

ROUND 9

TOSS-UP

1) **BIOLOGY** *Multiple Choice* In a typical cell, cytokinesis overlaps with:

- W) S phase
- X) metaphase
- Y) anaphase
- Z) telophase

ANSWER: Z) TELOPHASE

BONUS

1) **BIOLOGY** *Short Answer* How many different cranial nerves are there in the human body?

ANSWER: 12

TOSS-UP

2) **CHEMISTRY** *Multiple Choice* If CO₂ is bubbled through distilled water at room temperature, which of the following will most likely occur:

- W) the pH of the water increases
- X) the pH of the water decreases
- Y) the pH of the water is unchanged
- Z) carbon will precipitate out of solution

ANSWER: X) THE PH OF THE WATER DECREASES

(Solution: CO₂ + H₂O → H₂CO₃, carbonic acid)

BONUS

2) **CHEMISTRY** *Multiple Choice* Ten grams of dietary fat contains how many food calories?

- W) 40 calories
- X) 90 calories
- Y) 60 calories
- Z) 120 calories

ANSWER: X) 90 CALORIES

TOSS-UP

3) PHYSICS *Multiple Choice* Which of the following is NOT an example of a transverse wave:

- W) ocean wave
- X) light wave
- Y) microwave
- Z) sound wave

ANSWER: Z) SOUND WAVE

BONUS

3) PHYSICS *Short Answer* What is the following statement most commonly known as:
“A body immersed in a fluid is supported by a force equal to the weight of the fluid it displaces.”

ANSWER: ARCHIMEDES' PRINCIPLE

TOSS-UP

4) ASTRONOMY *Multiple Choice* An emission or bright line spectrum consists of:

- W) a series of bright lines superimposed on a black or continuous background.
- X) a series of bright and dark lines superimposed on a black-lined grid
- Y) a series of faint black lines superimposed on a bright background
- Z) a circular array of dark ring patterns on a bright background

ANSWER: W) A SERIES OF BRIGHT LINES SUPERIMPOSED ON A BLACK OR CONTINUOUS BACKGROUND.

BONUS

4) ASTRONOMY *Short Answer* What is the name for the celestial body of interstellar gas and dust where stars are sometimes born?

ANSWER: NEBULA

TOSS-UP

5) MATH *Short Answer* How many degrees are there in π (read as: PIE) radians:

ANSWER: 180°

BONUS

5) MATH *Short Answer* What is the cube root of 729?

ANSWER: 9

TOSS-UP

6) EARTH SCIENCE *Multiple Choice* What is the name for a roughly circular coral reef enclosing a shallow lagoon:

- W) barrier reef
- X) fringing reef
- Y) shallow reef
- Z) atoll

ANSWER: Z) ATOLL

BONUS

6) EARTH SCIENCE *Short Answer* A limestone cave that is open to the sky or whose roof has collapsed is now called a:

ANSWER: SINKHOLE

TOSS-UP

7) GENERAL SCIENCE *Short Answer* No reported cases of this pervasive and deadly disease has been reported in the western hemisphere for over two decades and it is believed to be nearly eliminated from the Earth:

ANSWER: SMALLPOX

BONUS

7) GENERAL SCIENCE *Multiple Choice* The majority of people experience the worst jet-lag flying in which of the following directions:

- W) East to West
- X) West to East
- Y) North to South
- Z) South to North

ANSWER: X) WEST TO EAST

TOSS-UP

8) GENERAL SCIENCE *Multiple Choice* Which of the following is NOT an example of a programming language:

- W) Pascal
- X) BIOS
- Y) Cobol
- Z) Fortran

ANSWER: X) BIOS

BONUS

8) GENERAL SCIENCE *Short Answer* A common type of RAM that is a small battery-backed memory that stores configuration settings is called:

ANSWER: CMOS (ACCEPT: COMPLEMENTARY METAL OXIDE SEMICONDUCTOR)

TOSS-UP

9) **BIOLOGY** *Multiple Choice* Francesco Redi is known for an experiment that refuted which of the following theories:

- W) the theory of spontaneous generation
- X) phlogiston theory
- Y) the theory of bad humors
- Z) the theory that disease was caused by astrological events

ANSWER: W) THE THEORY OF SPONTANEOUS GENERATION

BONUS

9) **BIOLOGY** *Short Answer* For a flower to be complete, it must possess what four types of floral appendages?

ANSWER: SEPALS, PETALS, STAMENS, AND CARPELS
(ACCEPT: SEPALS, PETALS, STAMENS, AND PISTALS)

TOSS-UP

10) **CHEMISTRY** *Short Answer* The disruption of the three-dimensional shape of a protein by factors such as heat, acids, bases, and organic solvents, is called what?

