

## ROUND 8

### TOSS-UP

- 1) PHYSICS *Short Answer* What are the two components of velocity?

ANSWER: SPEED AND DIRECTION

### BONUS

- 1) PHYSICS *Multiple Choice* Neutrinos are named in which of the following ways:
- W) after their successive discovery dates
  - X) based on the particles they are linked with
  - Y) based on the Greek letters that describe their relative energies
  - Z) based on their charges and masses

ANSWER: X) BASED ON THE PARTICLES THEY ARE LINKED WITH

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### TOSS-UP

- 2) CHEMISTRY *Short Answer* What is the systematic name for the compound  $N_2O$ ?

ANSWER: NITROUS OXIDE

### BONUS

- 2) CHEMISTRY *Short Answer* What is the common name for the following compound: a benzene ring with an OH group attached to carbon #1, a bromine attached to carbon #2, and a bromine attached to carbon #4

ANSWER: 2,4-DIBROMOPHENOL

**TOSS-UP**

3) **BIOLOGY** *Multiple Choice* Transferral of immunity from breast milk to the infant is an example of:

- W) passive immunity
- X) active immunity
- Y) cell mediated immunity
- Z) paternal immunity

ANSWER: W) PASSIVE IMMUNITY

**BONUS**

3) **BIOLOGY** *Multiple Choice* The term pulmonic stenosis refers most specifically to:

- W) pneumonia
- X) an occluded coronary artery
- Y) a blocked pulmonary valve
- Z) hypertrophy of the pulmonary valves

ANSWER: Y) A BLOCKED PULMONARY VALVE

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**TOSS-UP**

4) **ASTRONOMY** *Short Answer* What is the standard spectral classification letter for the Sun?

ANSWER: G

**BONUS**

4) **ASTRONOMY** *Short Answer* Edwin Hubble devised a system, sometimes called a tuning fork classification, to differentiate what type of celestial bodies?

ANSWER: GALAXIES

**TOSS-UP**

- 5) MATH Short Answer In the graph of a curve such as the cosecant curve, the straight vertical line to which the curve moves closer and closer is called what:

ANSWER: ASYMPTOTE

**BONUS**

- 5) MATH *Short Answer* What is the 10<sup>th</sup> term in the following arithmetic progression: 2, 7, 12...

ANSWER: 47

(Solution:  $a_n = 2 + (10 - 1)5$ )

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**TOSS-UP**

- 6) EARTH SCIENCE *Multiple Choice* During the last 18,000 years, nearly all coasts have experienced:

- W) submergence
- X) emergence
- Y) world wide decrease in sea level
- Z) relatively unchanging sea levels

ANSWER: W) SUBMERGENCE

**BONUS**

- 6) EARTH SCIENCE *Short Answer* What is the name given to a circular or horseshoe-shaped organic reef growing on a submerged volcano, with an occasional small, low, coral sand island surrounding a shallow lagoon:

ANSWER: ATOLL

### TOSS-UP

7) GENERAL SCIENCE *Multiple Choice* Which of the following do archeologists and sociologists generally believe is the most important prerequisite to development of large cultural systems:

- W) technology
- X) writing
- Y) agriculture
- Z) a monetary system

ANSWER: Y) AGRICULTURE

### BONUS

7) GENERAL SCIENCE *Multiple Choice* Which of the following is an example of a simple fruit:

- W) sour cherry
- X) pineapple
- Y) figs
- Z) raspberries

ANSWER: W) SOUR CHERRY

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### TOSS-UP

8) COMPUTER SCIENCE *Multiple Choice* Secondary storage refers to:

- W) processor cache
- X) hard drives
- Y) system memory
- Z) a CPU

ANSWER: X) HARD DRIVES

### BONUS

8) COMPUTER SCIENCE *Short Answer* What is the three-bit natural binary code equivalent of the decimal value  $\frac{3}{8}$ ?

