

AP Biology
Fall Final Review

MULTIPLE CHOICE. Read each question carefully and select the BEST response

- Which of these is *not* one of the procedures used in Southern blotting?
 - DNA microarray assay
 - hybridization
 - restriction fragment preparation
 - electrophoresis
 - autoradiography
- In a hypotonic solution an animal cell will
 - experience turgor.
 - shrink.
 - lyse.
 - lose water.
 - neither gain nor lose water.
- Which of the following is an example of polymorphism in humans?
 - variation in intelligence
 - variation in fingerprints
 - variation in the number of fingers
 - the presence or absence of a widow's peak
 - variation in height
- Darwin was able to formulate his theory of evolution based on several facts. Which of the following facts was unavailable to Darwin in the mid-nineteenth century?
 - Natural resources are limited.
 - Characteristics are inherited as genes on chromosomes.
 - Individual organisms in a population are not alike.
 - Most populations are stable in size.
 - All populations have the potential to increase.
- What are the maximum number of covalent bonds an element with atomic number 16 can make with hydrogen?
 - 5
 - 2
 - 3
 - 1
 - 4
- Molecules capable of interacting must first overcome a thermodynamic barrier known as the reaction's
 - activation energy.
 - free-energy content.
 - heat content.
 - entropy.
 - endothermic level.
- What kind of chemical bonds are found between paired bases of the DNA double helix?
 - ionic
 - covalent
 - phosphate
 - sulfhydryl
 - hydrogen
- Water's high specific heat is mainly a consequence of the
 - inability of water to dissipate heat into dry air.
 - small size of the water molecules.
 - absorption and release of heat when hydrogen bonds break and form.
 - high specific heat of oxygen and hydrogen atoms.
 - fact that water is a poor heat conductor.

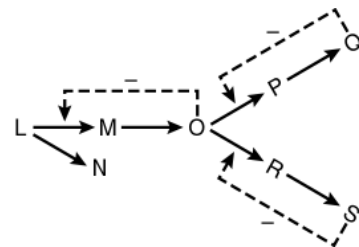


9. Each element is unique and different from other elements because of its
- atomic weight.
 - atomic number.
 - mass number.
 - Only A and B are correct.
 - A, B, and C are correct.
10. A new organism is discovered in the deserts of New Mexico. Scientists there determine that the polypeptide sequence of hemoglobin from the new organism has 68 amino acid differences from humans, 62 differences from a gibbon, 24 differences from a rat, and 6 differences from a frog. These data
- were collected to determine the type of blood in the new organism.
 - show that the new organism is best adapted to an aquatic habitat.
 - indicate that the new organism may be closely related to frogs.
 - suggest that the new organism is closely related to humans.
 - suggest that the new organism evolved from gibbons but not rats and mice.
11. The polymerase chain reaction (PCR) could be used to amplify DNA from which of the following?
- a fossil
 - a fetal cell
 - a virus
 - B and C
 - A, B, and C
12. For a science fair project, two students decided to repeat the Hershey and Chase experiment, with modifications. They decide that labeling the phosphates of the DNA wasn't good enough. Each nucleotide has only one phosphate, whereas each has two to five nitrogens. Thus, labeling the nitrogens would provide a stronger label than labeling the phosphates. This experiment will not work because
- radioactive nitrogen has a half-life of 100,000 years and the material would be too dangerous for too long.
 - amino acids (and thus proteins) also have nitrogen atoms, thus the radioactivity would not distinguish between DNA and proteins.
 - there is no radioactive isotope of nitrogen.
 - Meselson and Stahl already did this experiment.
 - although there are more nitrogens in a nucleotide, labeled phosphates actually have 16 extra neutrons, so they are more radioactive.
13. Which of the following may explain genomic imprinting?
- retrotransposons
 - DNA methylation
 - microsatellite DNA
 - post-translational modification of proteins
 - oncogenes
14. All of the structures listed below are associated with movement in cells or by cells *except*
- flagella.
 - cilia.
 - dynein.
 - myosin.
 - peroxisomes.



