

ROUND 12

TOSS-UP

1) PHYSICAL SCIENCE *Multiple Choice* Which of the following statements is TRUE:

- W) for a heavy element to be stable the number of protons typically equals the number of neutrons
- X) the faster a boiling uncovered pot of water boils the hotter the water becomes
- Y) cellulose is an example of a natural polymer
- Z) the speed of light is always the same

ANSWER: Y) CELLULOSE IS AN EXAMPLE OF A NATURAL POLYMER

BONUS

1) PHYSICAL SCIENCE *Multiple Choice* Which of the following is NOT a salt:

- W) potassium hydroxide
- X) potassium bromide
- Y) magnesium chloride
- Z) calcium carbonate

ANSWER: W) POTASSIUM HYDROXIDE

TOSS-UP

2) EARTH SCIENCE *Multiple Choice* A high-pressure weather system is typically associated with which of the following conditions:

- W) cool with high thin clouds
- X) cool with nimbostratus clouds
- Y) warm with moderate overcast
- Z) warm with cumulonimbus clouds

ANSWER: W) COOL WITH HIGH THIN CLOUDS

BONUS

2) EARTH SCIENCE *Short Answer* What is the specific name for ridges of the giant accumulations of glacial till that form along the outer sides or edges of an alpine glacier?

ANSWER: LATERAL MORAINES (DO NOT ACCEPT: MORAINE)

TOSS-UP

3) MATH *Short Answer* How many faces does a dodecagon have?

ANSWER: 12

BONUS

3) MATH *Short Answer* Find the sum of all interior angles, in degrees, in a regular hexagon:

ANSWER: 720

(Solution: $(6 - 2)(180) = 720^\circ$)

TOSS-UP

4) GENERAL SCIENCE *Multiple Choice* A recent 375-million year old fossil discovered in the upper reaches of Canada had many unusual features including a flat head with eyes on top and overlapping ribs. This was a major discovery because it is believed this:

- W) represents a missing link between fish and land vertebrates
- X) was the first juvenile Tyrannosaurus ever found in Canada
- Y) was an amphibian bird from the Cretaceous Period
- Z) supports vertebrates evolving first on land rather than at sea

ANSWER: W) REPRESENTS A MISSING LINK BETWEEN FISH AND LAND VERTEBRATES

BONUS

4) GENERAL SCIENCE *Multiple Choice* Which of the following practices is one of the MAIN ways of preventing Brucellosis in humans:

- W) avoid tick bites
- X) include vitamin C in your diet
- Y) include niacin in your diet
- Z) consume only pasteurized dairy products

ANSWER: Z) CONSUME ONLY PASTEURIZED DAIRY PRODUCTS

TOSS-UP

5) LIFE SCIENCE *Multiple Choice* Which of the following is the BEST example of a heterozygous condition:

- W) non-identical twins
- X) the matching alleles for a certain physical characteristic are different
- Y) one of a pair of chromosomes is lost
- Z) two zygotes are fused together

ANSWER: X) THE MATCHING ALLELES FOR A CERTAIN PHYSICAL CHARACTERISTIC ARE DIFFERENT

BONUS

5) LIFE SCIENCE *Short Answer* Meiosis is typically divided into meiosis 1 and meiosis 2. In a typical human egg cell, how many chromosomes will it have in each cell after meiosis 1?

ANSWER: 23

TOSS-UP

6) PHYSICAL SCIENCE *Multiple Choice* Which of the following is typically TRUE:

- W) rare earth metals are also known as alkali metals
- X) a combustion reaction releases heat
- Y) noble gases are very reactive elements
- Z) a reaction in equilibrium cannot move forward or backward

ANSWER: X) A COMBUSTION REACTION RELEASES HEAT

BONUS

6) PHYSICAL SCIENCE *Short Answer* Name all of the following 4 choices that contain ionic bonds: NaCl; O₂; KBr; CO₂

ANSWER: NaCl; KBr

TOSS-UP

7) EARTH SCIENCE *Multiple Choice* Which of the following is a volcano that is generally the smallest type, has very steep slopes, and would most likely result from a single violent eruption:

- W) stratovolcano
- X) cinder cone
- Y) shield volcano
- Z) lava dome

ANSWER: X) CINDER CONE

BONUS

7) EARTH SCIENCE *Multiple Choice* Which of the following primarily influences the viscosity and therefore the explosivity of a magma:

- W) silica content
- X) gas content
- Y) temperature
- Z) pressure

ANSWER: W) SILICA CONTENT

TOSS-UP

8) MATH *Short Answer* Evaluate the following radical: $-\sqrt{\left(\frac{144}{9}\right)}$

ANSWER: -4

BONUS

8) MATH *Short Answer* Giving your answer in slope-intercept form, what is the equation of the line passing through the point (2, 1) that is parallel to the line with the equation $3y + 12x = 6$?