ANSWER: DENATURATION

BONUS

10) **CHEMISTRY** *Short Answer* This metal lies between silicon and tin in its chemical and physical properties and used extensively in the making of transistors:

ANSWER: GERMANIUM (ACCEPT: Ge)

TOSS-UP

11) PHYSICS *Multiple Choice* The Department of Energy's B-Factory at the Stanford Linear Accelerator Lab is designed to collide electron and positron beams of unequal energies and produce millions of these particles, which are commonly called:

- W) B mesons
- X) B leptons
- Y) B muons
- Z) B neutrons

ANSWER: W) B MESONS

BONUS

11) PHYSICS *Short Answer* According to Coulomb's Law, if two charged particles are repelled with a given force at a distance d , by what multiple will the force decrease by if d is increased by 4 times?

ANSWER: 16 TIMES

TOSS-UP

12) ASTRONOMY *Multiple Choice* Maria on the moon are:

- W) darker and smoother parts of the moon's surface
- X) mountains of the moon
- Y) irregular craters
- Z) highland areas which show up as irregular contours

ANSWER: W) DARKER AND SMOOTHER PARTS OF THE MOON'S SURFACE

BONUS

12) ASTRONOMY *Short Answer* Based on "best altitude conditions", during what month in the northern hemisphere is it the best time to observe the full moon?

ANSWER: DECEMBER

(Solution: Norton Star Atlas pg. 96)

TOSS-UP

13) MATH *Short Answer* What is the sum of the internal angles of a pentagon:

ANSWER: 540°

BONUS

13) MATH *Multiple Choice* Which of the following is the surface area of a perfect sphere with a radius of 10 meters?

- W) 1256.7 m² (read as: meters squared)
- X) 1200.5 m²
- Y) 628 m²
- Z) 125.7 m²

ANSWER: W) 1256.7 m²

(Solution: $4\pi r^2 \sim 400 \times 3.14 = 1256$)

TOSS-UP

14) EARTH SCIENCE *Multiple Choice* Ground depressions in areas of Karst topography are called:

- W) kettles
- X) grabens
- Y) sinkholes
- Z) cirques

ANSWER: Y) SINKHOLES

BONUS

14) EARTH SCIENCE *Multiple Choice* Steep-sided volcanoes such as Mounts Rainier, Hood, and Fuji, are examples of what kind of volcanoes:

- W) stratovolcanoes
- X) tephra cone volcanoes
- Y) shield volcanoes
- Z) tower volcanoes

ANSWER: W) STRATOVOLCANOES

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* A mixture of turpentine, ether, camphor gum, and powdered emory, was historically used for which of the following:

- W) sealing mirrored surfaces
- X) grinding glass surfaces
- Y) gluing glass plates together
- Z) coating lenses for chromatic aberration

ANSWER: X) GRINDING GLASS SURFACES

BONUS

15) GENERAL SCIENCE *Short Answer* Thermal stratification of lakes occurs in 3 layers. Give the names of these 3 layers from the top of a lake to the bottom:

ANSWER: EPILIMNION; THERMOCLINE; HYPOLIMNION (must be in correct order)

TOSS-UP

16) GENERAL SCIENCE *Multiple Choice* Which of the following is NOT true about JAVA:

- W) it provides support for networking.
- X) it is an ISO standard language
- Y) it is an object oriented language
- Z) it is a dynamic language.

ANSWER: X) IT IS AN ISO STANDARD LANGUAGE

BONUS

16) GENERAL SCIENCE *Short Answer* What JAVA statement makes Java classes available to the current class under an abbreviated name?

ANSWER: THE IMPORT STATEMENT (ACCEPT: IMPORT)

TOSS-UP

17) BIOLOGY *Multiple Choice* Bacteria are more likely used to produce which of the following:

- W) gelatin
- X) wine
- Y) pasteurized milk
- Z) vinegar

ANSWER: Z) VINEGAR

BONUS

17) BIOLOGY *Short Answer* Biologists usually refer to the head of a tapeworm by what name?

