



2014 Academic Challenge

BIOLOGY TEST - REGIONAL

This Test Consists of 50 Questions

Biology Test Production Team

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GENERAL DIRECTIONS

Please read the following instructions carefully. This is a timed test; any instructions from the test supervisor should be followed promptly.

The test supervisor will give instructions for filling in any necessary information on the answer sheet. Most Academic Challenge sites will ask you to indicate your answer to each question by marking an oval that corresponds to the correct answer for that question. Only one oval should be marked to answer each question. Multiple ovals will automatically be graded as incorrect answers.

Be sure ovals are marked as  , not  ,  ,  , etc.

If you wish to change an answer, erase your first mark completely before marking your new choice.

You are advised to use your time effectively and to work as rapidly as you can without losing accuracy. Do not waste your time on questions that seem too difficult for you. Go on to the other questions, and then come back to the difficult ones later if time remains.

***** TIME: 40 MINUTES *****

DO NOT OPEN TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO!

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WYSE – Academic Challenge
Biology Test (Regional) – 2014

- Which of the following statements is true?
 - Lipids are non-polar molecules soluble in water.
 - Amino acids are building blocks to polypeptides.
 - Hydrogen bonds are the most important and strongest bonds.
 - Answers a and c are both true.
 - All of the above are true.
- Which organelle contains digestive enzymes?
 - ribosome
 - mitochondrion
 - chloroplast
 - lysosome
 - nucleolus
- Which of the following is true?
 - The subatomic particles of an atom are protons, neutrons, and electrons.
 - Electrons are located within the nucleus of an atom.
 - If an atom has 12 protons and 13 neutrons, its atomic mass is 25.
 - The valence shell is the innermost energy shell of an atom.
 - Both a and c are true.

- Match the terms in **Column A** with its definition from **Column B**.

Column A

- Community
- Ecosystem
- Population

Column B

- the same organism in a given area
- all the different organisms within a given area
- living and nonliving

Select the correct matching sequence.

- | | | |
|--------|-----|-----|
| a. 1-b | 2-c | 3-a |
| b. 1-c | 2-b | 3-a |
| c. 1-c | 2-a | 3-b |
| d. 1-a | 2-b | 3-c |
| e. 1-b | 2-a | 3-c |

- Which of the following statements is false?
 - Rh factor was first discovered in Rhesus monkeys.
 - Women with Rh negative blood will receive a Rho Gam shot during pregnancy to prevent the antibodies to Rh positive blood from being formed.
 - People with AB blood type are considered universal blood donors.
 - If a parent has AB blood type, their biological children will not have type O blood.
 - A father with type A and a mother with type B blood could have a type O child.
- Which of the following is **not** true?
 - Smooth endoplasmic reticulum is responsible for lipid synthesis.
 - Peroxisomes are the same as lysosomes.
 - Ribosomes synthesize proteins.
 - ATP is produced in the mitochondrion.
 - Contractile vacuoles are found in *Paramecium*.

7. Which of the following statements is **not** true?
- Transmission electron microscopes are higher magnification than light microscopes and give scientists a three dimensional view of our cells.
 - The objective lenses of a microscope are located on the revolving or rotating nosepiece.
 - The course adjustment knob allows for the smallest of focusing movements while using the light microscope.
 - Total magnification is calculated by multiplying the objective lens and the eyepiece or ocular lens.
 - Both a and c are not true.
8. Which of the following statements is false?
- Taxonomy is a method of classifying organisms based on shared characteristics.
 - Homeostasis is the ability to maintain a stable internal environment in the presence of external changes.
 - Metabolism is all the chemical and physical reactions that may take place within a living organism.
 - Anabolic reactions are synthesis reactions and involve the gain of electrons through reduction.
 - Enzyme activity increases activation energy of a reaction.
9. In humans, which is **not** a component of the large intestine?
- ileum
 - cecum
 - transverse colon
 - hepatic flexure
 - sigmoid colon
10. In an experiment, a scientist places a sealed dialysis tube containing 5% glucose and 95% pure distilled water solution into a beaker of 100% pure distilled water. Which of the following statements is true related to this experiment?
- The water in the beaker is hypotonic to the solution inside the dialysis tubing.
 - Because of the osmotic pressure, water will move out of the dialysis tubing over time.
 - The solution inside the dialysis tubing is hypertonic to the water in the beaker.
 - Both a and c are correct predictions of the experiment.
 - None of the above is true of this experiment.
11. Place the following anatomical structures in the proper order beginning with the entrance of air into the human body.
- 1-trachea
 - 2-nasal cavity
 - 3-larynx
 - 4-bronchus
 - 5-pharynx
 - 6-alveoli
- 2, 3, 5, 4, 1, 6
 - 2, 5, 3, 1, 4, 6
 - 2, 5, 1, 3, 4, 6
 - 5, 2, 3, 1, 6, 4
 - 2, 1, 5, 3, 4, 6