ANSWER: 0.011

**TOSS-UP**

- 9) **PHYSICS** *Short Answer* What color would be produced when mixing magenta and yellow pigments?

ANSWER: RED

**BONUS**

- 9) **PHYSICS** *Short Answer* What is the centripetal force required for an 8 kilogram body traveling at 2 meters per second in a perfect circle with a radius of 2 meters?

ANSWER: 16 NEWTONS

(Solution:  $CF = m v^2 / r = 8 \times 2^2 / 2 = 16$ )

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**TOSS-UP**

- 10) **CHEMISTRY** *Short Answer* What is its characteristic geometrical arrangement of a molecule that has a hybrid orbital set of four identical  $sp^3$  (pronounced S,P, 3)?

ANSWER: TETRAHEDRAL

**BONUS**

- 10) **CHEMISTRY** *Short Answer* Order the following 4 gases found in the Earth's atmosphere from the greatest percent by volume of dry air to the least: carbon dioxide; argon; nitrogen; oxygen

ANSWER: NITROGEN; OXYGEN; ARGON; CARBON DIOXIDE

(Solution: N = 70%; O = 21%; Ar = 0.93%; CO<sub>2</sub> = 0.036%)

**TOSS-UP**

11) **BIOLOGY** *Multiple Choice* In which of the following areas of the human body is the zygomatic arch found:

- W) hip
- X) wrist
- Y) shoulder
- Z) head

ANSWER: Z) HEAD

**BONUS**

11) **BIOLOGY** *Short Answer* Finger nails are mostly composed of what protein?

ANSWER: KERATIN

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**TOSS-UP**

12) **ASTRONOMY** *Short Answer* What is the common name for the group of seven brightest stars in Ursa Major?

ANSWER: BIG DIPPER (ACCEPT: PLOUGH)

**BONUS**

12) **ASTRONOMY** *Short Answer* What millimeter-sized silicate metal spheres are the most abundant component of chondrites (PRON: con-drights), making up between 50-80% by volume of this type of meteorite?

ANSWER: CHONDRULES

**TOSS-UP**

- 13) MATH *Short Answer* A plane curve that is the locus of all points in the plane equidistant from a given point best describes what geometric figure?

ANSWER: CIRCLE

**BONUS**

- 13) MATH *Short Answer* Name two consecutive integers where three times the second plus the first equals 91:

ANSWER: 22 AND 23 (must be in order)

(Solution:  $3(n+1) + n = 91$ )

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**TOSS-UP**

- 14) EARTH SCIENCE *Multiple Choice* Which of the following is NOT classified as a high-level cloud:

- W) altocumulus
- X) cirrocumulus
- Y) cirrostratus
- Z) cirrus

ANSWER: W) ALTOCUMULUS

**BONUS**

- 14) EARTH SCIENCE *Multiple Choice* The Namib desert of southwest Africa is an example of what type of desert:

- W) continental
- X) subtropical
- Y) rainshadow
- Z) coastal

ANSWER: Z) COASTAL

**TOSS-UP**

- 15) GENERAL SCIENCE *Short Answer* Beekeepers typically use what substance to calm bees?

ANSWER: SMOKE

**BONUS**

- 15) GENERAL SCIENCE *Short Answer* What common substance used by bacteriologists has a different melting point and freezing point?

ANSWER: AGAR AGAR (ACCEPT: AGAR)

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**TOSS-UP**

- 16) COMPUTER SCIENCE *Multiple Choice* When doing a hardware setup procedure on a computer, the operator is effectively writing to:

- W) ROM
- X) RAM
- Y) C-drive
- Z) volatile memory

ANSWER: W) ROM

**BONUS**

- 16) COMPUTER SCIENCE *Multiple Choice* What is the name for the high-speed serial bus developed by Apple and Texas Instruments that allows for the connection of up to 63 multiple devices, supports hot-swapping, and transfers data at rates of up to 400 megabits per second:

- W) USB port
- X) ISO 9660
- Y) FireWire
- Z) Hot Port

ANSWER: Y) FIREWIRE



**TOSS-UP**

- 17) PHYSICS *Short Answer* What is the most common term for the motion that is associated with an object that moves without rotating?

