TOSSUP

1. Biology - *Multiple Choice* What color is blood in human veins?
W) Green
X) Blue
Y) Purple
Z) Red

ANSWER: Z) RED [SO]

BONUS

1. Biology - *Short Answer* Order all of the following three steps of cellular respiration in chronological order after a glucose molecule enters the cell: I. Glycolysis, II. Citric acid cycle, III. Electron transport chain.

ANSWER: I, II, III [SO]

TOSSUP

2. Math - *Short Answer* How many primes are there less than 20?

ANSWER: 8

BONUS

2. Math - *Short Answer* 6 apples and 7 bananas cost 33 dollars. 7 apples and 9 bananas cost 41 dollars. What is the cost of 3 apples and 6 bananas, in dollars?

ANSWER: 24 DOLLARS

TOSSUP

3. Earth and Space - *Multiple Choice* Which of the following layers of Earth's interior is the thinnest?
W) Crust
X) Mantle
Y) Outer core
Z) Inner core

ANSWER: W) CRUST [EB; RR ESS-G]

BONUS

3. Earth and Space - *Short Answer* What type of fault, formed by compressive stress, is characterized by the hanging wall moving up relative to the footwall?

ANSWER: REVERSE [RE; RR ESS-G]

TOSSUP

4. Chemistry - *Multiple Choice* Connor dips a piece of litmus paper into a mystery solution, and it turns red. Which of the following best describes Connor's solution?
W) Acidic
X) Basic
Y) Neutral
Z) Hydrolytic

ANSWER: W) ACIDIC [SO]

BONUS

4. Chemistry - *Short Answer* Identify all of the following three statements that are inferences:

1) It must be cold outside because my mom told me to wear a coat
2) It must be cold outside because the thermometer says -40 degrees
3) It must be cold outside because there is frost on the grass

ANSWER: 1 AND 3 [EB; RR Chem-NS]

TOSSUP

5. Physics - *Multiple Choice* Which of the following values has the largest number of significant digits?
W) 30
X) 0.0056
Y) 1000
Z) 200.1

ANSWER: Z) 200.1 [EB; RR Phys-LB]

BONUS

5. Physics - *Multiple Choice* By standing on one end of a lever, Suzuko can lift up to a 100 kilogram box positioned at the other end. What change should they make to their system if they wanted to lift a 200 kilogram box?

W) Moving the fulcrum away from the box

X) Moving the fulcrum toward the box

Y) Increasing the size of the fulcrum

Z) Decreasing the size of the fulcrum

ANSWER: X) MOVING THE FULCRUM TOWARD THE BOX [EB; RR Phys-ME]

TOSSUP

6. Energy - *Short Answer* Researchers at Argonne National Lab are studying methods to safeguard the energy grid. These complex systems rely on the conductivity of metals. Metals can be approximated as a lattice of nuclei surrounded by a mobile sea of what particles, explaining their conductive properties?

ANSWER: ELECTRONS [SO]

BONUS

6. Energy - *Short Answer* Researchers at Brookhaven National Lab are studying the use of nucleic acids in linking nanoparticles together. Identify all of the following three molecules which are nucleic acids:

1) Collagen

2) RNA

3) Glycogen

ANSWER: 2 ONLY [SO]

TOSSUP

7. Biology - *Multiple Choice* Which of the following animals is omnivorous?
W) Common raccoon
X) Right whale
Y) Lion
Z) Bighorn sheep

ANSWER: W) COMMON RACCOON [SO]

BONUS

7. Biology - *Multiple Choice* Which of the following types of microbes is not considered to be alive?
W) Bacteria
X) Viruses
Y) Protozoa
Z) Fungi

ANSWER: X) VIRUSES [SO]

TOSSUP

8. Math - *Short Answer* What is the least common multiple of 3, 4, and 5?

ANSWER: 60

BONUS

8. Math - *Short Answer* How many distinct ways are there to rearrange the letters W, H, I, F, and F if you must use all five letters?

ANSWER: 60 WAYS

TOSSUP

9. Earth and Space - *Short Answer* What is the name of the nearest star to the solar system?

ANSWER: PROXIMA CENTAURI [EB; RR ESS-SS]

BONUS

9. Earth and Space - *Short Answer* What phenomenon explains why a comet's tail always points directly away from the sun?

ANSWER: SOLAR WIND [EB; RR ESS-SS]

TOSSUP

10. Chemistry - *Short Answer* What is the ratio of the number of iron atoms to the number of sulfur atoms in iron (II) sulfide, which has molecular formula FeS?

ANSWER: ONE [SO]

BONUS

10. Chemistry - *Short Answer* How many neutrons does one atom of radium-228 have, given that radium has 88 protons?

ANSWER: 140 [EB; RR Chem-AE]

TOSSUP

11. Physics - *Short Answer* An 8 kilogram bird is flying with velocity 5 meters per second. In joules, what is its kinetic energy?

ANSWER: 100 [EB; RR Phys-ME]

BONUS

11. Physics - *Short Answer* What name is given to waves that primarily travel as oscillations parallel to its direction of propagation, such as a sound wave?

ANSWER: LONGITUDINAL [RE]

TOSSUP

12. Energy - *Multiple Choice* Pacific Northwest National Lab scientists are working to provide assistance in bringing renewable energies to communities around the country. Which of the following renewable energy sources is the most consistent across different weather conditions?

