



**ENGINEERING
AT ILLINOIS**

2016 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. One oval should be marked to answer each question. Multiple ovals will automatically be graded as an incorrect answer.

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) – 2016

1. Most enzyme names end in ____.
 - a. ose
 - b. ase
 - c. acid
 - d. ence
 - e. ant
2. Which cell part is **not** found in Domain Bacteria?
 - a. capsule
 - b. cell wall
 - c. nucleus
 - d. ribosomes
 - e. flagella
3. Charles Darwin is to ____, as Alexander Fleming is to ____.
 - a. artificial selection; DNA structure
 - b. pasteurization; antibiotic resistance
 - c. penicillin; natural selection
 - d. DNA structure; antibiotic resistance
 - e. natural selection; penicillin
4. A cation has ____.
 - a. gained electrons
 - b. gained protons
 - c. lost protons
 - d. lost electrons
 - e. lost neutrons
5. The epidermis of the skin is considered ____ tissue.
 - a. epithelial
 - b. adipose
 - c. muscle
 - d. bone
 - e. nervous
6. Monocots would have ____.
 - a. a tap root system
 - b. floral parts in multiples of threes
 - c. netted veins in leaves
 - d. woody plants
 - e. vascular bundle in rings

7. Lichen is considered a ____.
- relationship between two heterotrophs
 - relationship between an algae and cyanobacterium
 - symbiotic relationship
 - pathogenic relationship
 - Both b and d are true.
8. The backbone of DNA would have ____.
- deoxyribose
 - phosphate
 - adenine
 - All of the above can be part of the DNA backbone.
 - Both a and b are part of the DNA backbone.
9. In pea plants, round seeds (R), is dominant to wrinkled seeds (r). What are the chances of producing wrinkled pea plants, if one pea plant is homozygous for round seeds and the other pea plant is homozygous for wrinkled seeds?
- 100%
 - 75%
 - 50%
 - 25%
 - 0%
10. Humans' pupils react to light. This is an example of ____.
- response to stimuli
 - development
 - positive feedback
 - All of the above are correct.
 - None of the above are correct.
11. Which is **not** an example of asexual reproduction?
- binary fission
 - runners produced by some plants
 - cuttings from plants
 - fusion of gametes
 - parthenogenesis
12. Which cell organelle is **not** matched with its function?
- mitochondria – ATP production
 - ribosomes – protein synthesis
 - lysosomes – digests worn out cell parts
 - Golgi complex – makes lipids
 - chloroplasts – photosynthesis
13. Which is **not** associated with tRNA?
- anticodon
 - translation
 - picks up the code from DNA
 - picks up amino acids
 - uracil

14. Pink snap dragons are produced by pollinating a red snap dragon with a white snap dragon. This can be explained by ____.
- incomplete dominance
 - codominance
 - independent assortment
 - dominant and recessive traits
 - epistasis
15. Hydrogen bonds ____.
- form between the bases in DNA
 - form the secondary structure in proteins
 - hold molecules of water together
 - are found in cellulose
 - All of the above are associated with hydrogen bonds.
16. Which is an example of a plant that produces spores, **not** seeds?
- ferns
 - roses
 - corn
 - pine trees
 - None of the above, all the above produce seeds.
17. A /an ____ consists of all the living organisms and physical environment in a given area.
- population
 - ecosystem
 - community
 - species
 - biosphere
18. Which is a correct association?
- AA – homozygous phenotype
 - Aa – heterozygous phenotype
 - pink roses – phenotype
 - round pea seeds – genotype
 - None of the above is a correct association.
19. A hypothesis ____.
- should be written so it can be falsified
 - must contain an if; then statement
 - must be proven
 - has lots of evidence to support it
 - is a hard fact
20. Which does not occur during Meiosis I?
- crossing over
 - chromosome pairs line up on the same spindle
 - reduction division
 - chromatids separate
 - synapsis

21. Given the following information, determine the molecular mass of glucose ($C_6H_{12}O_6$).
Atomic mass – H = 1 amu; C = 12 amu; O = 16 amu
- 29 amu
 - 24 amu
 - 100 amu
 - 180 amu
 - 360 amu
22. Which animal is **not** matched with its Class?
- Gastropoda – snail
 - Bivalvia – oyster
 - Cestoda – liver fluke
 - Cephalopoda – squid
 - Polyplacophora – chiton
23. An enzyme can be described as ____.
- a protein catalyst
 - the energy currency of the cell
 - the genetic material
 - a structural material
 - hydrophobic
24. Plants have a/an ____ that helps give their cells shape.
- chloroplast
 - central vacuole
 - mitochondrion
 - Golgi complex
 - endoplasmic reticulum
25. Cyanobacteria ____.
- fix nitrogen in plant roots
 - have chloroplasts
 - are photosynthetic
 - can be classified as algae
 - All of the above are true.
26. If a family digs a pond and puts a few fish into the pond to establish a population, this is an example of ____.
- genetic bottleneck
 - founder effect
 - directional selection
 - stabilizing selection
 - Hardy Weinberg equilibrium
27. Which is **not** a correct association?
- Cnidaria – nematocysts
 - Porifera – choanocytes
 - Echinodermata – water vascular system
 - Annelida – setae
 - Chordata – dorsal heart