15. Which of the following does *not* occur during mitosis?
- separation of the centrosomes
 - separation of sister chromatids
 - spindle formation
 - replication of the DNA
 - packaging of the chromosomes
16. What are the two classifications of prokaryotes?
- Domain Bacteria and Domain Eukarya
 - Domain Bacteria and Domain Archaea
 - Domain Eukarya and Domain Archaea
 - Domain Archaea and Kingdom Monera
 - Domain Bacteria and Kingdom Monera
17. In terms of the hierarchical organization of life, an amoeba is _____ level of organization, whereas a dog is at the _____ level of organization.
- only at the tissue ... multicellular organism
 - only at the organelle ... cell and multicellular organism
 - only at the organelle ... unicellular organism
 - at the cell and organism ... multicellular organism
 - only at the cell ... organism
18. Which of the following is an example of a hydrogen bond?
- the bond between two hydrogen atoms
 - the bond between C and H in methane
 - the bond between Na and Cl in salt
 - the bond between the H of one water molecule and the O of another water molecule
 - the bond between Mg and Cl in $MgCl_2$
19. What are ribosomes composed of?
- two subunits, each consisting of rRNA only
 - mRNA, rRNA, and protein
 - two subunits, each consisting of several proteins only
 - mRNA, tRNA, rRNA, and protein
 - both rRNA and protein
20. Dog breeders maintain the purity of breeds by keeping dogs of different breeds apart when they are in season. This kind of isolation is most similar to which of the following reproductive isolating mechanisms?
- reduced hybrid fertility
 - mechanical isolation
 - hybrid breakdown
 - habitat isolation
 - gametic isolation
21. In the following branched metabolic pathway, a dotted arrow with a minus sign symbolizes inhibition of a metabolic step by an end product:

Which reaction would prevail if both Q and S were present in the cell in high concentrations?



- $O \rightarrow P$
- $L \rightarrow N$
- $M \rightarrow O$
- $L \rightarrow M$
- $R \rightarrow S$



22. Which statement is most consistent with the natural theology that was prevalent in Europe and America during Darwin's life?
- God is nature.
 - To love God is to love nature.
 - God can be discerned only through the study of nature.
 - God is all-natural.
 - Nature reflects God's intelligent design.
23. There are _____ subgroups within the domain Archaea.
- one
 - two
 - three
 - four
 - five
24. What are the basic "building blocks" of DNA?
- 20 amino acids
 - protein
 - four nucleotides
 - carbohydrates and lipids
 - 26 nucleotides
25. Changes to the nucleotide sequence within a gene can occur through which process(es)?
- crossing over
 - mutation
 - independent assortment
 - Only A and B are correct.
 - A, B, and C are correct.
26. Antibody diversity is due to
- alternative splicing.
 - genetic recombination and combining of polypeptides.
 - the attachment of acetyl groups to histone proteins.
 - the presence of thousands of enhancers.
 - the cell's ability to make rRNA.
27. Which of the following pairs is mismatched?
- lysosome—protein synthesis
 - nucleolus—ribosomal RNA
 - nucleus—DNA replication
 - cytoskeleton—microtubules
 - cell membrane—lipid bilayer
28. The DNA content of a diploid cell in the G₁ phase of the cell cycle is measured (see Chapter 12 in the textbook). If the DNA content is x , then the DNA content of the same cell at metaphase of meiosis I would be
- $0.25x$
 - $0.5x$
 - x .
 - $2x$.
 - $4x$.
29. Which of the following can best be explained by continental drift?
- The scarcity of eutherian (placental) mammals in Australia.
 - The relative age of fossils.
 - The Chicxulub crater.
 - The Cretaceous extinctions of 65 million years ago.
 - The evolution of aquatic reptiles, such as ichthyosaurs.
30. Energy enters *most* ecosystems as
- chemical energy.
 - heat and chemical energy.
 - light.
 - light and chemical energy.
 - heat.



