



2013 Academic Challenge

BIOLOGY TEST - SECTIONAL

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 (Sectional) – 2013

1. Following lunch, a person's glucose levels will _____ and the pancreas will release _____ in response to help maintain homeostasis.
 - a. decrease; insulin
 - b. increase; glucagon
 - c. increase; insulin
 - d. decrease; glucagon
 - e. none of the above
2. A father has type AB blood and a mother has type B blood, what are the chances that their children will have type O blood?
 - a. 0%
 - b. 25%
 - c. 50%
 - d. 75%
 - e. 100%
3. Which of the following is least likely to be associated with DNA research techniques?
 - a. Ian Wilmut
 - b. Francis Crick
 - c. James Watson
 - d. Francis Collins
 - e. Antonie vanLeuwenhoek
4. _____ are vectors, that are small extra circular pieces of DNA sometimes found in bacterial cells, and that are used in recombinant DNA research.
 - a. Chlorophylls
 - b. Plasmids
 - c. Cristae
 - d. Grana
 - e. Chromatin strands
5. Cell wall, chloroplasts, and large central vacuoles are all part of _____ cells.
 - a. prokaryotic
 - b. eukaryotic
 - c. fungi
 - d. plant
 - e. protista
6. Sodium – Na has an atomic number of 11 and an atomic mass of 23. Which of the following is true?
 - a. The atom has only 1 valence electron.
 - b. If sodium loses an electron while bonding with chlorine it will become a cation.
 - c. Na has 12 neutrons and 11 electrons.
 - d. Both a and c are correct.
 - e. All of the above are correct.

7. Ribosomal subunits originate from the ____.
- plasma membrane
 - nucleolus
 - lysosome
 - ribosome
 - mitochondria
8. Which statement is **not** correct?
- The expected dihybrid cross ratio is 9:3:3:1.
 - A test cross is a cross between an organism with the recessive phenotype and one with the dominant phenotype to determine the dominant organisms genotype.
 - Labrador retrievers have three coat colors because of multiple alleles.
 - In snapdragons, a cross between a red snapdragon and a white snapdragon yields pink snapdragons. A cross between the pink hybrid snapdragons would produce a 1 : 2 : 1 phenotype and genotype ratio.
 - A cross between $RrTt \times rrtt$ would yield a 1:1:1:1 genotype ratio.
9. Which of the following is true?
- Cellulose, chitin, and starch are polysaccharides.
 - Spider silk is a protein.
 - Insulin is a carbohydrate.
 - Both a and b are correct.
 - All of the above are true.
10. Which of the following is the **most** productive ecosystem?
- open ocean
 - deciduous forest
 - prairie
 - boreal forest
 - tundra
11. Which association is **not** true?
- leaf epidermal layer – most photosynthesis
 - xylem – moves water
 - anther – pollen production
 - sepals – flower bud
 - root hairs – water absorption
12. Given the information that T is dominant for tall and t is recessive for short, calculate probabilities. If a heterozygous tall plant is crossed with a short plant, what will the genotypic ratio of their offspring be?
- 1: 2: 1
 - 3: 1
 - 1: 1
 - 100% tall
 - Not enough information is provided to complete the question.

13. Which of the following is true?
- During DNA replication, DNA polymerase works alone to proofread and fix mistakes that may have occurred during the process.
 - Restriction enzymes may splice or cleave DNA at specific sites.
 - The area where DNA is actively being replicated is referred to as the replication fork.
 - Both a and b are true.
 - Both b and c are true.
14. What characteristics do NAD, FAD, and NADP share?
- They are coenzymes.
 - They are in their reduced form.
 - They are utilized during cellular respiration.
 - They are inorganic molecules.
 - They are metal ions.
15. Which is **not** a female flower part?
- pistil
 - carpal
 - ovary
 - filament
 - style

16. Match the terms in **Column A** with the most appropriate information from **Column B**.

Column A

- Mitochondria
- Golgi complex or apparatus
- Endoplasmic reticulum

Column B

- can modify chemicals
- ATP synthesis
- cellular respiration
- package and sorts
- lipid synthesis

Select the correct matching sequence.

- | | | |
|--------------------|----------------|---------------|
| a. 1 – ii; | 2 – i and iv; | 3 – iii and v |
| b. 1 – iii; | 2 – iv and v; | 3 – i and ii |
| c. 1 – ii and iii; | 2 – i and iv; | 3 – v |
| d. 1 – ii and iii; | 2 – i; | 3 – iv and v |
| e. 1 – iii; | 2 – ii and iv; | 3 – i and v |

17. *Amoeba* move by _____ and *Paramecia* move by _____.
- cilia; pseudopods
 - cilia; flagella
 - pseudopods; flagella
 - flagella; pseudopods
 - pseudopods; cilia

18. Match the cell parts in **Column A** to their function in **Column B**.

Column A

1. leucoplast
2. chloroplast
3. chromoplast
4. peroxisome

Column B

- i. contains the enzyme catalase
- ii. stores starch
- iii. photosynthesis
- iv. contain pigments

