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11/13/12 Science Bowl Questions

25 Toss Up

All Subjects

1. BIOLOGY; *Short Answer*: What is the property of biological membranes that allows some substances to cross more easily than others?

ANSWER: Selective permeability.

2. BIOLOGY; *Multiple Choice*: Membranes are arranged in which of the following structures?

W. Static sheets of molecules locked rigidly in place.

X. Blocks of phospholipids arranged in a grid.

Y. Many, many phospholipids held together by hydrophobic interactions.

Z. Many, Many phospholipids held together by hydrophilic interactions.

ANSWER: Y

3. BIOLOGY; *Short answer*: In order to function properly, a cell’s plasma membrane should be in what state of matter?

ANSWER: Liquid OR Fluid

4. BIOLOGY; *Multiple Choice*: Which of the following is NOT a function of proteins in the plasma membrane?  
 W. To transport substances across the plasma membrane.

X. To serve as identification tags that are recognized by other cells.

Y. To perform enzymatic activity.

Z. To help a cell hook with a protein of an adjacent cell.

5. BIOLOGY; *Short Answer:* What name is given to a molecule made up of a membrane carbohydrate covalently bonded to a protein?

ANSWER: Glycoproteins.

6. MATH; *Short Answer:* The following is what type of sequence? 4, 48, 576, 6912.

ANSWER: Geometric sequence.

7. MATH; *Multiple Choice:* Which of the following is divisible by (2x-3)?

W. 6x-10

X. 4x-9

Y. 8x-12

Z. 10x-16

8. MATH; *Short Answer:* What French mathematician invented the coordinate plane?

ANSWER: Rene Descartes

9. MATH; *Short Answer:* Find the first term of (3x-8)^4

ANSWER: 81x^4

10. MATH; *Multiple Choice:* A which of the following equations passes through the point (2,5)?

W. 2x+5

X. 3x^3

Y. -3x+10

Z. x^2+1

ANSWER: Z

11. PHYSICS; *Multiple Choice:* Which of the following is NOT a flavor of quark?

W. Up

X. Charm

Y. Weird

Z. Bottom

ANSWER: Weird

12. PHYSICS; *Short Answer:* Acceleration is equal to what divided by mass?

ANSWER: Force

13. PHYSICS; *Short Answer:* What is the speed of light in meters per minute?

ANSWER: 1.80 x 10^9

14. CHEMISTRY; *Multiple Choice:* As temperature increases, vapor pressure—

W. Decreases

X. Increases

Y. Stays the same

Z. Depends on the substance

ANSWER: X

15. CHEMISTRY; *Multiple Choice:* If mercury is poured into a graduated cylinder, it will have—

W. A meniscus curving downward

X. A meniscus curving upwards

Y. No meniscus

Z. Mercury cannot be poured into a graduated cylinder.

16. EARTH AND SPACE; *Short Answer:* What are the letters, in order, used in stellar classification?

ANSWER: O, B, A, F, G, K, M, R, N, S

17. BIOLOGY *Short Answer:* What membranous structure is made from the plasma membrane during the process of endocytosis?

ANSWER: Vesicle

18. BIOLOGY *Multiple Choice:* Which of the following is not a type of endocytosis?

W. Phagocytosis

X. Pinocytosis

Y. Receptor-mediated endocytosis

Z. Phemocytosis

19. BIOLOGY *Short Answer:* What is a transmembrane protein with hydrophobic regions that completely spans the hydrophobic interior of the membrane called?

ANSWER: Integral proteins.

20. BIOLOGY *Short Answer:* What is a protein appendage loosely bound to the surface of a membrane and not embedded in the lipid bilayer called?

ANSWER: Peripheral protein.

21. BIOLOGY *Multiple Choice:*  What does it mean for a plant cell to be turgid?

W. For there to be very little water in the plant cell, so that it is very unhealthy.

X. For there to be very much water in the plant cell, so that it is very unhealthy.

Y. For there to be very little water in the plant cell, so that it is very healthy.

Z. For there to be very much water in the plant cell, so that it is very healthy.

ANSWER: Z

22. BIOLOGY *Short Answer:* What is the phenomenon where a plant cell’s plasma membrane pulls away from the cell wall due to a hypertonic environment?

ANSWER: Plasmolysis

23. BIOLOGY *Multiple Choice:* Which of the following is not a form of transportation of substances across the plasma membrane?

W. Osmosis

X. Active Transport

Y. Passive Transport

Z. Ionic Transport

ANSWER: Z

24. BIOLOGY *Short Answer:* What is the name of the compound that supplies the energy most active transport?

ANSWER: Adenosine Triphosphate (ATP)

25. BIOLOGY *Short Answer:* What is the cellular secretion of macromolecules by the fusion of vesicles with the plasma membrane?

ANSWER: Exocytosis