31. Theoretically, the production of sterile mules by interbreeding between female horses and male donkeys should
- eventually result in the formation of a single species from the two parental species.
 - reinforce prezygotic isolating mechanisms between horses and donkeys.
 - cause convergent evolution.
 - weaken the intrinsic reproductive isolating mechanisms between horses and donkeys.
 - result in the extinction of one of the two parental species.
32. _____ first appeared during the Precambrian era.
- Amphibians
 - Dinosaurs
 - Reptiles
 - Mammals
 - Cyanobacteria
33. The two ring forms of glucose (α and β)
- arise when different carbons of the linear structure join to form the rings.
 - arise because the hydroxyl group at the point of ring closure can be trapped in either one of two possible positions.
 - include an aldose and a ketose.
 - arise from different linear (nonring) glucose molecules.
 - are made from different structural isomers of glucose.
34. Which of the following statements about the domains of prokaryotes is *not* true?
- Of the two groups, bacteria are more closely related to eukaryotes.
 - Bacteria include the cyanobacteria.
 - The lipid composition of the plasma membrane found in archaea is different from that of bacteria.
 - Both archaea and bacteria have cell walls, but the walls of archaea lack peptidoglycan.
 - Archaea and bacteria probably diverged very early in evolutionary history.
35. Which of the following characterizes the sodium-potassium pump?
- Potassium ions are pumped into a cell against their gradient.
 - Sodium ions are pumped out of a cell against their gradient.
 - A and B
 - A carrier protein undergoes conformational change.
 - A, B, and C
36. In chemiosmotic phosphorylation, what is the most direct source of energy that is used to convert $\text{ADP} + \text{P}_i$ to ATP?
- energy released from movement of protons through ATP synthase
 - energy released as electrons flow through the electron transport system
 - No external source of energy is required because the reaction is exergonic.
 - energy released from substrate-level phosphorylation
 - energy released from ATP synthase pumping hydrogen ions against their concentration gradient
37. In animals, meiosis results in gametes, and fertilization results in
- sporophytes.
 - clones.
 - spores.
 - somatic cells.
 - zygotes.
38. The general name for an enzyme that transfers phosphate groups from ATP to a protein is
- ATPase.
 - phosphorylase.
 - phosphatase.
 - protein kinase.
 - protease.



39. All of the following statements are true *except*:
- Mitosis and cytokinesis are required for asexual reproduction.
 - The mitotic spindles in prokaryotic cells are composed of microtubules.
 - Mitosis may occur without cytokinesis.
 - Mitosis produces new nuclei with exactly the same chromosomal endowment as the parent nucleus.
 - All cells come from a preexisting cell.

40. Which of the following responses would be expected in myxobacteria when nutrients are scarce?
- Cells secrete an **a**-factor and an α -factor signal that releases new nutrients.
 - Cells would cannibalize each other unless they secrete a chemical signal telling the other myxobacteria they are alike.
 - Starving cells secrete a chemical signal that simulates other cells to aggregate in the soil and form spores.
 - The starved cells secrete a signal to other cells that it is time to move to another environment.
 - Both C and D are expected responses.

41. During oxidative phosphorylation, H_2O is formed. Where do the oxygen atoms in the H_2O come from?
- molecular oxygen
 - pyruvate
 - glucose
 - carbon dioxide
 - lactate

42. CAM plants can keep stomates closed in daytime, thus reducing loss of water. They can do this because they
- fix CO_2 into sugars in the bundle-sheath cells.
 - use photosystems I and II at night.
 - use the enzyme phosphofructokinase, which outcompetes rubisco for CO_2 .
 - fix CO_2 into pyruvic acid in the mesophyll cells.
 - fix CO_2 into organic acids during the night.

43. A 0.1% frequency of recombination is observed
- on unlinked chromosomes.
 - for any two genes on different chromosomes.
 - on genetic maps of viral chromosomes.
 - only in sex chromosomes.
 - in genes located very close to one another on the same chromosome.

