TAMS Tournament Biology Test

1. Which of the following is considered a weak chemical bond?
   1. Van der Waals interactions
   2. Covalent bonds
   3. Ionic bonds
   4. Metallic bonds
   5. Polar bonds
2. Which of the following is not a special property of water?
   1. Cohesion
   2. Moderation of temperature
   3. High specific heat
   4. Evaporative cooling
   5. High viscosity
3. Amino acids contain which functional groups?
   1. Amine and carboxyl
   2. Amine and sulfhydrl
   3. Amine and phosphate
   4. Amine and carbonyl
   5. Amine and hydroxyl
4. What is the difference between cellulose and starch structures?
   1. Cellulose is made of glucose monomers and starch is made of galactose monomers
   2. Starch is made of glucose monomers and cellulose is made of galactose monomers
   3. Cellulose is made of beta glucose monomers and starch is made of alpha glucose monomers
   4. Starch is made of beta glucose monomers and cellulose is made of alpha glucose monomers
   5. Cellulose is stored in animals and starch is stored in plants
5. The tertiary structure of a protein is determined by:
   1. Hydrogen bonds
   2. Hydrophobic interactions
   3. Disulfide bridges
   4. A and B
   5. A, B, and C
6. Primary cilia are different from other cilia that:
   1. There is a 9+0 microtubule structure
   2. They are primarily sensory organelles
   3. They are made of microtubules extending from a basal body
   4. A and B
   5. A, B, and C
7. What role does cholesterol play in the cell membrane?
   1. It is malignant and destroys the membrane
   2. It prevents the membrane from damage by acting as a buffer
   3. It is a toxin and under certain conditions can be either benign or malignant
   4. It is the primary molecule found in the cell membrane
   5. It plays no role
8. Gibb’s free energy change:
   1. Does not depend on the presence or absence of a catalyst
   2. Is the potential energy of the products of a reaction
   3. Is the potential energy of the reactants of a reaction
   4. Is the kinetic energy of the products of a reaction
   5. Is the kinetic energy of the reactants of a reaction
9. Allosteric regulation of enzymes:
   1. Are malignant to the enzyme
   2. Can either prevent or activate enzymes
   3. Are primarily nucleic acids
   4. Only inhibit the action of the enzyme
   5. Attaches to the enzyme’s active site
10. Fats, through beta oxidation, can be broken down to re-enter the Kreb’s Cycle as:
    1. Pyruvate
    2. Acetyl CoA
    3. Glyceraldehyde-3-Phosphate
    4. A and B
    5. B and C
11. What is the constantly recycled molecule that is essential to the Calvin Cycle?
    1. G3P
    2. Rubisco
    3. NADP+
    4. RuBP
    5. A sugar
12. You place a growing seedling in an east-facing window. On which side of the plants will auxins accumulate?
    1. North side
    2. South side
    3. East side
    4. West side
    5. Equally distributed on all sides of the plant
13. During translation in prokaryotes, the ribosome binds to
    1. The TATA box
    2. The mRNA cap
    3. The terminator sequence
    4. An enhancer sequence
    5. The Shine-Dalgarno sequence
14. Which of the following is NOT a second messenger?
    1. Calcium ion
    2. Magnesium ion
    3. Diacyl glycerol
    4. Inositol triphosphate
    5. Cyclic AMP
15. During which phase is mitosis arrested to take the images for a karyotype?
    1. Anaphase
    2. Telophase
    3. Prophase
    4. Metaphase
    5. Interphase
16. Which of the following contribute to the variation among offspring?
    1. Independent assortment of alleles
    2. Crossing over
    3. Nondisjunction
    4. A and B
    5. A, B, and C
17. Linked genes are:
    1. Less likely to mutate
    2. Do not exactly follow independent assortment of alleles
    3. Are more likely to mutate
    4. Never change from parent to offspring besides mutations
    5. Are made up of the essential genes, such as for the five basic senses
18. If a person born with a XY genotype had his Y chromosome inactivated, what is the genotype and phenotype of the person?