12. DNA amplification is accomplished by ____.
- Gel electrophoresis
 - RFLP
 - PCR
 - Western Blot
 - Hybridization
13. Which of the following is **not** a correct association?
- Robert Hooke is to cells, as Rudolf Virchow is to cloning.
 - Rosalind Franklin is to DNA, as Watson and Crick are to DNA.
 - Carolus Linnaeus is to taxonomy, as Gregor Mendel is to genetics.
 - Thomas Morgan is to fruit flies, as Ian Wilmut is to sheep.
 - Francis Collins is to DNA, as Schleiden and Schwann are to plants and animals.
14. The taxonomic categories in correct sequence are Domain, Kingdom, ____, ____, ____, ____, _____, and Species.
- Class, Family, Phylum, Order, Genus
 - Family, Order, Phylum, Class, Genus
 - Phylum, Class, Family, Order, Genus
 - Phylum, Family, Order, Class, Genus
 - None of the above
15. Which of the following statements is true?
- Mitosis and meiosis take place in both plants and animals.
 - Spindle fibers are distinct structures that can easily be seen with the light microscope during prophase.
 - Animal cells lack centrioles and a visible cleavage furrow.
 - Both b and c.
 - All of the above.
16. Which of the following statements is **not** true?
- Carbon, hydrogen, oxygen and nitrogen are the four most common compounds in living organisms.
 - Glucose is the monomer for starch.
 - Water is the most abundant inorganic compound in a living organism.
 - A neutral substance has a pH of 7.0.
 - Acidic substances have a higher hydrogen ion concentration than alkaline substances.
17. Select the incorrect association.
- Diploid – parent cell prior to mitosis
 - Haploid – daughter cell post mitosis
 - Zygote – diploid
 - Gamete – haploid
 - Downs syndrome – trisomy
18. Which of the following is true?
- DNA is electronegative.
 - Larger fragments of DNA or molecules travel farther on the gel compared to smaller ones.
 - Restriction enzymes cleave DNA.
 - Both a and b are true.
 - All of the above are true.

19. Xylem ____.
- is only found in angiosperms
 - transports glucose produced during photosynthesis
 - is the main photosynthetic tissue
 - transports both water and minerals
 - Both b and d are correct.
20. Mushrooms, yeast, and mildew are all ____.
- in the same phylum
 - prokaryotes
 - in Kingdom Fungi
 - single celled
 - All of the above are true.
21. In humans, albinism is caused by a recessive trait. If a child has albinism, then ____.
- both parents must be albino
 - one parent must be an albino and the other can be homozygous for normal skin pigmentation
 - both parents could be heterozygous for albinism
 - one parent can be an albino and the other can be heterozygous for albinism
 - Both c and d are correct.
22. Which is **not** correctly matched?
- adenine – thymine
 - uracil – purine
 - adenine – uracil
 - guanine – cytosine
 - cytosine – pyrimidine
23. Phylum Annelida has all the following characteristics except ____.
- bilateral symmetry
 - segments
 - closed circulatory system
 - incomplete digestive system
 - seta

24. Match the following plants in **Column A** with a structure or characteristic in **Column B**.

Column A	Column B
1. Angiosperms	a. sori
2. Gymnosperms	b. cones
3. Mosses	c. fruit
4. Ferns	d. nonvascular

Select the correct matching sequence.

- 1-c 2-b 3-d 4-a
- 1-a 2-b 3-c 4-d
- 1-c 2-d 3-b 4-a
- 1-a 2-c 3-d 4-b
- 1-c 2-a 3-b 4-d

25. Determine the molecular weight of glucose ($C_6H_{12}O_6$), given the following atomic number and atomic weights: C – 6 and 12, O – 8 and 16, H – 1 and 1.
- 19
 - 24
 - 90
 - 96
 - 180
26. The light reaction of photosynthesis occurs in the _____.
- thylakoid membranes of grana
 - cristae of the double membrane
 - electron transport chain
 - stroma of the matrix
 - cytosol of the chloroplast
27. Which of the following is true?
- Ribosomes may be free floating or located on the Golgi apparatus.
 - The nucleus contains nucleoplasm and has a nuclear envelop with nuclear pores.
 - Cytoplasm is the fluid within the large central vacuole of cells.
 - Phagocytosis is a method by which cells form vacuoles to expel large molecules.
 - Both a and b are true.
28. Match the terms in **Column A** with its definition from **Column B**.

Column A

- Cells
- Chemicals
- Organs
- Tissues

Column B

- tissues functioning together
- smallest level of organization considered living
- similar cells working together for a common function
- atoms or macromolecules

Select the correct matching sequence.

- 1-c 2-b 3-a 4-d
- 1-a 2-c 3-d 4-b
- 1-b 2-d 3-a 4-c
- 1-d 2-c 3-a 4-b
- None of the above sequences are correct.

