreviated protein product.

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5' TAC GGT CGT TTA ATC 3'

RNA: 5' ___________________________ 3'

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*The genetic code.*
MULTIPLE CHOICE AND MATCHING (100%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

1. What type of reproductive isolating mechanism is associated with the structure of reproductive organs? A) hybrid inviability B) behavioral isolation C) time isolation D) gamete isolation E) mechanical

2. A mode of speciation which is the most common and is associated with isolated locations (i.e., islands) is called A) sympatric B) parapatric C) allopatric D) isopatric E) exopatric

3. Compounds from which carbon, nitrogen, and oxygen were derived to enable formation of amino acids during evolution of the Earth included all of the following EXCEPT A) sodium hydroxide B) methane C) ammonia D) water

4. According to a hypothesis, what substance(s) functioned to assemble proteins during the evolution of life? A) Adam and Eve B) snakes C) bacteria D) plastic E) clay particles

5. What process(es) is(are) hypothesized to have enriched Earth’s oxygen supply during evolution of life? A) amino acid synthesis B) respiration C) photosynthesis D) glycolysis E) b and d only

6. The hypothesis discussed in lecture which explained how cells obtained mitochondria claimed that A) cells engulfed (“ate”) mitochondria B) cells synthesized mitochondria from proteins C) cells converted nuclei into mitochondria D) cells modified membranes to make mitochondria

7. How many fertilization events occur in the typical life cycle of a flowering plant? A) one - to produce the zygote B) two - to produce the zygote and the endosperm C) three - to produce the roots, shoots, and leaves D) four - to produce the roots, shoots, leaves, and flowers

8. What non-life entity affects the five living kingdoms by inflicting disease upon organisms? A) bacteria B) moneran C) virus D) fungus E) a and b only

9. A T4 Phage (virus) consists of all of the following parts EXCEPT A) head B) flagella C) sheath D) tail fibers E) nucleic acids

10. Which of the following viruses can lead to leukemia and AIDS? A) Herpes B) Rhinoviruses C) Retroviruses D) Influenza viruses
11. Which organism(s) is (are) procaryotic, has (have) a single chromosome, and reproduce(s) by binary fission? A) bacteria B) fungi C) protists D) monerans E) a and d only

12. What term is used to identify an organism that uses sunlight as energy to drive synthesis of biological molecules? A) heterotroph B) chemosynthetic heterotroph C) photosynthetic heterotroph D) photosynthetic autotroph

13. Single-celled eucaryotes can be found in the kingdom A) virusia B) mycota C) monera D) protista E) plantae

14. The pressure-flow hypothesis explains A) source-sink relationships B) how sap moves in the xylem C) water movement up the plant D) a and b only

15. A mushroom is an example of the kingdom A) mycota B) protista C) plantae D) fungi E) a and d only F) a and c only

16. A heterotrophic organism that obtains its nutrition from dead organic matter is called A) lichen B) symbiotic mycorrhizae C) parasite D) saprophyte

17. What compound is uniquely found in cell walls of bacteria? A) water B) cellulose C) chitin D) peptidoglycan E) cellulose

18. Members of the kingdom plantae are usually A) monocots B) heterotrophs C) photosynthetic autotrophs D) parasites E) a and b only

19. Dioecious means A) male and female parts are on same plant B) male and female parts are on different plants

20. Meiosis in flowering plants directly forms A) sperm and egg B) a zygote C) megaspores and microspores D) pollen grains E) seeds

Use the letters corresponding to items of the flower structure depicted below to answer questions 21 through 25:

21. Anther
22. Ovary
23. Stigma
24. Filament
25. Style
26. Vascular plants which reproduce by seeds but do not have "real" flowers are called A) ferns B) dicots C) angiosperms D) gymnosperms E) fungi

27. Name the structure of monocotyledonous plants that keeps water from between stem and sheath A) blade B) sheath C) auricle D) ligule E) collar

28. Parenchyma tissue is associated with A) storage B) ground tissue C) vascular tissue D) a and b E) a, b, and c

29. Vessels are found in A) the phloem B) the xylem C) ground tissue D) epidermal tissue

30. Which of the following is NOT associated with xylem? A) water B) passive C) down D) tracheids E) dead

31. Which of the following is the strongest type of tissue? A) parenchyma B) chlorenchyma C) sclerenchyma D) collenchyma E) aerenchyma

32. Meristematic tissue A) is a region of rapidly dividing cells B) gives rise to other tissues C) is important in growth D) can be found in apical meristems E) all of the above

33. Plants grow from A) the base of shoots and roots B) the middle of roots and shoots C) tips of roots and shoots

34. The quiescent center is A) a region of rapid division B) a region where frequency of mitosis is low C) in the root cap D) at the tip of the shoot

35. Pro cambium produces A) cortex and pith B) parenchyma C) vascular tissue D) epidermal tissue E) protoderm

36. Roots hairs can be found in the A) apical meristem B) zone of cell elongation C) zone of cell division D) zone of cell differentiation E) a and c only

37. Dicot can be associated with A) ferns B) bryophytes C) vascular plants D) angiosperms E) gymnosperms F) c and d only G) b, c, and d only

38. The point above the youngest primordia is best defined as the A) apical meristem B) shoot apex C) leaf D) stem E) meristematic tissue

39. The apical meristem directly gives rise to all of the following EXCEPT A) protoderm B) cuticle C) procambium D) ground meristem

40. Epidermis of young stems can have all of the following EXCEPT A) cuticle B) chloroplasts C) epidermal cells D) vascular tissue

41. The region between procambial strands and epidermis of stems is called A) xylem B) phloem C) cuticle D) pith E) cortex