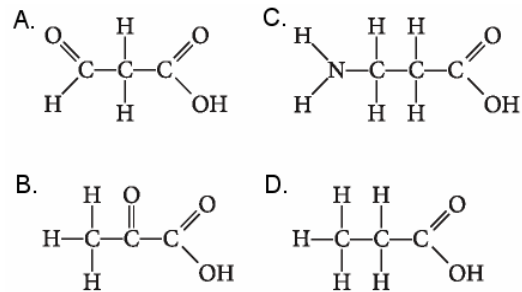


Figure 4.12

44. Which of the molecules shown in Figure 4.12 would be the strongest acid?
- B
 - A
 - C
 - D
 - E



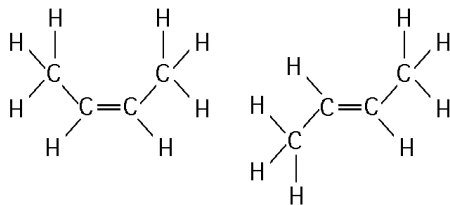


Figure 4.3

45. The two molecules shown in Figure 4.3 are best described as
- radioactive isotopes.
 - structural isomers.
 - nonisotopic isomers.
 - geometric isomers.
 - enantiomers.

The following questions refer to the following simple metabolic pathway:



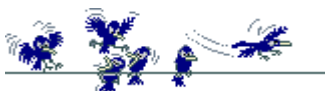
46. One strain of a diploid organism is homozygous for a recessive allele coding for a defective enzyme *a*. Another strain is homozygous for a recessive allele coding for a defective enzyme *b*. Crossing those two strains will result in a strain that would grow on which of the following?
- a minimal medium supplemented with A
 - a minimal medium supplemented with both A and B
 - a minimal medium supplemented with B
 - All of the above will support the growth of the new strain.

Use the following information to answer the question below. Albinism (lack of skin pigmentation) is caused by a recessive autosomal allele. A man and woman, both normally pigmented, have an albino child together.

47. The couple decides to have a second child. What is the probability that this child will be albino?
- 0
 - 3/4
 - 1/2
 - 1
 - 1/4

Use the following information to answer the questions below. Thomas Engelmann illuminated a filament of algae with light that passed through a prism, thus exposing different segments of algae to different wavelengths of light. He added aerobic bacteria and then noted in which areas the bacteria congregated. He noted that the largest groups were found in the areas illuminated by the red and blue light.

48. What did he conclude about the congregation of bacteria in the red and blue areas?
- Bacteria congregated in these areas due to an increase in the temperature of the red and blue light.
 - Bacteria congregated in these areas because these areas had the most oxygen being released.
 - Bacteria released excess carbon dioxide in these areas.
 - Bacteria are attracted to red and blue light and thus these wavelengths are more reactive than other wavelengths.
 - Bacteria congregated in these areas due to an increase in the temperature caused by an increase in photosynthesis.



Use the information given here to answer the following questions. Feather color in budgies is determined by two different genes that affect the pigmentation of the outer feather and its core. $Y_B_$ is green; $yyB_$ is blue; Y_bb is yellow; and $yybb$ is white.

49. Two blue budgies were crossed. Over the years, they produced 22 offspring, 5 of which were white. What are the most likely genotypes for the two blue budgies?
- $yyBB$ and $yyBb$
 - $yyBb$ and $yyBb$
 - $yyBb$ and $yybb$
 - $yyBB$ and $yybb$
 - $yyBB$ and $yyBB$

Use the list of chromosomal systems below to answer the following questions.

- haploid-diploid
- X-O
- X-X
- X-Y
- Z-W

50. What is the chromosomal system for sex determination in birds?
- A
 - B
 - C
 - D
 - E



Answer Key

Testname: FALLFINALREVIEW.TST

1. Answer: a
2. Answer: c
3. Answer: d
4. Answer: b
5. Answer: b
6. Answer: a
7. Answer: e
8. Answer: c
9. Answer: b
10. Answer: c
11. Answer: e
12. Answer: b
13. Answer: b
14. Answer: e
15. Answer: d
16. Answer: b
17. Answer: d
18. Answer: d
19. Answer: e
20. Answer: d
21. Answer: b
22. Answer: e
23. Answer: b
24. Answer: c
25. Answer: d
26. Answer: b
27. Answer: a
28. Answer: d
29. Answer: a
30. Answer: c
31. Answer: b
32. Answer: e
33. Answer: b
34. Answer: a
35. Answer: b
36. Answer: a
37. Answer: e
38. Answer: d
39. Answer: b
40. Answer: c
41. Answer: a
42. Answer: e
43. Answer: e
44. Answer: a
45. Answer: d
46. Answer: a
47. Answer: e
48. Answer: b
49. Answer: b
50. Answer: e