ANSWER: SCOLEX

TOSS-UP

18) CHEMISTRY *Multiple Choice* Which of the following is true of an oxidation reaction:

- W) in an electrolytic cell, oxidation takes place at the cathode
- X) in the following reaction, bromine is oxidized $\text{Br}_2 + 2\text{e}^- \rightarrow 2\text{Br}^-$
- Y) in a chemical reaction, the substance that is being oxidized is also known as the reducing agent
- Z) in a chemical reaction, the substance that is being oxidized is also known as the oxidizing agent

ANSWER: Y) IN A CHEMICAL REACTION, THE SUBSTANCE THAT IS BEING OXIDIZED IS ALSO KNOWN AS THE REDUCING AGENT

BONUS

18) CHEMISTRY *Short Answer* Name any 5 of the 8 nonmetals that form homonuclear diatomic molecules:

ANSWER: (accept any 5) HYDROGEN, NITROGEN, OXYGEN, FLUORINE, CHLORINE, BROMINE, IODINE, ASTATINE (ACCEPT: H_2 , N_2 , O_2 , F_2 , Cl_2 , Br_2 , I_2 , At_2)

TOSS-UP

19) PHYSICS *Short Answer* The lowest frequency that determines the pitch of a musical note is most commonly called the:

ANSWER: FUNDAMENTAL (ACCEPT: FUNDAMENTAL TONE)

BONUS

19) PHYSICS *Short Answer* Order the following from the WORST electrical conductor to the BEST electrical conductor: glass, rubber, iron, dry wood:

ANSWER: RUBBER, GLASS, DRY WOOD, IRON

TOSS-UP

20) ASTRONOMY *Short Answer* The Magellan clouds are actually what type of celestial body?

ANSWER: GALAXIES

BONUS

20) ASTRONOMY *Short Answer* If the temperature of a star increases from 10,000K to 30,000K, by what factor will the rate of energy radiated per second increase?

ANSWER: 81 (ACCEPT: 3^4)

TOSS-UP

21) MATH *Multiple Choice* Given that the $\log_{10} 2 = 0.301$ (read as: log base 10 of 2 equals 0.301), what is the $\log_{10} 8$ (read as: log base 10 of 8) equal to:

- W) 0.903
- X) 1.204
- Y) 1.002
- Z) 1.293

ANSWER: W) 0.903

BONUS

21) MATH *Short Answer* What is the mean for the following data set of 5 numbers: 84, 50, 73, 27, 16

ANSWER: 50

TOSS-UP

22) EARTH SCIENCE *Multiple Choice* Which will most likely form when a steep mountain stream flows abruptly onto a flat plain:

- W) delta
- X) alluvial fan
- Y) braided stream
- Z) mid-channel bar

ANSWER: X) ALLUVIAL FAN

BONUS

22) EARTH SCIENCE *Multiple Choice* When, in the geologic column, did dinosaurs become extinct:

- W) at the Cretaceous-Tertiary boundary
- X) at the Jurassic-Cretaceous boundary
- Y) at the Triassic-Jurassic boundary
- Z) at the Permian-Triassic boundary

ANSWER: W) AT THE CRETACEOUS-TERTIARY BOUNDARY

TOSS-UP

23) BIOLOGY *Multiple Choice* Which of the following is NOT a nematode:

- W) pinworm
- X) hookworm
- Y) tapeworm
- Z) ascaris

ANSWER: Y) TAPEWORM

BONUS

23) BIOLOGY *Multiple Choice* Assuming a male mammal has an x-linked recessive gene which exhibits a certain characteristic phenotypic trait, which of the following is NOT true:

- W) all of his daughters will be carriers
- X) all of his sons will exhibit the trait
- Y) there is a 50% chance his daughters will pass the recessive allele to their sons
- Z) none of his sons will pass the recessive allele

ANSWER: X) ALL OF HIS SONS WILL EXHIBIT THE TRAIT

TOSS-UP

24) CHEMISTRY *Multiple Choice* Which one of the following statements is true about the specific gravity of a substance:

- W) specific gravity is one of the few unitless values encountered in chemistry
- X) the specific gravity of water is 1 gram per milliliter
- Y) specific gravity is calculated by dividing the density of water by the density of the substance
- Z) specific gravity is measured with an instrument called the densitometer

ANSWER: W) SPECIFIC GRAVITY IS ONE OF THE FEW UNITLESS VALUES ENCOUNTERED IN CHEMISTRY

BONUS

24) CHEMISTRY *Short Answer* An atom has 18 protons and 22 neutrons. What is its mass number:

ANSWER: 40

(Solution: $18+22=40$)

TOSS-UP

25) PHYSICS *Short Answer* This person established the “one fluid theory” of electricity and performed some of the first investigations into electrical grounding and insulation:

ANSWER: BEN FRANKLIN

BONUS

25) PHYSICS *Short Answer* Assuming $g = 9.8 \text{ m/sec}^2$, what is the weight on Earth, in Newtons, of a 60 kilogram person?

ANSWER: 588 NEWTONS