42. In a stem longitudinal section, which tissue is formed inside and discontinuously? A) parenchyma B) phloem C) xylem D) collenchyma E) sclerenchyma
43. Meristematic tissue in leaves which gives rise to mesophyll is called A) protoderm B) ground meristem C) procambium D) apical meristem E) a and c only

44. The cohesion-adhesion-transpiration pull theory explains A) how phloem moves its sap throughout the plant B) how sugars are transported C) apical dominance D) water movement up the plant E) a and b only

45. Dancing or other reproductive rituals include which reproductive isolating mechanism(s)? A) hybrid inviability B) behavioral isolation C) mechanical D) gamete isolation E) c and d only

Use the plant sample distributed in class to answer questions 46 through 50:

46. What is the name of the structure which connects the leaf to the stem and allows leaf movement? A) collar B) ligule C) petiole D) blade E) stipule

47. The shape of the leaves on this plant is A) entire B) dentate C) lobed

48. This plant is a representative of a A) fern B) gymnosperm C) dicot D) monocot

49. The leaves on this plant are A) simple B) compound

50. What type of leaf venation does this plant have? A) netted B) parallel
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MULTIPLE CHOICE AND MATCHING (100%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.  

SECTION I: MULTIPLE CHOICE AND MATCHING (50 questions at 2 points each = 100 points).  

_____ 1. Allopatic speciation often occurs A) at an isolated location  B) between mountains and bottomlands  C) as a result of gamete isolation  D) b and c only  

_____ 2. Three compounds abundant during early earth that combined with energy to make amino acids were A) CO₂, water, and nitrogen  B) methane, water, and ammonia  C) oxygen, water, and nitrogen  D) carbon dioxide, water, and nitrogen  E) a and d only  

_____ 3. What type of crystals or particles are hypothesized to have served as templates for protein synthesis during early earth? A) diamond  B) quartz  C) gold  D) clay  E) water  F) ice  

_____ 4. During the evolution of life, lipids were attracted to protein and surrounded it to form the first A) nucleus  B) cell wall  C) membrane  D) ribosome  E) vacuole  

_____ 5. According to a theory, how did the first cell acquire a mitochondrion? A) it converted its nucleus into a respiratory organelle  B) it changed a chloroplast into a mitochondrion  C) it ate (engulfed) a mitochondrion  D) it assembled microtubules to make new organelles  E) a and b only  F) a, b, and d only  

_____ 6. A virus is A) living  B) non-living  

_____ 7. What type of virus is the common cold? A) RNA virus  B) DNA virus  C) rhinovirus  D) retrovirus  E) a and c only  F) b and c only  G) a and d only  H) b and d only  

_____ 8. A relationship in which both organisms benefit from each other is called A) saprophytic  B) parasitic  C) symbiotic  D) heterotrophic  E) autotrophic  

_____ 9. How many fertilization events usually occur in the ovary of plants? A) millions  B) thousands  C) hundreds  D) five  E) two  F) one  

_____ 10. Name the type of plant that reproduces by seeds but that does not have true flowers A) dicot  B) monocot  C) legume  D) gymnosperm  E) angiosperm  F) fern  

_____ 12. What type of reproductive isolating mechanism is characterized by dancing or other reproductive ritual? A) mechanical  B) gamete isolation  C) time isolation  D) behavioral isolation  E) hybrid inviability.
12. Collenchyma tissue gives the plant A) storage B) support C) strength D) tail fibers E) xylem and phloem

13. A T4 Phage (virus) consists of all of the following parts EXCEPT A) head B) flagella C) sheath D) tail fibers E) nucleic acids

Questions 14-17: Write the letter to the left of the term that corresponds to the figure depicted below. Answers may be used only once

14. DNA

15. Head

16. Sheath

17. Tail fiber

18. Which sequence of living kingdoms demonstrates the best representation of evolutionary events?
   A) Fungi, Monerans, Protists = = > [Plants and Animals]
   B) Monerans, Protists = = = > [Fungi, Plants, and Animals]
   C) Protists, Monerans, Fungi = = > [Plants and Animals]
   D) Protists, Monerans, Fungi, Plants, and Animals
   E) Protists, Fungi, Monerans, Animals, and Plants

19. Which organism(s) is (are) procaryotic, has (have) a single chromosome, and reproduce(s) by binary fission? A) bacteria B) fungi C) protists D) monerans E) a and d only

20. What term is used to identify an organism that uses inorganic chemicals as energy to drive synthesis of biological molecules? A) heterotroph B) chemosynthetic autotroph C) photosynthetic heterotroph D) photosynthetic autotroph

21. Single-celled eucaryotes can be found in the kingdom A) virus B) mycota C) monera D) protista E) plantae

22. Bread mold is an example of the kingdom A) mycota B) protista C) plantae D) fungi E) a and d only F) a and c only

23. A heterotrophic organism that obtains its nutrition from dead organic matter is called a A) lichen B) symbiotic mycorrhizae C) parasite D) saprophyte

24. What compound is uniquely found in cell walls of fungi? A) water B) cellulose C) chitin D) peptidoglycan E) cellulose
25. Members of the kingdom plantae are usually A) procaryotic  B) heterotrophs  
C) photosynthetic autotrophs  D) parasites  E) a and b only

26. Which of the following should NOT be classified as a plant? A) blue-green algae  
B) venus flytrap  C) pine tree  D) moss  E) dicot

27. Monoecious means A) male and female parts are on same plant  B) male and female 
parts are on different plants.

Questions 28-34: Write the letter to the left of the term that best describes items depicted on the 
figures below. Answers may be used only once; not all answers are used.