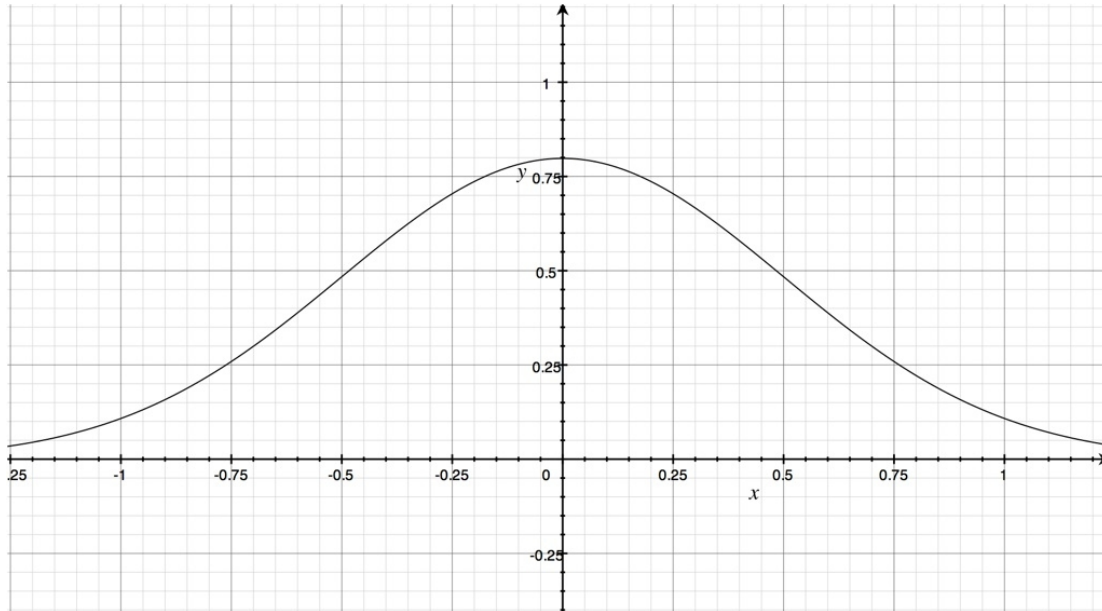
Select the correct matching sequence.

- a. 1 – iv; 2 – iii; 3 – ii; 4 – i
 - b. 1 – ii; 2 – iii; 3 – i; 4 – iv
 - c. 1 – i; 2 – ii; 3 – iii; 4 – iv
 - d. 1 – ii; 2 – iii; 3 – iv; 4 – i
 - e. 1 – i; 2 – iv; 3 – ii; 4 – iii
19. The dentition for mammals can best be described as _____, while the dentition for frogs can best be described as _____.
- a. heterodont; heterodont
 - b. homodont; homodont
 - c. deciduous; heterodont
 - d. heterodont; homodont
 - e. deciduous; deciduous
20. Which of the following is true?
- a. Researchers in the 1950's had no idea of the structure of DNA.
 - b. Rosalind Franklin used x-ray diffraction techniques to reveal the helical structure of DNA.
 - c. Francis Collins worked with Watson and Crick and helped build the DNA model.
 - d. Both b and c are true.
 - e. All of the above are true.
21. Which term is **not** associated with ferns?
- a. protonema
 - b. sori
 - c. prothallus
 - d. fiddlehead
 - e. rhizome
22. Mitochondrial DNA can be used to track _____.
- a. the paternal side of the family
 - b. genetic diseases
 - c. changes to the nuclear DNA
 - d. the maternal side of the family
 - e. All of the above are true.
23. Tetracycline affects the ribosomes of bacteria. This drug works because it _____.
- a. does not allow for ATP to be produced
 - b. causes the cell to release digestive enzymes
 - c. affects protein synthesis
 - d. does not let the bacteria ferment
 - e. produces hypotonic conditions

24. Corn smut, rusts, brown rot of peaches, and powdery mildew are examples of pathogenic ____.
- fungi
 - plants
 - viroids
 - viruses
 - bacteria
25. Which of the following is **not** true?
- Crossing over takes place in Prophase I and Prophase II of meiosis.
 - The point at which crossing over occurs between two homologous chromosomes is called the chiasm.
 - Inversions can be described as a chromosome segment that is reversed from the normal orientation.
 - Having an extra chromosome may be referred to as trisomy.
 - During asexual reproduction of eukaryotes, clones are produced.
26. Which of the following is **true**, if the following is the DNA template?
- 5' ATGCTACGA 3'
- 3' TACGATGCT 5' is the complimentary DNA strand.
 - 3' TCGTAGCA 5' is the complimentary DNA strand.
 - UACGAUGCU is the mRNA codon strand.
 - ATGCTACGA is the tRNA anticodon strand.
 - Both a and c are true.
27. Which is **not** a true association?
- perch – operculum
 - earthworm – open circulatory system
 - crayfish – gills
 - frog – 3 chambered heart
 - snakes – amniotic eggs
28. Which of the following statements is **not** true?
- Both plants and bacteria have cell walls and may photosynthesize.
 - Bacteria can be divided into two groups based on their cell wall make up.
 - The exoskeleton of arthropods and the cell walls of fungi have chitin.
 - Plant and bacterial cell walls are composed of peptidoglycan.
 - Many fungi and many bacteria are major decomposers.
29. Stomata open at night for CO₂ fixation in ____.
- C₃ plants
 - CAM plants
 - C₄ plants
 - aquatic plants
 - algae