    1. XX female
    2. XX male
    3. XY male
    4. XY female
    5. X female
19. During the lytic cycle of a virus,
    1. The virus eventually kills the cell
    2. The virus multiplies inside the cell and becomes dormant
    3. The virus takes up the cell’s DNA
    4. The virus synthesizes toxic chemicals
    5. The virus cuts up the cell’s DNA
20. Prions are:
    1. Viruses in the brain
    2. Normal proteins in the brain
    3. Contagious through the consumption of brains
    4. Abnormally shaped neurons in the brain that is contagious to other neurons
    5. Bacteria that attack and destroy brain regions
21. Which of the following binds to complementary sequences in mRNAs and destroys them?
    1. snRNA
    2. miRNA
    3. tRNA
    4. ggRNA
    5. siRNA
22. Which of the following is not a condition of the Hardy-Weinberg equilibrium?
    1. High population
    2. No emigration
    3. No immigration
    4. Randomized matings
    5. Equal gender distribution
23. Which period was characterized by the sudden increase in diversity of many animal phyla?
    1. Permian
    2. Carboniferious
    3. Devonian
    4. Cambrian
    5. Ordovician
24. Which group of proteobacteria is known as sulfur bacteria that oxidize hydrogen sulfide to produce sulfur as a waste?
    1. Alpha proteobacteria
    2. Beta proteobacteria
    3. Gamma proteobacteria
    4. Delta proteobacteria
    5. Epsilon proteobacteria
25. Alveolates are characterized as
    1. Protists that have sacs beneath the plasma membrane
    2. Possessing cilia
    3. Having the ability to sexually reproduce
    4. Fungi that are poisonous to humans
    5. Diatoms
26. Which of the following are NOT characterized as a monocot nor a dicot?
    1. Orchids
    2. Dog roses
    3. Peas
    4. Water lilies
    5. Ferns
27. What class is the common jellyfish under?
    1. Hydrozoan
    2. Scyphozoan
    3. Cubozoan
    4. Anthozoan
    5. Mollusks
28. Which of the following are characterized by radial cleavage?
    1. Echinoderms
    2. Humans
    3. Crustaceans
    4. A and B
    5. A and C
29. Root hairs are:
    1. Extensions of the cell membrane of plant cells
    2. Absorb large molecules
    3. Are not restricted to only the roots of a plant
    4. A and B
    5. A and C
30. A large tree can have a hole straight through the center and live perfectly fine because:
    1. The heartwood is made up of secondary xylem that no longer transports water
    2. The phloem adapts and half of them become the xylem that is destroyed
    3. Neither xylem nor phloem are in the center of the tree trunk
    4. Nutrient paths can adjust to go around the hole
    5. squirrels eventually live in there and help the tree survive
31. Water is pushed up the xylem to nourish the top of the tree primary through the action of:
    1. Transpiration
    2. Root pressure
    3. Pokemon
    4. Active transport
    5. Torque
32. A phosphate-deficient plant’s leaves will turn:
    1. Yellow
    2. Red
    3. Blue
    4. Purple
    5. Brown
33. A pineapple is an example of a \_\_\_\_\_\_\_\_\_ fruit.
    1. Aggregate
    2. Multiple
    3. Pea
    4. Berry
    5. Auxillary
34. Why is an excess of vitamins A, D, E, and K harmful for your health?
    1. They are fat soluble vitamins
    2. They are water-soluble vitamins
    3. They can never be removed from your body
    4. They make clots in your blood
    5. They dehydrate the kidneys
35. How does the stomach prevent the enzymes from causing it to digest itself?
    1. The mucus layer over the stomach is protective
    2. The stomach’s equilibrium pH is extremely acidic
    3. The stomach’s equilibrium pH is extremely basic
    4. It takes a break from digestion to rebuild its walls
    5. It doesn’t, but the stomach wall’s breakdown takes longer than the average human life span
36. Which of the following animals use countercurrent waterflow to regulate its temperature?
    1. Fish
    2. Geese
    3. Humans
    4. Mice
    5. Rabbit
37. Which of the following cell types are involved in the inflammatory response?
    1. Macrophages
    2. Mast cells
    3. Plasma cells
    4. Memory cells
    5. Red blood cells
38. The cells in the descending limb of the loop of Henle are specialized in that they:
    1. Contain a large concentration of aquaporins
    2. They lack aquaporins
    3. Are larger for more outward water flow
    4. Are larger for more inward water flow