28. Vascular bundle

29. Protoderm

30. Node

31. Internode

32. Ground meristem

33. Bud

34. Primary root

35. Meiosis in flowering plants directly forms A) sperm and egg  B) a zygote  
C) megaspores and microspores  D) pollen grains  E) seeds

36. The pistil is composed of all of the following EXCEPT A) stamen  B) ovary  C) stigma  
D) style  E) a and b only  F) a, b, and c only  G) a, b, c, and d
37. Name the structure of monocotyledonous plants that forms a collar at the base of the blade A) blade B) sheath C) auricle D) ligule E) collar

38. Sieve cells are found in A) the phloem B) the xylem C) ground tissue D) epidermal tissue

39. Which of the following is NOT associated with xylem? A) water B) passive C) down D) tracheids E) dead

40. Which of the following is the strongest type of tissue? A) parenchyma B) chlorenchyma C) sclerenchyma D) collenchyma E) aerenchyma

41. Meristematic tissue A) is a region of rapidly dividing cells B) gives rise to other tissues C) is important in growth D) can be found in apical meristems E) all of the above

42. Procambium produces A) cortex and pith B) parenchyma C) vascular tissue D) epidermal tissue E) protoderm

43. Roots hairs can be found in the A) apical meristem B) zone of cell elongation C) zone of cell division D) zone of cell differentiation E) all of the above

44. Dicots can be associated with A) ferns B) bryophytes C) vascular plants D) angiosperms E) gymnosperms F) c and d only G) b, c, and d only

45. In a stem longitudinal section, which tissue is formed inside and discontinuously? A) parenchyma B) phloem C) xylem D) collenchyma E) sclerenchyma

46. Meristematic tissue in leaves which gives rise to mesophyll is called A) protoderm B) ground meristem C) procambium D) apical meristem E) all of the above

47. The cohesion-adhesion-transpiration pull theory explains A) how phloem moves its sap throughout the plant B) how sugars are transported C) apical dominance D) water movement up the plant E) a and b only

48. The pressure-flow hypothesis explains A) source-sink relationships B) how sap moves in the phloem C) water movement up the plant D) a and b only

49. Identify the sample being passed around class A) gymnosperm B) angiosperm C) monocot D) dicot E) a and c only F) b and c only G) b and d only H) b and c only

50. Secondary growth can often be observed in A) grasses B) monocots C) oak trees D) dicots E) a and b only F) b and c only G) c and d only
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General Biology 1114  
(Dr. Bidlack)  

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Section _________________________

MULTIPLE CHOICE AND MATCHING (100%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

SECTION I: MULTIPLE CHOICE AND MATCHING (50 questions at 2 points each = 100 points).

____ 1. An example of a DNA virus is A) the common cold  B) an influenza  C) a retrovirus  
D) AIDS  E) herpes type II

____ 2. What type or reproductive isolating mechanism is demonstrated by dancing or other reproductive ritual? A) mechanical  B) gamete isolation  C) time isolation  
D) behavioral  E) hybrid inviability

____ 3. Another term for the genotype X environment interaction is A) mutation  B) phenotype  
C) how an organism looks D) a and b only  E) b and c only

____ 4. What type of speciation might have occurred as a result of rapid environmental change? A) cladistic  B) extinction  C) gradualism  
D) punctualism  E) a and b only

____ 5. The energy source during "Early Earth" theorized to have enabled combining of methanes, ammonia, and water to make protein is A) fire  B) mechanical  C) lightning  
D) solar  E) cosmic

____ 6. What substance is theorized to have functioned as a template for protein synthesis during "Early Earth?" A) clay  B) water  C) rock  D) algae  E) rubber

____ 7. What term best defines the shape of a protein in its natural state? A) microsphere  B) linear  C) helical  D) square  E) triangular

____ 8. The process that changed the surface of the Earth by providing it with oxygen is A) respiration  B) transcription  C) translation  D) replication  E) photosynthesis

____ 9. The common cold is A) a DNA virus  B) an RNA virus  C) a retrovirus  D) a and c only  
E) b and c only

____ 10. What term(s) best define an organism that uses sunlight as energy to drive synthesis of biological molecules? A) photosynthetic  B) autotroph  C) heterotroph  D) a and b only  
E) b and c only

____ 11. Which of the following is NOT a protist? A) single-celled eucaryote  B) mushroom  
C) slime mold  D) euglenoid  E) proctazoan

____ 12. What stage in the life cycle of a mushroom intervenes between cytoplasmic fusion and fusion of gametes? A) mitotic  B) meiotic  C) dikaryotic  D) diploid  E) haploid

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Questions 13 through 17: Use the following scheme to match letters with that which is depicted below:

13. Plantae
14. Monera
15. Mycota
16. Protista
17. Animalia

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Questions 18 through 24: Use the following statement to appropriately match terms referring to plant reproductive anatomy:

The male part of the plant is referred to as the \( \text{E} \) and consists of the \( \text{D} \) and the \( \text{C} \); the female part of the plant is referred to as the \( \text{B} \) and consists of the \( \text{A} \), \( \text{E} \), and \( \text{D} \).

