

ROUND 9

TOSS-UP

- 1) **BIOLOGY** *Multiple Choice* Interferons are produced most commonly when:
- W) the nervous system perceives pain
 - X) when mast cells bind compliment
 - Y) the immune system reacts to a viral infection
 - Z) implantation has occurred

ANSWER: Y) THE IMMUNE SYSTEM REACTS TO A VIRAL INFECTION

BONUS

- 1) **BIOLOGY** *Short Answer* Multiple sclerosis is a degenerative disorder that destroys what specific nerve structure?

ANSWER: MYELIN SHEATH (ACCEPT: MYELIN)

TOSS-UP

- 2) **CHEMISTRY** *Short Answer* What does the acronym STP stand for?

ANSWER: STANDARD TEMPERATURE AND PRESSURE (ACCEPT: 0°C OR 273 K AND 1 ATM OR 760 mm Hg)

BONUS

- 2) **CHEMISTRY** *Short Answer* At standard temperature and pressure, 1 mole of gas occupies how many liters of volume?

ANSWER: 22.4

TOSS-UP

- 3) PHYSICS *Short Answer* The Department of Energy's Brookhaven National Lab is the home of the RHIC, which is world's highest energy particle collider. What do the letters R, H, I, and C each respectively stand for?

ANSWER: RELATIVISTIC HEAVY ION COLLIDER

BONUS

- 3) PHYSICS *Short Answer* Assuming air resistance is negligible and the gravitational acceleration is 10 meters per second squared, what is the distance traveled, in meters, by a body in free fall after 5 seconds if it started from rest?

ANSWER: 125

TOSS-UP

- 4) ASTRONOMY *Multiple Choice* Pallas, Iris, Hidalgo, and Adonis are all well known to astronomers as:
- W) variable stars
 - X) minor planets
 - Y) places on mars
 - Z) mountains on the moon

ANSWER: X) MINOR PLANETS

BONUS

- 4) ASTRONOMY *Short Answer* A star with a brightness at the lower limit of human vision is typically given what value?

ANSWER: 6

TOSS-UP

- 5) MATH *Multiple Choice* If A and B are sets such that A is a subset of B but A does not equal B, then A is called what in regards to B:
- W) empty set
 - X) universal set
 - Y) proper subset
 - Z) roster set

ANSWER: Y) PROPER SUBSET

BONUS

- 5) MATH *Short Answer* Name 2 consecutive ODD integers where 5 times the second minus 6 times the first equals 55:

ANSWER: -45 AND -43 (must be in order)

(Solution: $5(n+2) - 6n = 55$)

TOSS-UP

- 6) EARTH SCIENCE *Multiple Choice* In terms of vulcanology, where in the Earth is the so-called Ring of Fire located:
- W) around the Pacific Ocean basin
 - X) between the South American and African Plate
 - Y) along the Mid-Atlantic ridge
 - Z) along the Australian-Indian Plate

ANSWER: W) AROUND THE PACIFIC OCEAN BASIN

BONUS

- 6) EARTH SCIENCE *Short Answer* Order the following three types of magma based on their viscosity, starting with the least viscous: rhyolitic, basaltic, andesitic

ANSWER: BASALTIC, ANDESITIC, RHYOLITIC

TOSS-UP

- 7) GENERAL SCIENCE *Multiple Choice* Which of the following medical instruments delivers the least ionizing radiation to the typical patient:

- W) MRI
- X) PET
- Y) CAT
- Z) X-ray

ANSWER: W) MRI

BONUS

- 7) GENERAL SCIENCE *Short Answer* Famous for her writing in 1928 of “The Coming of Age in Samoa”, who posited the revolutionary idea that cultural expectations shaped sexual development?

ANSWER: MARGARET MEAD

TOSS-UP

- 8) COMPUTER SCIENCE *Multiple Choice* The file extension .ZIP (read as: dot, Z, I, P) refers to what type of file:

- W) file compression
- X) QuickTime movie
- Y) graphics
- Z) Excel worksheet

ANSWER: W) FILE COMPRESSION

BONUS

- 8) COMPUTER SCIENCE *Multiple Choice* What is the minimum amount of RAM required for the proper execution of Windows 98:

- W) 4 MB
- X) 16 MB
- Y) 24 MB
- Z) 32 MB

ANSWER: Y) 24 MB

TOSS-UP

9) **BIOLOGY** *Multiple Choice* The cricoid (Pron: kri-koyd) cartilage is part of the:

- W) pelvic symphysis
- X) larynx
- Y) knee
- Z) rib cage

ANSWER: X) LARYNX

BONUS

9) **BIOLOGY** *Short Answer* Gram positive is to blue as gram negative is to:

ANSWER: RED (ACCEPT: PINK)

TOSS-UP

10) **CHEMISTRY** *Multiple Choice* Two identical beakers are placed in a sealed bell-jar. Beaker 1 contains 50 milliliters of pure water and Beaker 2 contains 50 milliliters of a saturated sugar solution in water. Slowly, the levels of solution will change such that:

- W) beaker 1 decreases and beaker 2 increases
- X) beaker 2 decreases and beaker 1 increases
- Y) both beakers decrease
- Z) both remain unchanged

ANSWER: W) BEAKER 1 DECREASES AND BEAKER 2 INCREASES

BONUS

10) **CHEMISTRY** *Short Answer* What is the substrate for which catalase has the greatest affinity?

ANSWER: HYDROGEN PEROXIDE (ACCEPT: H₂O₂)

TOSS-UP

- 11) PHYSICS *Short Answer* Although known to the Chinese as early as the 11th century, what term, named after its 19th century discoverer, indicates the temperature at which ferromagnets lose their magnetism?

ANSWER: CURIE POINT (ACCEPT: CURIE TEMPERATURE)

BONUS

- 11) PHYSICS *Short Answer* Order the following from the WORST electrical conductor to the BEST electrical conductor: pure water, aluminum, steel, dry wood

ANSWER: PURE WATER, DRY WOOD, STEEL, ALUMINUM

TOSS-UP

- 12) ASTRONOMY *Short Answer* What constellation that is prominent in the summer sky in North America is recognized by the distinctive “W” shape of its 5 brightest stars?

ANSWER: CASSIOPEIA

BONUS

- 12) ASTRONOMY *Multiple Choice* In A.D. 1054, Chinese astronomers observed the appearance of a new star, whose location is now occupied by:

- W) a white dwarf
- X) a brown dwarf
- Y) a supernova remnant containing a pulsar
- Z) an emission nebula

ANSWER: Y) A SUPERNOVA REMNANT CONTAINING A PULSAR

TOSS-UP

- 13) MATH *Short Answer* An angle measures $\frac{\pi}{4}$ radians. In radians and degrees, how much is half the angle?

ANSWER: $\frac{\pi}{8}$ AND 22.5°

BONUS

- 13) MATH *Short Answer* Of the 75 cars in a lot, two-fifths are Chevy's. If four-ninths of the cars that are not Chevy's are Fords, how many of cars on the lot are neither Chevy's nor Fords?

ANSWER: 25 (ACCEPT: 1/3)

(Solution: (not Chevy) $\frac{3}{5} \times \frac{5}{9}$ (not Ford) = $\frac{1}{3}$)

TOSS-UP

- 14) EARTH SCIENCE *Multiple Choice* Which of the following minerals is used as the primary ore of aluminum:

- W) bauxite
- X) galena
- Y) magnetite
- Z) hematite

ANSWER: W) BAUXITE

BONUS

- 14) EARTH SCIENCE *Multiple Choice* Which of the following geological periods is youngest?

- W) Cambrian
- X) Jurassic
- Y) Tertiary
- Z) Devonian

ANSWER: Y) TERTIARY

TOSS-UP

- 15) GENERAL SCIENCE *Short Answer* What is the most common term for the difference in the brightness of an object's image and the brightness of the surroundings?

ANSWER: CONTRAST

BONUS

- 15) GENERAL SCIENCE *Short Answer* EKG is to the heart as EEG is to the what?

ANSWER: BRAIN

TOSS-UP

- 16) COMPUTER SCIENCE *Multiple Choice* Which protocol is used when web content is transferred over the internet:

- W) SMTP
- X) HTTP
- Y) HTML
- Z) MIME

ANSWER: X) HTTP

BONUS

- 16) COMPUTER SCIENCE *Multiple Choice* The oldest programming language still in common use today is:

- W) COBOL
- X) LISP
- Y) FORTRAN
- Z) ADA

ANSWER: Y) FORTRAN

(Solution: outdates LISP by one year)

TOSS-UP

17) **BIOLOGY** *Multiple Choice* What is the single most important way that health care personnel can prevent self infection or spreading infections in hospitals:

- W) receiving full immunizations
- X) proper use of antibiotics
- Y) wearing face masks
- Z) washing their hands

ANSWER: Z) WASHING THEIR HANDS

BONUS

17) **BIOLOGY** *Short Answer* What is the anatomical term for movement of a bone towards the midline of the body?

