



# 2015 Academic Challenge

## BIOLOGY TEST - REGIONAL

This Test Consists of 50 Questions

**Mathematics Test Production Team**  
Julie Ellis, Kaskaskia College – Author  
Donna Ford, John A. Logan College – Author  
Keith A. Krapf, John A. Logan College – Reviewer  
Kathryn Torrey, WYSE – Coordinator of Test Production

### 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 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) – 2015

1. The area of the enzyme where the substrate binds to be catalyzed is the \_\_\_\_\_.
  - a. allosteric site
  - b. active site
  - c. substrate site
  - d. complex site
  - e. both a and b
2. Which of the following cell parts is **not** found in a typical plant cell?
  - a. centrioles
  - b. chloroplasts
  - c. mitochondria
  - d. endoplasmic reticulum
  - e. ribosomes
3. The backbone of DNA consists of \_\_\_\_\_.
  - a. adenine and guanine
  - b. a phosphate and a base
  - c. a phosphate and a sugar
  - d. thymine and cytosine
  - e. uracil and thymine
4. The part of the atom that is negatively charged is the \_\_\_\_\_.
  - a. nucleus
  - b. neutron
  - c. proton
  - d. photon
  - e. electron
5. Which of the following associations is correct?
  - a. purple flowers - genotype
  - b. AA – heterozygous phenotype
  - c. AA – heterozygous genotype
  - d. tall pea plants – phenotype
  - e. aa – homozygous phenotype
6. An animal cell placed in a/an \_\_\_\_\_ solution will burst.
  - a. isotonic
  - b. hypertonic
  - c. hypotonic
  - d. supersaturated
  - e. osmotic

7. All viruses have \_\_\_\_.
- a. a protein coat
  - b. a chromosome
  - c. a nucleic acid core
  - d. both a and b
  - e. both a and c
8. Scientific names consist of \_\_\_\_.
- a. the Kingdom and Phylum name
  - b. the Phylum and Class name
  - c. the Genus and Specific epithet
  - d. the Family and Genus name
  - e. the Order and Family name
9. Xylem will transport \_\_\_\_.
- a. carbohydrates
  - b. water
  - c. minerals
  - d. both b and c
  - e. all of the above
10. Kidneys, ureters, and urethra are part of the \_\_\_\_.
- a. excretory system
  - b. digestive system
  - c. immune system
  - d. integumentary system
  - e. circulatory system
11. Which is **not** a characteristic of angiosperms?
- a. flowers
  - b. fruit
  - c. double fertilization
  - d. fronds
  - e. carpals and stamens
12. Organic molecules must have \_\_\_\_.
- a. carbon
  - b. hydrogen
  - c. oxygen
  - d. both a and b
  - e. all of the above

13. Catabolic reactions \_\_\_\_.
- are all the chemical reactions in an organism
  - are build up reactions
  - are break down reactions
  - are endergonic reactions
  - are protein building reactions
14. Which of the following is an incorrect association?
- mitochondrion – cellular respiration
  - ribosome – protein synthesis
  - centriole – packaging hormones
  - chloroplasts – photosynthesis
  - lysosomes – digesting worn out cell parts
15. RNA is made up of \_\_\_\_.
- amino acids
  - phospholipids
  - glycerol and fatty acids
  - nucleotides
  - monosaccharides
16. Use the following key to determine the phenotype ratio for a dihybrid cross, T – tall; t – short; R – round seeds; r – wrinkled seeds. TtRr x TtRr
- 1 : 1 : 1 : 1
  - 3 : 1
  - 1 : 2 : 1
  - 1 : 1
  - 9 : 3 : 3 : 1
17. Which of the following is an incorrect association?
- Tundra – very cold conditions, permafrost layer
  - Taiga – coniferous forest
  - Savanna – moderate rainfall year around
  - Tropical rain forest – hot and wet conditions
  - Prairie – many types of grasses
18. Changes in allele frequencies are called \_\_\_\_.
- microevolution
  - macroevolution
  - natural selection
  - speciation
  - extinction

19. Match the scientists in **Column A** with their discoveries in **Column B**.

**Column A**

1. Watson and Crick
2. Pasteur
3. Margulis
4. Fleming
5. Darwin

**Column B**

- a. natural selection
- b. endosymbiosis theory
- c. vaccine for rabies
- d. structure of DNA
- e. penicillin

- |    |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|
| a. | 1-d | 2-c | 3-e | 4-b | 5-a |
| b. | 1-d | 2-c | 3-b | 4-e | 5-a |
| c. | 1-e | 2-b | 3-d | 4-a | 5-c |
| d. | 1-b | 2-d | 3-a | 4-e | 5-c |
| e. | 1-b | 2-a | 3-d | 4-c | 5-e |

20. Which best describes plasmodesmata?

- a. holds adjacent cells together where there is mechanical stress
- b. allows organelles to pass from one cell to an adjacent cell
- c. found in some plant cells where the plasma membrane is continuous from one plant cell to another
- d. are also known as tight junctions
- e. are also known as the middle lamella

21. Amino acids are to \_\_\_\_ as glucose is to \_\_\_\_.

- a. lipids; proteins
- b. proteins; lipids
- c. lipids; starch
- d. starch; proteins
- e. proteins; starch

22. The stoma \_\_\_\_.

- a. allows for gas exchange
- b. is the area of the leaf where glucose is produced
- c. absorbs light energy
- d. has many chloroplasts
- e. is arranged in bundles

23. The plasma membrane can be described as a \_\_\_\_.

- a. protein layer on the top and bottom with lipids in between
- b. lipid bilayer with proteins scattered throughout
- c. carbohydrate bilayer with proteins scattered throughout
- d. protein bilayer with lipids scattered throughout
- e. lipid bilayer with carbohydrates scattered throughout

24. A pair of salamanders leave their colony and start a new colony. This is an example of \_\_\_\_\_.

- a. genetic bottleneck
- b. founder effect
- c. natural selection
- d. artificial selection
- e. random mating

25. Gastropoda, Cephalopoda, and Bivalvia are classes in Phylum \_\_\_\_\_.

- a. Arthropoda
- b. Cnidaria
- c. Porifera
- d. Mollusca
- e. Platyhelminthes

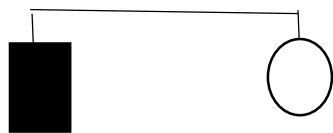
26. Petals are modified \_\_\_\_\_.