18. Style
19. Pistil
20. Anther
21. Ovary
22. Stamen
23. Filament
24. Stigma
25. Monoecious refers to A) only male parts  B) only female parts  C) male and female parts on the same plant  D) male and female parts on different plants  E) absence of both male and female parts

26. How many fertilization events occur during the life cycle of a typical flowering plant? A) one  B) two  C) eight  D) nine  E) more than 1,000,000,000

27. What is the function of the ligule? A) it attaches the leaf to the stem  B) it attaches the blade to the sheath  C) it keeps water out  D) it eventually makes fruit  E) nothing - it just looks really cool

Questions 28 through 30: Write the letter to the left of the item to that which is depicted below (not all answers are used):

28. Head

29. Sheath

30. Tail fibers

31. The strongest type of ground tissue that contains lignin and functions in providing strength is A) sclerenchyma  B) collenchyma  C) parenchyma  D) phloem  E) meristematic

32. What meristematic tissue gives rise to mesophyll in leaves? A) ground meristem  B) procambium  C) protoderm  D) vascular  E) collenchyma

33. Water is pulled up through the roots to the leaves by what process? A) active transport  B) ion exchange  C) precipitation  D) respiration  E) transpiration

34. Ions probably move into the roots by A) all active transport  B) all passive transport (bulk flow)  C) mostly active transport; some passive transport  D) mostly passive transport; some active transport  E) dancing through the Casparian Strip

35. The cohesion-adhesion-tension hypothesis explains how A) water moves through the xylem  B) sap goes from the leaf to the fruit  C) photosynthesis works  D) sugars are made in the palisade layer  E) students feel after taking an exam

37. Sugars move through the phloem according to A) the cohesion-adhesion-tension hypothesis  B) source to sink directionality  C) the pressure-flow hypothesis  D) a and c only  E) b and c only
38. Which element is essential for plants to enable proper functioning of the oxygen evolving complex (OEC)? A) zinc B) chlorine C) iron D) boron E) copper

39. Xylem A) is living B) contains sieve cells C) transports sugars D) is part of the apoplastic E) moves substances down the plant

40. Biologists generally agree that there (is) are _________ kingdom(s) of life. A) one B) two C) three D) four E) five

41. Age of a tree can be estimated by the number of 'rings' which consist mostly of what tissue? A) vascular B) xylem C) phloem D) parenchyma E) a and b only

42. Which of the following is NOT a true plant? A) blue-green algae B) fern C) gymnosperm D) monocot E) dicot

43. Rapidly dividing tissue can be found A) at the tip of a shoot B) at apical meristems C) at the base of a root D) a and b only E) a, b, and c

44. The three main types of ground tissue are A) dermis, epidermis, and periderm B) vascular, xylem, and phloem C) dermal, ground, and vascular D) tracheids, vessels, and sieve cell tissue E) parenchyma, collenchyma, and sclerenchyma

45. Viruses are A) the simplest living organisms B) agents of infection C) nonliving D) a and b only E) b and c only

46. Fungi are A) photosynthetic autotrophs B) chemosynthetic autotrophs C) heterotrophs D) a and b only

47. The two classes of flowering plants are A) angiosperms and gymnosperms B) monocots and dicots C) shrubs and trees D) herbs and shrubs E) fun and games

48. _________ cells are thin-walled, alive at maturity, and function in photosynthesis, storage, and other tasks. A) Parenchyma B) Sclerenchyma C) Collenchyma D) Epidermis E) Vascular

49. In plant metabolism, mineral ions have roles in A) metabolic activities B) establishing solute concentration gradients across cell membranes C) water movement into cells D) maintaining cell shape and growth E) all of the above

50. During the day, plants lose _________ and take up _________.
A) carbon dioxide; water
B) water; oxygen
C) oxygen; water
D) water; carbon dioxide
E) confidence; classes at UCO
EXAM IV
General Biology 1114
(Dr. Bidlack)

NAME ________________________________
Social Security No. ________________________________
Section (10:30 or 11:30) ________________________________

MULTIPLE CHOICE AND MATCHING (100%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

1. Which sequence of living kingdoms demonstrates the best representation of evolutionary events?
   A) Fungi, Monera, Protista, Animalia, Plantae
   B) Monera, Protista, Animalia, Plantae
   C) Protista, Monera, Fungi
   D) Protista, Monera, Fungi, Animalia, Plantae
   E) Protista, Fungi, Monera, Animalia, Plantae

2. Cephalization is a term used to indicate the presence of a distinct A) head B) tail
   C) spinal cord D) mouth E) body segment

3. Which of the following is NOT a reptile? A) crocodile B) lizard C) turtle D) toad
   E) snake

4. Mammals usually have A) milk-secreting glands B) hair C) four-chambered heart
   D) a and b only E) a, b, and c

5. Man belongs to the Family A) Chordata B) Mammalia C) Animalia D) Hominidae
   E) Primates

6. Gibbons, orangutans, gorillas, chimpanzees, and man are A) prosimians
   B) arthropods C) lesser apes D) anthropoids E) tarsiers

7. Trends in primate evolution probably include A) less reliance on sight and more reliance on smell
   B) from quadrupedalism to bipedalism C) from specialized to omnivorous feeding behavior
   D) a and b only E) b and c only

8. Which of the following may have enabled man to survive during the Ice Ages? A) use
   of fire B) development of sophisticated tools C) making of shelters D) a and b only
   E) a, b, and c

9. Preliminary animal tissue which gives rise to muscle, some organ, and connective tissues is A) procambium B) mesoderm
   C) endoderm D) ectoderm E) protoderm

10. What type of tissue is responsible for contraction and can be found in blood vessels,
    biceps, and heart? A) epithelial B) connective C) nerve D) muscle E) lymphatic

11. The organ system responsible for detection of stimuli, coordination, and responses
    is A) nervous B) endocrine C) circulatory D) urinary E) skeletal
12. Positive feedback of the homeostatic control mechanism is exemplified by A) pulling your hand away from a pot of boiling water B) sexual arousal in response to a stimulus C) vomiting to remove toxic substances D) a and c only E) a, b, and c

13. The basic unit of the nervous system is the A) neuron B) nerve cell C) brain D) a and b only E) a, b, and c

14. Eyes have what class of nerve cells that enable them to function as receptors? A) interneurons B) sensory neurons C) motor neurons D) integrators E) a, b, c, and d