ANSWER: ADDUCTION

TOSS-UP

18) **CHEMISTRY** *Short Answer* What is the simplest amino acid?

ANSWER: GLYCINE

BONUS

18) **CHEMISTRY** *Short Answer* A sample of gas has a volume of 6 liters at a temperature of 300K. If the pressure remains constant and the temperature is raised to 400K, what is the new volume of the gas, in liters:

ANSWER: 8

(Solution: $V_1/T_1 = V_2/T_2$; $6L/300K = V_2/400K$; $= 8L$)

TOSS-UP

- 19) PHYSICS *Short Answer* What two Nobel laureates, while working at Berkeley California, are often credited with co-discovering more elements than any other scientists?

ANSWER: GLENN SEABORG AND ALBERT GHIORSO (ACCEPT: SEABORG AND GHIORSO)

BONUS

- 19) PHYSICS *Multiple Choice* What is the average acceleration of a golf ball struck from rest and reaching a maximum speed of 80 meters per second at a displacement of 3 meters from the point of contact:

- W) 13 m/sec²
- X) 530 m/sec²
- Y) 1066 m/sec²
- Z) 2020 m/sec²

ANSWER: Y) 1066 M/SEC²

TOSS-UP

- 20) ASTRONOMY *Short Answer* What is the force that causes fusion in stars?

ANSWER: GRAVITY

BONUS

- 20) ASTRONOMY *Multiple Choice* The biggest known asteroid is named:

- W) Vesta
- X) Icarus
- Y) Ceres
- Z) Eros

ANSWER: Y) CERES

TOSS-UP

21) MATH *Multiple Choice* How many faces does an dodecahedron have, and what shape are the faces:

- W) 12, equilateral triangles
- X) 12, pentagons
- Y) 20, equilateral triangles
- Z) 20, pentagons

ANSWER: X) 12, PENTAGONS

BONUS

21) MATH *Short Answer* The line whose equation is $3x - 4y - 3 = 0$ passes through the x - and y -axes at what points?

ANSWER: (1, 0) AND $(0, -\frac{3}{4})$ (ACCEPT: $x = 1, y = -\frac{3}{4}$)

TOSS-UP

22) EARTH SCIENCE *Multiple Choice* Which rock is the best example of a product of extreme weathering?

- W) peridotite (Pron: pear-id-o-tite)
- X) schist (Pron: shist)
- Y) siltstone
- Z) limestone

ANSWER: Y) SILTSTONE

BONUS

22) EARTH SCIENCE *Multiple Choice* In miles per second, the typical velocity of an S-wave near the Earth's surface is which of the following:

- W) 3.7
- X) 2.2
- Y) 9.7
- Z) 0.6

ANSWER: X) 2.2

TOSS-UP

23) BIOLOGY *Multiple Choice* Which of the following does NOT occur in mitosis:

- W) DNA synthesis
- X) sets of sister chromatids line up singly
- Y) sister chromatids separate as the centromere divides
- Z) kinetochores (Pron: kin-et-oh-kors) divide

ANSWER: W) DNA SYNTHESIS

BONUS

23) BIOLOGY *Short Answer* A lack of the neurotransmitter dopamine in the brain of humans causes what disease:

ANSWER: PARKINSON'S

TOSS-UP

24) CHEMISTRY *Multiple Choice* In thin-layer chromatography, the movement of the solvent through the solid phase is accomplished by:

- W) gravity
- X) an inert carrier gas such as nitrogen
- Y) evaporation
- Z) capillary action

ANSWER: Z) CAPILLARY ACTION

BONUS

24) CHEMISTRY *Short Answer* What is the general term for a procedure used to separate components of different boiling points from a liquid mixture by vaporizing the liquid and passing the vapor through a separation glass column packed with glass beads?

ANSWER: FRACTIONAL DISTILLATION

TOSS-UP

- 25) PHYSICS *Short Answer* When mixing equal proportions of blue and green light, what color light is produced?

ANSWER: CYAN

BONUS

- 25) PHYSICS *Multiple Choice* If we consider that the higher the specific activity of a radioactive isotope the more particles or electromagnetic radiation it emits per unit time, which of the following has the least specific activity:

- W) uranium-238
- X) strontium
- Y) iodine-131
- Z) xenon-133

ANSWER: W) URANIUM-238