28. Stomata ____.
- allow for gas exchange in plants
 - are part of the chloroplast
 - are part of the leaf with many chloroplasts
 - surround the bundle sheaths
 - are scattered throughout the stem
29. In guinea pigs, short fur (A) is a dominant trait while long fur (a) is a recessive trait. If two heterozygous guinea pigs mate, what is the expected phenotypic ratio?
- 1 : 2 : 1
 - 9 : 3 : 3 : 1
 - 1 : 1 : 1 : 1
 - 3 : 1
 - 1 : 1
30. Amino acids ____.
- are the building blocks of proteins
 - contain nitrogen
 - are carried to the ribosome by tRNA
 - are held together by peptide bonds
 - All of the answers are correct.
31. The phases of interphase are ____.
- G₁
 - S
 - G₂
 - All of the above are phases of interphase.
 - None of the above are phases of interphase.
32. Which of the following is **not** associated with Louis Pasteur?
- vaccine for rabies
 - pasteurization
 - disproved spontaneous generation
 - evidence to support germ theory
 - All of the above are associated with Louis Pasteur.
33. An omnivore's main diet is ____.
- plants
 - animals
 - decaying animals
 - both plants and animals
 - leaf litter in the soil
34. Carbon has an atomic number of 6 and an atomic mass of 12 amu. How many valence shell electrons does carbon have?
- 12
 - 8
 - 6
 - 4
 - 2

35. Glycolysis ____.
- splits glucose into two pyruvate molecules
 - takes place in the cytoplasm of the cell
 - takes place during fermentation
 - uses ATP
 - All of the above are true.
36. Which is **not** a correct associate?
- kidney – excretory system
 - macrophage – nervous system
 - cecum – digestive system
 - skin – integumentary system
 - bronchi – respiratory system
37. Which of the following is true?
- The neutron number of an atom helps determine its atomic mass.
 - The atomic mass is a sum of electrons and protons.
 - When an atom is neutral, the electron number is equal to the neutron number.
 - Both b and c are true.
 - All of the above are true.
38. ____ is the process of a seedling sprouting.
- Pollination
 - Germination
 - Fertilization
 - Hybridization
 - Fission
39. A bacteriophage ____.
- is a bacterial virus
 - is a plant virus
 - is a vector for malaria
 - causes meningitis
 - is a decomposer
40. Down syndrome, Turner syndrome, and Klinefelter's disease are ____.
- dominant genetic disorders
 - recessive genetic disorders
 - produced by nondisjunction
 - disorders that may occur in both males and females
 - all trisomies
41. The human central nervous system consists of all the following **except** ____.
- cerebrum
 - cranial nerves
 - spinal cord
 - cerebellum
 - brain stem

42. Electrons are given up ____.
- during reduction reactions
 - during oxidation reactions
 - when anions are produced
 - when water is produced during cellular respiration
 - None of the above are true.
43. The monomer for DNA is a/an ____.
- monosaccharide
 - amino acid
 - nucleotide
 - glycerol
 - fatty acid
44. Which of the following is **not** true?
- Prokaryotes are smaller than eukaryotes.
 - Bacteria and protists are examples of prokaryotes.
 - Eukaryotes have membrane bound organelles.
 - Some bacteria, such as *E. coli* have been genetically altered to produce human insulin.
 - Some bacteria are photosynthetic.
45. During ____, chromatids separate.
- metaphase
 - telophase
 - anaphase
 - prophase
 - interkinesis
46. Placing a human cell, such as a red blood cell, in a hypotonic solution will cause it to ____.
- shrink and lose its liquid or water content
 - swell and potentially burst
 - remain intact and there is no net movement of water
 - None of the above are true.
 - All of the above are true.
47. Which of the following are the four most abundant organic compounds found in living organisms?
- carbohydrates, lipids, proteins, nucleic acids
 - carbon, hydrogen, oxygen, nitrogen
 - water, salt, buffers, oxygen
 - albumin, water, collagen, phospholipids
 - None of the above are true.

48. Releasing hydrogen ions into a solution would make the solution ____.
- a. more acidic
 - b. more basic
 - c. more alkaline
 - d. Both b and c are true.
 - e. None of the above are true.
49. Which is **not** associated with viruses?
- a. capsid
 - b. nucleic acid core
 - c. intracellular parasites
 - d. divides by binary fission
 - e. some have an envelope
50. Fungi have cell walls made up of ____.
- a. cellulose
 - b. peptidoglycan
 - c. chitin
 - d. murine
 - e. collagen