15. Another name for the output zone of the neuron is called the A) dendrite B) trigger zone C) axon D) axon terminal E) interneuron

16. Use the following numbers to determine the proper sequence of events for the neuron mechanism:
   1 = synapse
   2 = gradient moves along the axon to axon terminal
   3 = receptor senses something
   4 = sodium channels open
   5 = inside of membrane gets charged
   A) 1-2-3-4-5 B) 3-4-5-2-1 C) 1-4-3-2-5 D) 1-3-2-4-5 E) 5-4-3-2-1

17. The hypothalamus is responsible for regulating A) heart rate B) breathing C) thirst, hunger, and sex D) reflexes E) a and b only

18. The right side of the brain is the center for control of all of the following EXCEPT A) spatial perception B) left ear C) left eye D) left nostril E) left toe

19. The master gland that exerts major control over the rest of the endocrine system is called the A) testis B) ovary C) pituitary D) thyroid E) thymus

20. Which gland regulates the immune response? A) parathyroid B) thyroid C) thymus D) adrenal cortex E) pancreas

21. Steroids function A) by altering transcription B) by making uniquely different RNAs from DNA C) by activating cyclic AMP D) a and b only E) b and c only

Use letters corresponding to items of the eye structure depicted below to answer questions 22 through 24 (not all letters are used):

22. Sclera
23. Pupil
24. Retina
25. Photoreceptors detect A) radiant energy  B) photon energy  C) mechanical energy  
D) chemical energy

26. What part of the ear is responsible for balance?  A) cochlea  B) malleus 
C) semicircular canals  D) tympanum  E) stapes

27. Which cells originate in the bone marrow?  A) red blood cells  B) white blood cells 
C) epidermal cells  D) a and b only  E) a, b, and c

28. Erythrocytes A) are white blood cells  B) function in O₂ and CO₂ transport  C) lack a 
nucleus and mitochondria  D) are red blood cells  E) a, b, and c only  F) b, c, and d only

29. Cells that function in day-to-day housekeeping and defense A) are also called 
erthrocytes  B) are also called leukocytes  C) have a nucleus  D) a and c only  E) b and 
c only  F) a, b, and c

30. Which are the most abundant cells of the circulatory system?  A) leukocytes 
B) phagocytes  C) erythrocytes  D) white blood cells

31. Circulation responsible for taking O₂-deficient blood to the lungs is called A) body 
B) systemic  C) pulmonary  D) a and b only  E) a, b, and c

32. Nonspecific defense responses include all of the following EXCEPT A) microbes of 
the vagina and gut  B) removal of foreign substances by ciliated mucus membranes 
C) intact skin  D) antigen-antibody interactions  E) stomach acid

33. A foreign body that lacks the major histocompatibility complex (MHC) is called a(n) 
A) antigen  B) phagocyte  C) leukocyte  D) antibody  E) erythrocyte

34. What is the most abundant component of the Earth’s “air”?  A) oxygen  B) nitrogen 
C) argon  D) carbon dioxide  E) helium

35. What facilitates CO₂ transport in the circulatory system of humans?  A) hemoglobin 
B) ribulose bisphosphate carboxylase/oxygenase  C) temperature  D) carbonic 
anhidrase  E) a and b only

36. What structure covers the larynx during swallowing of food?  A) larynx  B) glottis 
C) trachea  D) esophagus  E) epiglottis

37. What is the proper sequence in the flow of air in mammals?  A) nasal cavities, larynx, pharynx, bronchi, trachea 
B) nasal cavities, pharynx, bronchi, larynx, trachea  C) nasal cavities, pharynx, larynx, trachea, bronchi 
D) nasal cavities, larynx, pharynx, trachea, bronchi  E) nasal cavities, bronchi, larynx, trachea, pharynx

38. The last mammalian structure that air moves through before the alveoli is the 
A) larynx  B) glottis  C) bronchioles  D) trachea  E) pharynx

39. Nutrition includes all of the following EXCEPT A) digestion  B) excretion  C) intake 
D) absorption  E) utilization
40. Mechanical breakdown, mixing of ingested foods, passage, and elimination are all part of what function of digestion? A) motility  B) secretion  C) digestion  D) absorption  E) b and c only

41. The process that moves nutrients into the blood or lymph is A) absorption  B) assimilation  C) digestion  D) ingestion  E) a, b, c, and d

42. What is the proper sequence for the passage of food in humans? A) mouth, esophagus, stomach, small intestine, large intestine, rectum, anus  B) mouth, esophagus, stomach, large intestine, small intestine, rectum, anus  C) mouth, stomach, esophagus, large intestine, small intestine, anus, rectum  D) mouth, stomach, large intestine, small intestine, esophagus, anus, rectum  E) mouth, esophagus, stomach, small intestine, large intestine, anus, rectum

43. The first part of the small intestine is the A) ileum  B) duodenum  C) colon  D) cecum  E) jejunum

44. Where does most of nutrient absorption occur? A) stomach  B) mouth  C) small intestine  D) large intestine  E) esophagus

45. Insulin A) is a laxative  B) releases sugar into the bloodstream  C) takes blood sugar and puts it to work in cells  D) is not necessary for normal metabolism

46. Sperm production takes place in the A) ovaries  B) vas deferens  C) testes  D) urethra  E) ejaculatory duct

47. Which of the following are haploid and non-duplicated? A) spermatids  B) spermatogonia  C) mature oocytes  D) primary oocytes  E) c and d only  F) a and b only  G) a and c only  H) a, b, c, and d

48. Which of the following occur(s) during sexual arousal in human females? A) increase in breast size  B) erection of clitoris  C) erection of labia minor  D) moistening of the vagina  E) b and d only  F) a, b, c, and d

49. Male orgasm includes all of the following EXCEPT A) sperm production  B) muscle contractions  C) ejaculation  D) sensations of release  E) sensations of warmth

50. Where does fertilization usually occur? A) ovary  B) vagina  C) oviduct  D) uterus  E) clitoris
MULTIPLE CHOICE AND MATCHING (100%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

SECTION I: MULTIPLE CHOICE AND MATCHING (50 questions at 2 points each = 100 points).