ANSWER: $y = -4x + 6$

TOSS-UP

9) GENERAL SCIENCE *Multiple Choice* Which of the following is the MAIN advantage of the LED, or light emitting diode, versus the conventional incandescent lamp:

- W) efficiency
- X) size
- Y) they can be made out of plastic
- Z) they are cheaper to manufacture

ANSWER: W) EFFICIENCY

BONUS

9) GENERAL SCIENCE *Multiple Choice* Which of the following elements is essential to the human body for muscle and nerve function and maintaining fluid balance:

- W) iodine
- X) potassium
- Y) calcium
- Z) iron

ANSWER: X) POTASSIUM

TOSS-UP

10) LIFE SCIENCE *Short Answer* What is the anatomical term for the nerves in humans that conduct messages from the eyes to the brain?

ANSWER: OPTIC

BONUS

10) LIFE SCIENCE *Short Answer* What is the scientific name for the veins in humans that return oxygen rich blood to the heart?

ANSWER: PULMONARY

TOSS-UP

11) PHYSICAL SCIENCE *Multiple Choice* Which of the following is the BEST description of the arrangement of the magnetic domains of an unmagnetized iron bar:

- W) all are aligned at 180° to each other
- X) all are aligned at 90° to each other
- Y) they are randomly arranged
- Z) there are no magnetic domains in this case

ANSWER: Y) THEY ARE RANDOMLY ARRANGED

BONUS

11) PHYSICAL SCIENCE *Short Answer* Which 2 of the following 4 elements are most easily magnetized at room temperature: iron; copper; nickel; aluminum

ANSWER: IRON AND NICKEL

TOSS-UP

12) EARTH SCIENCE *Multiple Choice* Which of the following is NOT true about glaciations:

- W) about 15,000 years ago, most of Wisconsin was buried under thick glacial ice
- X) throughout history, times such as now when only minor ice sheets existed coincided with high sea levels
- Y) because of its high altitude, Mt. Everest contains a vast continental glacier
- Z) Australia does not currently contain any glaciers

ANSWER: Y) BECAUSE OF ITS HIGH ALTITUDE, MT. EVEREST CONTAINS A VAST CONTINENTAL GLACIER

BONUS

12) EARTH SCIENCE *Multiple Choice* Which of the following is the Epoch name given to the last approximately 10,000 years of Earth's history:

- W) Quaternary
- X) Eocene
- Y) Miocene
- Z) Holocene

ANSWER: Z) HOLOCENE

TOSS-UP

13) MATH *Short Answer* Give the numerical value of 25 factorial divided by 24 factorial:

ANSWER: 25

BONUS

13) MATH *Short Answer* Express the following radical in its simplest radical form if all variables represent positive quantities: $5\sqrt{(16a^2b^4c)}$

ANSWER: $20ab^2\sqrt{c}$

TOSS-UP

14) GENERAL SCIENCE *Multiple Choice* If you notice a red-ringed rash similar to the shape of a bull's-eye, which of the following diseases would you expect you have:

- W) malaria
- X) poison ivy
- Y) sickle cell anemia
- Z) Lyme disease

ANSWER: Z) LYME DISEASE

BONUS

14) GENERAL SCIENCE *Multiple Choice* Which of the following is NOT true about Lyme disease:

- W) only a small percentage of tick bites in the U.S. result in Lyme disease
- X) in early stages, people experience flu-like symptoms
- Y) Lyme disease is treated with anti-viral drugs
- Z) the ticks that carry the disease are about the size of a sesame seed

ANSWER: Y) LYME DISEASE IS TREATED WITH ANTI-VIRAL DRUGS

TOSS-UP

15) LIFE SCIENCE *Multiple Choice* Which of the following is the name for the blood cell in humans that plays the most central role in regulating the immune system:

- W) macrophage
- X) mast cell
- Y) erythrocyte
- Z) lymphocyte

ANSWER: Z) LYMPHOCYTE

BONUS

15) LIFE SCIENCE *Multiple Choice* Which of the following is a common excitatory neurotransmitter in mammals:

- W) acetylcholine
- X) insulin
- Y) estrogen
- Z) glycine

ANSWER: W) ACETYLCHOLINE

TOSS-UP

16) PHYSICAL SCIENCE *Multiple Choice* Real images produced by a single lens are always:

- W) upright
- X) inverted
- Y) virtual
- Z) smaller

ANSWER: X) INVERTED

BONUS

16) PHYSICAL SCIENCE *Multiple Choice* Which of the following is NOT true:

- W) sound waves can be considered longitudinal waves
- X) light slows down when it enters glass from dry air
- Y) as a light wave's frequency increases so must its amplitude
- Z) light can be produced with one frequency

ANSWER: Y) AS A LIGHT WAVE'S FREQUENCY INCREASES SO MUST ITS AMPLITUDE

TOSS-UP

17) EARTH SCIENCE *Multiple Choice* Which of the following is the primary process by which colder ocean water loaded with nutrients rises to the surface:

- W) upwelling
- X) ocean swells
- Y) maelstroms
- Z) eddies

ANSWER: W) UPWELLING

BONUS

17) EARTH SCIENCE *Multiple Choice* Which of the following BEST describes or exemplifies an aquifer:

- W) superheated water bursting through surface cracks in the Earth
- X) a lake, pond or stream
- Y) the side of a mountain facing the prevailing winds
- Z) porous subsurface rock saturated with water

ANSWER: Z) POROUS SUBSURFACE ROCK SATURATED WITH WATER

TOSS-UP

18) MATH *Short Answer* Find the value of the following logarithmic expression: $\log_{25} 5$

ANSWER: $\frac{1}{2}$ (ACCEPT: 0.5)

BONUS

18) MATH *Short Answer* What is the surface area of a closed box, in centimeters, with a width of 6, height of 4, and length of 10 centimeters, respectively?

ANSWER: 248

(Solution: $A = 2lw + 2lh + 2wh = 2(10)(6) + 2(10)(4) + 2(6)(4) = 248$ cm)

TOSS-UP

19) GENERAL SCIENCE *Multiple Choice* Which of the following is an anti-oxidant vitamin typically found in relatively high amounts in vegetable oils, nuts and dark green leafy vegetables:

- W) vitamin K
- X) vitamin C
- Y) vitamin D
- Z) vitamin E

ANSWER: Z) VITAMIN E

BONUS

19) GENERAL SCIENCE *Multiple Choice* Thyroid disease is typically thought of as:

- W) a blood disorder
- X) a metabolic disease
- Y) a digestive system disorder
- Z) an immune system disorder

ANSWER: X) A METABOLIC DISEASE

TOSS-UP

20) LIFE SCIENCE *Multiple Choice* Which of the following is the phylum to which organisms with large amounts of chitin belong:

- W) *Anthophyta*
- X) *Arthropoda*
- Y) *Vertebrata*
- Z) *Ginkophyta*

ANSWER: X) *ARTHROPODA*

BONUS

20) LIFE SCIENCE *Multiple Choice* Which of the following is the MOST readily available energy store during normal human cellular conditions:

- W) fat
- X) proteins
- Y) ATP
- Z) glucose

ANSWER: Y) ATP

TOSS-UP

21) PHYSICAL SCIENCE *Short Answer* Assuming a planet has a gravitational force of 5 meters per second squared, what would an object's weight be, in newtons, if it has a specific gravity of 2 and a mass of 5 kilograms?

ANSWER: 25

BONUS

21) PHYSICAL SCIENCE *Short Answer* What is the mass, in grams, of a bag of beans that weighs 90 newtons if the force of gravity is assumed to be 10 meters per second squared?

ANSWER: 9,000

(Solution: $90/10 \times 1000 = 9000$)

TOSS-UP

22) EARTH SCIENCE *Short Answer* Which 2 of the following 5 choices are sedimentary rocks formed as the result of evaporation and precipitation: gypsum; marble; rock salt; gneiss; diorite

ANSWER: GYPSUM; ROCK SALT

BONUS

22) EARTH SCIENCE *Short Answer* As viewed from Earth, what is the proper name for the brightest-appearing star in the night sky of mid northern latitudes?

ANSWER: SIRIUS

TOSS-UP

23) MATH *Short Answer* What are the exact lengths, in centimeters, of the shorter and longer legs, respectively, of a 30-60-90 degree right triangle if the length of the hypotenuse is 12 centimeters?

ANSWER: SHORTER LEG = 6; LONGER LEG = $6\sqrt{3}$

BONUS

23) MATH *Short Answer* Today, Ted is 3-times as old than Alice. In 6 years from now, Ted will be twice as old as Alice will be. How many years old, respectively, are Alice and Ted today?

ANSWER: ALICE = 6; TED = 18

(Solution: $3x + 6 = 2(x + 6)$; $x = 6$ (Alice); $3x = 18$ (Ted))

TOSS-UP

24) GENERAL SCIENCE *Short Answer* If solid dry ice is placed in a sealed sandwich bag at room temperature, the bag quickly expands because of the release of what gas?

ANSWER: CARBON DIOXIDE (ACCEPT: CO₂)

BONUS

24) GENERAL SCIENCE *Short Answer* Name the gas that has a very high partial pressure in air and is the main problem in decompression sickness, commonly known as the bends, that can happen to deep-sea divers if they swim to the surface too quickly?

ANSWER: NITROGEN

TOSS-UP

25) LIFE SCIENCE *Short Answer* Of the four general types of biological molecules, proteins, carbohydrates, lipids and nucleic acids, under which one would insulin be categorized?

ANSWER: PROTEINS

BONUS

25) LIFE SCIENCE *Short Answer* What specific human gland is the primary production site of epinephrine?

ANSWER: ADRENAL GLAND