W) solar
X) wind
Y) hydropower
Z) geothermal

ANSWER: Z) GEOTHERMAL [SO]

BONUS

12. Energy - *Short Answer* Researchers at the Human Genome Institute are studying the applications of DNA technology. In addition to circular chromosomes, bacteria often contain small circular pieces of DNA which can replicate on their own. What is the term for these DNA molecules, which can also be transferred from one cell to another?

ANSWER: PLASMIDS [SO]

TOSSUP

13. Biology - *Multiple Choice* The phloem of a plant is primarily responsible for transporting which of the following substances?

W) Sugars
X) Water
Y) Carbon dioxide
Z) Nitrogen gas

ANSWER: W) SUGARS [AT]

BONUS

13. Biology - *Multiple Choice* Which of the following types of RNA is transcribed in the nucleus and is translated by ribosomes?
W) mRNA
X) tRNA
Y) rRNA
Z) fRNA

ANSWER: W) mRNA [SO]

TOSSUP

14. Math - *Short Answer* There are 50 leaves on a branch, and there are 30 branches on a tree. How many leaves are on a tree?

ANSWER: 1500 LEAVES

BONUS

14. Math - *Short Answer* 5 marbles can be traded in for 3 beads, 4 beads can be traded in for 9 balls, and 2 balls can be traded in for 3 googly eyes. How many googly eyes can you get from 40 marbles?

ANSWER: 81 GOOGLY EYES

TOSSUP

15. Earth and Space - *Short Answer* What is the most common gas in Earth's atmosphere?

ANSWER: NITROGEN [EB; RR ESS-AO]

BONUS

15. Earth and Space - *Multiple Choice* Which of the following primarily determines the size of crystals in an igneous rock?
W) Chemical composition
X) Time taken to solidify
Y) Freezing temperature
Z) Pressure the cooling magma was under

ANSWER: X) TIME TAKEN TO SOLIDIFY [RE; RR ESS-G]

TOSSUP

16. Chemistry - *Short Answer* What term refers to a reaction that absorbs heat from the environment?

ANSWER: ENDOTHERMIC [SO]

BONUS

16. Chemistry - *Short Answer* What two elements are the main components of glass?

ANSWER: SILICON AND OXYGEN [SO]

TOSSUP

17. Physics - *Short Answer* A nine-volt battery is connected to a lightbulb with a resistance of 3 ohms. What is the current, in amps, that flows through the circuit?

ANSWER: 3 AMPS [EB; RR Phys-EM]

BONUS

17. Physics - *Short Answer* What name is given to the type of reflection that occurs in mirrors where the resulting image is a clear reflection of the object in the mirror?

ANSWER: SPECULAR [RE]

TOSSUP

18. Energy - *Short Answer* Researchers in the U.S. Office of Public Health are studying disease transmission in order to mitigate another catastrophic pandemic. Many diseases can be preemptively weakened by giving an individual a dose of a weaker version of the carrier of the disease. What is the term for this process, which was first done to prevent smallpox?

ANSWER: VACCINATION [SO]

BONUS

18. Energy - *Short Answer* Researchers at Lawrence Berkeley National Lab have been working to create specific labels for phages. Phages are used by scientists to insert foreign genetic material into cells, fundamentally altering the genomes of organisms. What name is given to these types of organisms?

Commented [1]: wait i think i made this kinda cursed

Commented [2]: lol def a bad question mb on the flavor text

ANSWER: GMOs (ACCEPT: GENETICALLY MODIFIED ORGANISMS) [SO]

TOSSUP

19. Biology - *Multiple Choice* In DNA, what nucleotide base is paired with thymine?

W) Guanine
X) Cytosine
Y) Adenine
Z) Uracil

ANSWER: Y) ADENINE [AT]

BONUS

19. Biology - *Short Answer* What is the main photosynthetic pigment in chloroplasts?

ANSWER: CHLOROPHYLL [AT]

TOSSUP

20. Math - *Short Answer* What is the probability of it raining today and not raining tomorrow if the probability that it rains on any given day is ⅖?

ANSWER: 6/25

BONUS

20. Math - *Short Answer* A water bottle itself weighs half a pound. When the bottle is filled ¼ of the way with water, the water bottle weighs a pound. How heavy, in pounds, is a full bottle?

ANSWER: 2.5 POUNDS

TOSSUP

21. Earth and Space - *Multiple Choice* Which of the following colors of star is the hottest?
W) Red
X) Yellow
Y) Blue
Z) White

ANSWER: Y) BLUE [EB; RR ESS-SA]

BONUS

21. Earth and Space - *Short Answer* What substance composes approximately 27% of the known universe and is only affected by gravity?

ANSWER: DARK MATTER [EB; RR ESS-OA]

TOSSUP

22. Chemistry - *Multiple Choice* Which of the following materials would likely be the most ductile?

W) Silver

X) Rubber

Y) Polystyrene

Z) Polyethylene

ANSWER: W) SILVER [SO]

BONUS

22. Chemistry - *Short Answer* What quantity gives the number of molecules in one mole of carbon dioxide?

ANSWER: AVOGADRO'S NUMBER

TOSSUP

23. Physics - *Short Answer* Identify all of the following 3 properties of steel that would increase as its temperature is increased. I. Density; II. Length; III. Mass

ANSWER: II ONLY [RE]

BONUS

23. Physics - *Short Answer* An object accelerates uniformly from rest until it reaches a speed of 15 m/s. If this process occurs over a span of 30 seconds, in meters per second squared, what is the average acceleration of the object?

ANSWER: 0.5 m/s^2 [RE]