29. Match the organelle in **Column A** with the correct organism from **Column B**.

Column A

- Flagella
- Cilia
- Pseudopodia

Column B

- Paramecium*
- Ameoba*
- Euglena*

Select the most appropriate matching sequence.

- 1-b 2-c 3-a
- 1-c 2-b 3-a
- 1-a 2-c 3-b
- 1-b 2-a 3-c
- None of the above

30. Which of the following is **not** a component of the endocrine system?
- pituitary gland
 - parathyroid
 - thyroid
 - spleen
 - thymus
31. Which of the following statements is correct?
- ATP is to the mitochondrion, as protein is to the ribosome.
 - Mitosis is to somatic cells, as meiosis is to gametes.
 - Microtubules are to cytoskeleton, as phospholipids are to plasma membrane.
 - Both a and c are correct.
 - All of the above are correct.
32. Good laboratory practice would **not** include?
- Documenting and labeling materials.
 - Keeping a laboratory notebook and taking notes.
 - Wearing protective clothing and gloves.
 - Storing food in the refrigerator.
 - Cleaning glassware and work spaces.
33. A person's ability to maintain body temperature may be explained by all of the following except?
- positive feedback loop
 - homeostatic mechanisms
 - negative feedback loop
 - vasoconstriction or vasodilation
 - sweat evaporation
34. Which of the following is a sex-linked trait?
- Klinefelter syndrome
 - hemophilia
 - color blindness
 - Turner's syndrome
 - both b and c
35. Which of the following is true of water?
- Hydrophilic molecules are attracted to water.
 - Polar bonds exist between oxygen and hydrogen within one molecule of water.
 - Water can change rapidly to different forms as compared to other liquids.
 - Both a and b are true.
 - All of the above are true.
36. In the following food chain, the primary consumer is ____.
- grass→fly→frog → snake→owl
- grass
 - snake
 - fly
 - frog
 - owl

37. Which plant part is **not** correctly matched with its function?
- cuticle – reduces water loss
 - mesophyll – conducts minerals
 - root hairs – water absorption
 - flower – reproduction
 - root cap – protects the meristem
38. Bacteria usually have ____.
- a cell wall
 - a nucleus
 - a mitochondrion
 - endoplasmic reticulum
 - All of the above
39. tRNA ____.
- picks up the genetic code
 - makes up the ribosome
 - edits the DNA before leaving the nucleus
 - acts as a catalyst during protein synthesis
 - picks up the amino acids and brings them to the ribosome
40. Which biome is **not** matched to one of its characteristics?
- deciduous forest – trees lose their leaves in the fall
 - savannah – lots of rain
 - desert – little rain
 - tundra – very cold long winters
 - rain forest – poor soil and lots of rain
41. Which term is **not** correctly matched?
- homozygous – AA
 - phenotype – straight hair line
 - genotype – a
 - heterozygous – Aa
 - 2n – diploid
42. Which of the following statements is true?
- Carbon is found in all living organisms.
 - An organic molecule contains hydrogen and carbon.
 - Salts are formed when an acid and base react.
 - Ions are atoms with a charge.
 - All of the above are true.
43. Which is an example of homologous structures?
- appendix
 - wings on a bat and wings on a fly
 - pelvic girdle inside a python
 - flippers on a dolphin and forelimbs on a horse
 - Both a and c are correct.

44. Which of the following is true?
- NAD and FAD are important coenzymes.
 - Water is the final acceptor of electrons in cellular respiration.
 - Fermentation results in 32 ATP molecules.
 - Both a and b are true.
 - None of the above are true.
45. DNA can be cleaved by ____.
- restriction enzymes
 - DNA polymerase
 - DNA ligase
 - RNA ligase
 - helicase
46. Monocots ____.
- have a taproot system
 - have vascular bundles in rings
 - have flower parts in multiples of 4
 - have leaves with parallel veins
 - are woody
47. A virus ____.
- has a protein coat
 - has a nucleic acid core
 - can have an envelope
 - can have the enzyme reverse transcriptase
 - A virus can have all the above.
48. Which animal is **not** matched to a characteristic it has?
- jelly fish – nematocysts
 - tapeworm – complex digestive system
 - octopus – can release ink
 - shark – can replace teeth
 - sea star – water vascular system
49. Which of the following statements is **not** true?
- Proteins are made up of amino acids.
 - The tertiary structure of proteins gives it a three dimensional shape.
 - Essential amino acids are produced by humans in large quantities.
 - Peptide bonds form between amino acids.
 - Proteins need to be digested so they can be absorbed.
50. An enzyme ____.
- speeds up chemical reactions
 - has a hydrophobic end and a hydrophilic end
 - is made up of glucose
 - is used up during a chemical reaction
 - All of the above answers are correct.