30. Complete the taxonomic categories in the correct sequence.
Domain, Kingdom, Phylum, _____, _____, _____, Genus, and Species
- Class, Order, Family
 - Family, Order, Class
 - Class, Family, Order
 - Order, Family, Class
 - Order, Class, Family
31. ATP, cyclic AMP, and RNA _____.
- are all very stable molecules
 - are all nucleic acids
 - all have uracil as a base
 - are all confined to the cytosol
 - All the above are true.
32. _____ is the study of behavioral biology such as imprinting.
- Etiology
 - Pathology
 - Immunology
 - Ethology
 - Epidemiology
33. In humans, there are _____ cervical vertebrae, _____ thoracic vertebrae, and _____ lumbar vertebrae.
- 7; 5; 5
 - 7; 12; 7
 - 12; 7; 5
 - 12; 5; 7
 - 7; 12; 5
34. _____ form between amino acids during protein synthesis.
- Ionic bonds
 - Peptide bonds
 - Glycosidic linkage
 - Hydrogen bonds
 - Ester linkage
35. Which part of the brain is **not** correctly matched to its function?
- frontal lobe – reasoning and motor function
 - occipital lobe – visual area
 - temporal lobe – color recognition
 - parietal lobe – sense of touch, taste, pain, and pressure
 - cerebellum – muscular coordination

36. Density-independent factors are usually _____ factors, while density-dependent factors are usually _____ factors.
- biotic; biotic
 - abiotic; abiotic
 - biotic; abiotic
 - abiotic; biotic
 - living; physical
37. The Figure below best describes _____ type of inheritance.



- codominance
 - incomplete dominance
 - polygenetic inheritance
 - multiple alleles
 - epistasis
38. Which blood type could result in children with type O blood?
- A
 - B
 - O
 - AB
 - All the above except d.
39. Which of the following would **not** be classified as a carbohydrate?
- amylose
 - chitin
 - cellulose
 - glycogen
 - steroid

40. All the following fruits are classified as a/an ____: tomato, grape, papaya, and pomegranate.
- berry
 - drupe
 - accessory fruit
 - multiple fruit
 - achene

41. Match the blood cells in **Column A** with their functions in **Column B**.

Column A

- neutrophils
- basophils
- platelets
- red blood cells

Column B

- carries oxygen
- clotting of blood
- phagocytic cells
- releases histamines

Select the correct matching sequence.

- 1 – iii; 2 – iv; 3 – i; 4 – ii
 - 1 – iii; 2 – iv; 3 – ii; 4 – i
 - 1 – iv; 2 – iii; 3 – i; 4 – ii
 - 1 – iv; 2 – iii; 3 – ii; 4 – i
 - 1 – ii; 2 – iv; 3 – iii; 4 – i
42. Which statement is **not** true?
- Transduction is the transfer of genes using a bacteriophage.
 - Transformation takes place when bacteria die and release DNA into the environment and another bacterium takes up the DNA from the environment.
 - Conjugation allows for DNA to be transferred through sex pili.
 - Prokaryotes divide by mitosis.
 - Bacterial species can live in communities called biofilm.
43. DNA ligase is used to ____.
- cut out segments of DNA
 - add new DNA nucleotides to the growing DNA strand
 - link Okazaki fragments
 - unwind the double helix of DNA
 - attach RNA primers
44. When a fatty acid is attached to a glycerol, ____ is taken out.
- carbon dioxide
 - water
 - a phosphate
 - a monosaccharide
 - hydrocarbon
45. Cladistic analysis is based on ____.
- phenetic approach
 - polyphyletic groups
 - sister taxa
 - outgroups
 - paraphyletic groups

46. Microtubules are found in the ____.
- ribosomes
 - actin fibers
 - plasma membrane
 - chromosomes
 - centrioles
47. Starch, DNA, glycogen, and proteins are all examples of ____.
- polymers
 - carbohydrates
 - polypeptides
 - nucleic acids
 - Both a and b are correct.
48. The atmosphere contains many gases. ____ gas is the most abundant in the atmosphere.
- Oxygen
 - Nitrogen
 - Carbon dioxide
 - Water vapor
 - Methane
49. Brown algae ____.
- is microscopic
 - is not photosynthetic
 - can be multicellular and large
 - include organisms like water molds
 - is called scouring rush
50. There are ____ codons in the following: UUUACACUCGAGCAUAAAACUGGG.
- 8
 - 7
 - 6
 - 5
 - 4