1. Cephalization is a term used to indicate the presence of a distinct A)head B)tail C)spinal cord D)mouth E)body segment

2. What phylum do millipedes belong to? A)anthropoid B)mollusca C)arthropoda D)chordates E)mammalia

3. A turtle is a(n) A)mammal B)reptile C)amphibian D)insect E)fish

4. A good example of a prosimian is a A)gibbon B)orangutan C)chimpanzee D)lemur E)a and b only F)b and c only G)c and d only

5. According to lecture, fire was best used by early man during the ice ages for what purpose? A)human sacrifices B)removal of excess vegetation C)warmth D)entertainment E)destruction

6. Tissue that can be found as a lining of the stomach, outer skin, and the vagina is A)muscle B)mesoderm C)epithelial D)connective E)nerve

7. What organ system is best described as "involved with hormones and control of bodily functions?" A)reproductive B)nervous C)lymphatic D)urinary E)endocrine

8. Name the term associated with maintenance of bodily functions A)movement B)homeostasis C)equilibrium D)entropy E)enthalpy

9. What term in primate classification includes monkeys, apes, and humans but not prosimians? A)Homo B)Homo sapiens C)arthropoda D)anthropoid E)a and c only F)a, b, and c only

10. The brain is a good example of where you will find a(n) A)sensory neuron B)interneuron C)motor neuron D)hormone E)a and c only F)a and d only G)a, c, and d only

11. Message transfer from one axon terminal to another neuron is called A)brain power B)a thought C)conduction D)synapse E)voltage F)relapse

12. What part of the brain is responsible for automatic functions such as breathing and heart rate? A)cerebellum B)thalamus C)hypothalamus D)cerebrum E)medulla oblongata
13. The "master" gland is the A)pituitary  B)thyroid  C)adrenal  D)thymus  E)ovary

14. What type of hormone(s) have a signaling mechanism that requires a change in transcription? A)growth-stimulating B)parathormone C)non-steroid D)steroid  E)a and b only  F)a, b, and c only  G)a, b, c, and d

15. J. C. Mahan, during his guest lecture, had what color hair? A)orange  B)bright purple  C)blonde  D)black  E)none - he was bald

Questions 16-26: Match the letter corresponding to organ systems depicted below that best describes their function(s) in the human body. Answers may be used only once; all answers are used; only one correct answer corresponds to each description.

16. Excretion of wastes
17. Ingestion and absorption of food
18. Detection of stimuli, coordination, and responses
19. Defense against invaders
20. Protection, regulation, excretion, and reception
21. Production of gametes
22. Control of bodily functions
23. Movement, maintenance, and heat production
24. Support, protection, muscle attachment, blood cell production
25. Regulation of gas exchange
26. Transport of gases, water, and food
27. Another name for a red blood cell is A) hemoglobin B) white blood cell C) leukocyte D) erythrocyte E) pulmonary

28. The following statement, 'a red blood cell has a nucleus' is A) true B) false

29. Which pump of the heart directs blood to the lungs A) systemic B) body C) valve D) pulmonary E) air

30. Another name for a foreign body that lacks the major histocompatibility complex is A) antigen B) antibody C) white blood cell D) red blood cell E) leukocyte F) e only G) d and e only

31. Members of the Kingdom Animalia are often A) single-celled B) chemotrophs C) photosynthetic D) autotrophs E) diploid

32. Which of the following is NOT a mammal? A) mouse B) rat C) blrd D) whale E) monkey

33. Positive feedback of the homeostatic control mechanism is exemplified by A) pulling your hand away from a pot of boiling water B) sexual arousal in response to a stimulus C) vomiting to remove toxic substances D) a and c only E) a, b, and c

34. The basic unit of the nervous system is the A) neuron B) nerve cell C) brain D) a and b only E) a, b, and c

35. Use the following numbers to determine the proper sequence of events for the neuron mechanism:

1 = synapse
2 = gradient moves along the axon to axon terminal
3 = receptor senses something
4 = sodium channels open
5 = inside of membrane gets charged

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

36. The hypothalamus is responsible for regulating A) heart rate B) desires C) breathing D) reflexes E) a and c only F) a, c, and d only

37. The right side of the brain is the center for control of all of the following EXCEPT A) left nostril B) left ear C) special perception D) left eye E) left toe

38. Cells that function in day-to-day housekeeping and defense A) are also called erythrocytes B) are also called leukocytes C) have a nucleus D) a and c only E) b and c only F) a, b, and c

39. What is the most abundant component of the Earth's "air"? A) oxygen B) nitrogen C) argon D) carbon dioxide E) CO₂ F) d and e only

40. What facilitates O₂ transport in the circulatory system of humans? A) hemoglobin B) ribulose bisphosphate carboxylase/oxygenase C) temperature D) carbonic anhydrase E) a and b only
41. What is the proper sequence for the passage of food in humans?
   A) mouth, esophagus, stomach, small intestine, large intestine, rectum, anus
   B) mouth, esophagus, stomach, large intestine, small intestine, rectum, anus
   C) mouth, stomach, esophagus, large intestine, small intestine, anus, rectum
   D) mouth, stomach, large intestine, small intestine, esophagus, anus, rectum
   E) mouth, esophagus, stomach, small intestine, large intestine, anus, rectum