    5. Produce mucus to protect the kidney
39. The slow block to polyspermy is characterized by:
    1. The cortical reaction
    2. The acrosomal reaction
    3. Fertilization
    4. Cause calcium ions to be released from the cytosol to the extracellular matrix
    5. The death of all of the sperm except for the one that fertilized the egg
40. Which lobe of the brain contains your motor cortex?
    1. Frontal lobe
    2. Temporal lobe
    3. Parietal lobe
    4. Occipital lobe
    5. The motor cortex is in the spinal cord
41. Carbon particles were injected into the blood of mice. In which of the following places would you most likely find the particles?
    1. In the glomerular filtrate
    2. In the adipose tissue of the liver
    3. In monocytes of the spleen
    4. In plasma cells of the bone marrow
    5. In the loops of Henle
42. Which of the following is not a function of the parasympathetic division of the nervous system?
    1. Constriction of the bronchii in the lungs
    2. Constriction of the pupil of the eye
    3. Slowing of the heart rate
    4. Stimulation of the adrenal medulla
    5. Stimulation of activity of the stomach and the intestines
43. An amphipathic molecule is a molecule that is characterized by:
    1. a hydrophilic end and a hydrophobic end
    2. an amino group
    3. 2 different forms that are mirror images of each other
    4. rarely being found in cell membranes
    5. it is important in sound transport
44. Which of the following marine communities would be LEAST affected by a volcanic eruption or meteor impact that injected enough debris into the atmosphere to reduce sunlight by 50% for two years?
    1. Benthic community
    2. Deep sea vent community
    3. Coral reefs
    4. Estuary community
    5. stagnant lakes
45. Which statement describing plant structure is appropriate?
    1. Sclerenchyma cells provide support for the plant body
    2. Collenchyma cells may form the outer cell layer of the plant
    3. Wood is formed from old epidermal cells
    4. Stomates are pores in the roots that allow nutrients to enter
    5. Parenchyma cells have thicker cell walls than other plant cells
46. A protein is usually tagged for degradation by proteasome activity by which of the following proteins?
    1. Caspase
    2. Kinase
    3. Ubiquitin
    4. Ubiquinone
    5. Protease
47. You extract RNA from liver cells and then carry out an agarose gel electrophoresis of the liver RNA. The RNA fragments are then transferred to an RNA-binding membrane using capillary action. You then hybridize a probe for gene X to the RNA on the membrane. Which of the following will your procedure accomplish?
    1. You are trying to determine how many copies of Gene X are in liver cells
    2. You are trying to replicate Gene X
    3. You are trying to determine if Gene X is expressed in liver cells
    4. You are trying to identify Gene X
    5. You are trying to determine whether Gene X has a mutant sequence
48. Hemoglobin, an iron-containing protein in erythrocytes, binds oxygen molecules. Myoglobin, a protein in muscle cells, is used for oxygen storage. What can be deduced about the relative oxygen affinities of hemoglobin and myoglobin?
    1. Myoglobin has greater oxygen affinity than hemoglobin
    2. Hemoglobin has greater oxygen affinity than myoglobin
    3. Both have roughly the same oxygen affinity
    4. Neither has a significant oxygen affinity
    5. The two cannot be compared because one is associated with binding and the other with storage
49. Plant systematicists have found that monocots were not the first flowering plants to evolve. This would suggest that:
    1. they must be more complex than previously thought
    2. they were misplaced in their lineage
    3. evolution does not always proceed from simple to complex
    4. they do not represent a true clade
    5. they evolved from a different ancestral group than other flowering plants did
50. When an ant in a colony dies, the live ants will throw the dead ant out of the anthill. If a live ant from the colony, Ant X, is sprayed with a chemical characteristic of dead ants, the live ants will repeatedly throw Ant X out of the anthill, until the chemical on Ant X wears off. What is the best behavioral explanation of ant colony?
    1. Learned behavior
    2. Fixed action pattern
    3. Muscle memory
    4. Trial and error
    5. negative taxis triggered by the chemical