- a. xylem
- b. leaves
- c. phloem
- d. sepals
- e. meristem

27. Which is an example of a parasitic relationship?

- a. *E. coli* in human large intestine
- b. fish that clean sharks
- c. a cat eats a bird
- d. bird's nest in a tree
- e. tapeworm in a fish

28. In the pedigree below, the male is \_\_\_\_\_.



- a. the circle
- b. affected with the disorder
- c. the square
- d. both a and b
- e. both b and c

29. Enzymes and antibodies are examples of \_\_\_\_\_.

- a. carbohydrates
- b. proteins
- c. lipids
- d. polysaccharides
- e. none of the above

30. LDL stands for \_\_\_\_\_.

- a. Low Density Lipoprotein
- b. Low Density Lipopolysaccharide
- c. the good cholesterol
- d. both a and c
- e. None of the above

31. PCR is a method to \_\_\_\_\_.

- a. amplify
- b. splice
- c. cleave
- d. paste
- e. separate

32. Plants are green because \_\_\_\_\_.

- a. they absorb photons within their thylakoid membranes
- b. they use the visible portion of the electromagnetic spectrum for photosynthesis
- c. they absorb blue and red light
- d. green light is reflected
- e. yellow and blue light is absorbed

33. If a scientist covered portions of a geranium leaf with a solid black paper for 1 week, which of the following would be true?

- a. More starch will be present in the leaf parts that were covered compared to the parts not covered
- b. Following a starch test, the parts of the leaf covered by the black paper would have less starch present than the leaf parts left uncovered
- c. The black piece of paper will have no effect on the amount of starch located in the covered portions of the leaf
- d. Starch will not be present in the geranium leaf
- e. Both a and c are correct

34. Which of the following is correct?

- a. Deciduous trees lose their leaves in the fall
- b. Evergreen trees retain their leaves during the winter
- c. CAM plants are adapted for dry arid conditions
- d. Both a and b are correct
- e. All the above are correct

35. Which of the following is an evergreen?

- a. white pine



- b. oak
- c. *Ginko*
- d. beech
- e. pear

36. Select the correct products of cellular respiration.

- a. carbon dioxide, water, glucose
- b. carbon monoxide, glucose, ATP
- c. water, glucose, ATP
- d. oxygen, water, glucose
- e. None of the above are correct

37. Kingdom, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, genus, species.

Select the correct answer sequence.

- a. Class, Phylum, Order, Family
- b. Phylum, Order, Class, Family
- c. Order, Class, Family, Phylum
- d. Class, Family, Phylum, Order
- e. None of the above are correct

38. Yeast belongs to the Kingdom \_\_\_\_\_.

- a. Fungi
- b. Animalia
- c. Protista
- d. Plantae
- e. Bacteria

39. Which of the following is a monocot?

- a. tomato
- b. bean
- c. corn
- d. both a and b
- e. none of the above

40. Which of the following is responsible for the production of pollen?

- a. filament
- b. stigma
- c. anther
- d. style
- e. carpal

41. Which of the following is responsible for the brushing of oocytes into the uterine tubes?

- a. fimbriae

- b. cervix
- c. uterus
- d. ureter
- e. vulva

42. \_\_\_\_ are formed by meiosis.

- a. Oocytes
- b. Spermatocytes
- c. Gametes
- d. All of the above
- e. None of the above

43. Mitosis is \_\_\_\_.

- a. asexual reproduction in prokaryotes
- b. asexual reproduction in bacteria
- c. asexual reproduction in eukaryotes
- d. both a and c
- e. both b and c

44. If a scientist has a 10X TBE buffer solution and would like to make 400ml 1X TBE solution, using H<sub>2</sub>O, which of the following is correct?

- a. Combine 40ml of the 10X TBE solution with 100ml of H<sub>2</sub>O.
- b. Mix 40ml of 10X TBE buffer with 360ml of H<sub>2</sub>O.
- c. Mix 4ml of 10X TBE with 394ml of H<sub>2</sub>O.
- d. Mix 4ml of 10X TBE buffer with 400ml of H<sub>2</sub>O.
- e. Mix 10ml of 10X TBE with 390ml of H<sub>2</sub>O.

45. Which of the following is a Cnidarian?

- a. jelly fish
- b. clam
- c. tortoise
- d. perch
- e. none of the above

46. Which of the following belongs to the Class Aves?

- a. alligator
- b. whale
- c. cardinal
- d. snake
- e. none of the above

47. The secretion of insulin is most closely associated with the \_\_\_\_ system.

- a. reproductive
- b. lymphatic

- c. endocrine
- d. integumentary
- e. urinary

48. Which of the following is associated with iodine metabolism?

- a. thymus
- b. thyroid
- c. spleen
- d. pancreas
- e. gall bladder

49. The respiratory tract terminates in small grape like structures called \_\_\_\_ sacs.

- a. pituitary
- b. interstitial
- c. seminiferous
- d. alveolar
- e. none of the above

50. Cells that work together form\_\_\_\_\_.

- a. tissues
- b. organs
- c. organelles
- d. atoms
- e. both a and c