42. Where does most of nutrient absorption occur? A) stomach B) mouth C) small intestine D) large intestine E) esophagus

43. Insulin A) is a laxative B) releases sugar into the bloodstream C) takes blood sugar and puts it to work in cells D) is not necessary for normal metabolism

44. Which of the following are haploid and non-duplicated? A) spermatids B) spermatogonia C) mature oocytes D) primary oocytes E) c and d only F) a and b only G) a and c only H) a, b, c, and d

45. Which of the following occur(s) during sexual arousal in human females? A) increase in breast size B) erection of clitoris C) erection of labia minor D) moistening of the vagina E) b and d only F) a, b, c, and d

46. Male orgasm includes all of the following EXCEPT A) sperm production B) muscle contractions C) ejaculation D) sensations of release E) sensations of warmth

47. Where does fertilization usually occur? A) ovary B) vagina C) oviduct D) uterus E) clitoris

48. In the movie, "The Miracles of Life," you observed A) birth at the beginning of the movie B) birth at the end of the movie C) mutated sperm D) normal sperm E) a and c only F) b and d only G) a and d only H) a, b, and d only I) b, c, and d only

49. According to a guest lecture by J.C. Mahan of John Paul Mitchell Systems, which component of hair forms a canal but has not yet been found to have a specific physiological function? A) medulla B) cortex C) fiber D) gland E) follicle

50. What type of hair "bonds" are broken to achieve a permanent "hair-do?" A) hydrogen B) disulfide C) ionic D) none

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EXAM IV
General Biology 1114
(Dr. Bidlack)

NAME ________________________________

Social Security No. ____________________

Section ______________________________

MULTIPLE CHOICE AND MATCHING (100%): Read each question carefully and write the letter of the best or most appropriate answer in the space to the left of each question. You MUST WRITE THE LETTER of the best answer on the left of each question to get credit. Illegible letters will be counted as incorrect. There is only one right answer for each question.

SECTION I: MULTIPLE CHOICE AND MATCHING (50 questions at 2 points each = 100 points).

1. An insect belongs to A)Kingdom Animalia B)Phylum Mollusca C)Class Mammalia D)a and b only E)a, b, and c

2. Mammals A)nourish their young through milk-secreting glands B)have lungs C)usually have hair D)a and b only E)a, b, and c

3. Which of the following is a member of the Family Hominidae? A)lemur B)orangutan C)man D)a and b only E)a, b, and c

4. According to lecture, fire was best used by early man during the ice ages for what purpose? A)human sacrifices B)removal of excess vegetation C)warmth D)entertainment E)destruction

5. What type of preliminary tissue in animals leads to formation of muscle and tissues of the circulatory system? A)protoderm B)mesoderm C)endoderm D)ectoderm E)interderm

6. Epithelial tissue is found in A)tendons B)neurons C)cartilage D)outer skin E)blood vessels

7. What organ system functions to provide movement, maintenance, end heat production? A)circulatory B)integumentary C)respiratory D)skeletal E)muscular

8. A turtle is a(n) A)mammal B)reptile C)amphibian D)insect E)fish

9. Dentition is A)flexibility to response B)type, number, and size of teeth C)skeletal structure D)number of indentations in the skull

10. The basic unit of the nervous system is the A)neuron B)nerve cell C)axon D)dendrite E)a and b only

11. What part of the brain is responsible for controlling "desires" such as thirst, hunger, and sex? A)cerebrum B)thalamus C)hypothalamus D)cerebellum E)cerebellum

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12. Use the following to describe the most appropriate sequence of events for nerve action:

1 = Inside membrane positively charged
2 = Inside membrane negatively charged
3 = Receptor senses something
4 = sodium channels open up
5 = gradient moves along axon

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

Use the following story below to answer questions 13 through 16:

Bart and Bertha were enjoying a meal together. Just as Bart began to pour the wine, Bertha felt a trembling and aching pain originating from her lower abdomen. "Could this be love?" pondered Bertha, "or simply a wild case of the butterflies?" But then it happened... The event that neither Bart nor Bertha anticipated. It came out from Bertha's flowered dress like a shot gun. Blast after blast after blast - the loudest, longest, and most unusual fart anyone could have ever produced. "PFTFTFTFTFTFTFTFTFTFTFTFT" sounded Bertha. And then the smell...It only took a few seconds for Bart's nose to detect the odiferous stench drifting from where Bertha was sitting. His brain went wild as he tried to decide whether or not he should be polite and ignore it or simply move. Bertha was too close though, and subsequent farts continued to flow from within her. The decision had been made. Bart had to do something. Fortunately, there was a window and a fan next to the dinner table. He got up, opened the window, and turned on the fan. They were both relieved.

13. Bertha's stinky fart is the A) response  B) receptor  C) stimulus  D) integrator  E) effector

14. What is the receptor? A) Bertha's flowered dress  B) Bart's nose  C) Bart's brain  D) the window  E) the fan

15. The effector is interpreted as A) Bertha's stinky fart  B) Bart's brain  C) Bart's muscles used to open the window  D) Bertha's flowered dress  E) Bart's nose

16. What type of homeostatic mechanism is demonstrated in this story? A) negative feedback  B) positive feedback  C) intensification  D) magnification  E) neutral

17. What gland of the endocrine system is responsible for growth and development? A) parathyroid  B) adrenal cortex  C) adrenal medulla  D) thyroid  E) thymus

18. Transcriptional control of cellular metabolism is demonstrated by A) epinephrine  B) insulin  C) testosterone  D) a and b only  E) a, b, and c

19. Insulin regulates sugar levels in the body by A) removing it from cells  B) forcing sugar to be excreted through the urinary system  C) putting it into cells for metabolism  D) keeping it suspended as free sugar in the blood  E) storing it all in the pancreas
20. Erythrocytes A) are white blood cells  B) have a nucleus  C) lack mitochondria  D) a and b only  E) a, b, and c

21. White blood cells A) are the most abundant cells of the blood  B) vary in number depending on severity of infection  C) lack a nucleus  D) transport oxygen  E) function exclusively in clotting

22. Which of the following is (are) a nonspecific defense response(s)? A) intact skin  B) ciliated mucus membranes  C) stomach acid  D) a and b only  E) a, b, and c

23. A foreign body that lacks the major histocompatibility complex (MHC) is called a(n) A) red blood cell  B) white blood cell  C) hemoglobin molecule  D) antibody  E) antigen

Questions 24 through 28: Write the letter to the left of the item which corresponds to that which is depicted below:

24. Parathyroid and thyroid glands

25. Ovaries and testes

26. Location of master gland

27. Adrenal glands and pancreas

28. Thymus gland

29. Oxygen will be released from the hemoglobin molecule when A) the blood is cooler  B) pH is higher  C) oxygen is need in surrounding tissues  D) a and b only  E) a, b, and c

30. Carbonic anhydrase A) competes with CO₂ for oxygen  B) enables CO₂ to be transported in the blood  C) combines ammonia with CO₂  D) warms the blood  E) cools the blood

31. The covering that protects air passage during swallowing of food is called the A) esophagus  B) epiglottis  C) larynx  D) trachea  E) alveoli
32. Which sequence of events best describes the flow of oxygen from the smallest lung unit to the hemoglobin molecule?

A) from interstitial fluid, through alveoli, capillaries, red blood cells, to hemoglobin
B) from capillaries, through interstitial fluid, alveoli, red blood cells, to hemoglobin
C) from alveoli, through capillaries, interstitial fluid, red blood cells, to hemoglobin
D) from red blood cells, through capillaries, interstitial fluid, alveoli, to hemoglobin
E) from alveoli, through interstitial fluid, capillaries, red blood cells, to hemoglobin

33. What enzyme of the stomach mucosa is secreted for digestion of proteins?
A) amylase  B) pepsin  C) lipase  D) peptidase  E) chymotrypsin

34. What is the proper sequence for the passage of food in humans?
A) mouth, esophagus, stomach, small intestine, large intestine, rectum, anus
B) mouth, esophagus, stomach, large intestine, small intestine, rectum, anus
C) mouth, stomach, esophagus, large intestine, small intestine, anus, rectum
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35. Where does most of nutrient absorption occur?
A) stomach  B) mouth  C) small intestine  D) large intestine  E) esophagus

36. Which of the following can occur during sexual arousal in human females?
A) moistening of the vagina  B) erection of clitoris  C) increase in breast size
D) a and b only  E) a, b, and c

37. Which of the following is haploid and non-duplicated?
A) spermatids  B) spermatogonia  C) secondary spermatocytes  D) primary oocytes  E) primary spermatocytes

38. Male orgasm includes all of the following EXCEPT
A) sperm production  B) muscle contractions  C) ejaculation  D) sensations of release  E) sensations of warmth

39. Where does fertilization usually occur?
A) ovary  B) vagina  C) oviduct  D) uterus  E) clitoris

40. In the movie, "The Miracles of Life," you observed
A) birth at the end of the movie  B) normal sperm  C) mutated sperm  D) a and b only  E) a, b, and c

41. In the movie, "The Miracles of Life," the father at the end of the movie said,
A) "WOW!!!"  B) "It's a girl!"  C) "It's a boy!"  D) "Happy Birthday!"  E) "I love you"

42. Cells in the animal body
A) engage in metabolic activities that ensure their survival
B) perform activities that contribute to the survival of the animal
C) contribute to maintaining the extracellular fluid
D) all of the above

43. In terms of sheer numbers and distribution, ___________ are the most successful animals.
A) arthropods  B) sponges  C) snails and clams  D) sea stars  E) vertebrates
44. In a simple reflex, __________ directly signal, which act on muscle cells. A) sensory neurons; interneurons B) interneurons; motor neurons C) sensory neurons; motor neurons D) motor neurons; sensory neurons

45. The hypothalamus produces two hormones that are released from the anterior lobe of the pituitary gland. One hormone, __________, affects kidney function; the other, __________, affects some reproductive events. A) ADH; oxytocin B) prolactin; ADH C) oxytocin; ADH D) ADH; prolactin

46. In the pulmonary circuit, the __________ half of the heart pumps __________ blood to the capillary beds inside the lungs, then __________ blood flows back to the heart. A) left; oxygen-poor; oxygen-enriched B) right; oxygen-poor; oxygen-enriched C) left; oxygen-enriched; oxygen-poor D) right; oxygen-enriched; oxygen-poor

47. Oxygen diffusing into pulmonary capillaries also diffuses into __________ and binds with __________. A) white blood cells; carbon dioxide B) red blood cells; carbon dioxide C) white blood cells; hemoglobin D) red blood cells; hemoglobin

48. Which glands are not associated with digestion? A) salivary glands B) thymus gland C) liver D) gallbladder E) pancreas

49. __________ and their products are the basis of the immune system. A) Red blood cells B) Blood platelets C) White blood cells D) Antigens

50. Sperm formation is controlled by A) testosterone B) LH C) FSH D) all of the above affect sperm formation
THE FINAL EXAM

INFORMATION ABOUT THE FINAL EXAM WILL BE PROVIDED IN CLASS TOWARD THE END OF THE SEMESTER