ANSWER: TRANSLATIONAL (ACCEPT: TRANSLATIONAL MOTION)

**BONUS**

- 17) PHYSICS *Short Answer* What is the total capacitance, in microfarads rounded to the second decimal place, for four capacitors connected in series if each capacitor is rated at 1 microfarad?

ANSWER: 0.25

(Solution:  $C_t = 1/\#$  of capacitors;  $1/4 = 0.25$ )

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**TOSS-UP**

- 18) CHEMISTRY *Short Answer* Marble statues around the world have been eaten away as a result of acid rain and the production of what aqueous acid?

ANSWER: SULFURIC ACID (ACCEPT:  $H_2SO_4$ )

**BONUS**

- 18) CHEMISTRY *Multiple Choice* The correct name for the compound  $CH_3OCH_3$  is:

- W) dimethyl ether
- X) ethyl ether
- Y) acetone
- Z) dimethyloxide

ANSWER: W) DIMETHYL ETHER

**TOSS-UP**

- 19) **BIOLOGY** *Short Answer* Aside from the four major blood types, what blood group in the USA is of the greatest clinical importance regarding agglutination (Pron: ag-glut-i-nation) reactions?

ANSWER: RH (ACCEPT: RH FACTOR OR RH GROUP OR RH ANTIGENS)

**BONUS**

- 19) **BIOLOGY** *Multiple Choice* Multiplication is to differentiation as growth is to:

- W) molting
- X) division
- Y) apoptosis (Pron: apo-tosis)
- Z) development

ANSWER: Z) DEVELOPMENT

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**TOSS-UP**

- 20) **MATH** *Short Answer* What is the formula for the volume of a right circular cone?

ANSWER:  $\frac{1}{3}\pi r^2h$  (read as: one third pie r (or radius) squared h (or height))

**BONUS**

- 20) **MATH** *Short Answer* To the first decimal place, what is the approximate length, in inches, of the arc that is cut off by an angle of  $\frac{\pi}{3}$  radians in a circle that has a radius of 4 inches:

ANSWER: 4.2

(Solution:  $S = \alpha \times r$ ;  $\frac{\pi}{3}(4) = 4.2$ )

**TOSS-UP**

21) EARTH SCIENCE *Multiple Choice* The now dormant volcanoes at Yellowstone National Park are examples of which of the following types of volcanoes:

- W) basaltic
- X) rhyolitic
- Y) andesitic
- Z) basaltic and andesitic

ANSWER: X) RHYOLITIC

**BONUS**

21) EARTH SCIENCE *Multiple Choice* Which of the following is classified as an intrusive igneous rock:

- W) gabbro
- X) obsidian
- Y) basalt
- Z) phyllite

ANSWER: W) GABBRO

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**TOSS-UP**

22) GENERAL SCIENCE *Short Answer* In Freudian theory, what are the 3 divisions of the subconscious mind?

ANSWER: ID, EGO, SUPEREGO

**BONUS**

22) GENERAL SCIENCE *Short Answer* Classical conditioning was first studied by what Russian Nobel laureate physiologist?

ANSWER: IVAN PAVLOV (ACCEPT: PAVLOV)

**TOSS-UP**

23) PHYSICS *Short Answer* Work is a product of two quantities whose SI units are what?

ANSWER: METER AND NEWTON

**BONUS**

23) PHYSICS *Multiple Choice* A 2.25 kilowatt engine is approximately the same as a:

- W) 3 horsepower engine
- X) 33 horsepower engine
- Y) 155 horsepower engine
- Z) 366 horsepower engine

ANSWER: W) 3 HORSEPOWER ENGINE

(Solution: 1 hp = 746 W)

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**TOSS-UP**

24) CHEMISTRY *Short Answer* What is the general term for a solid crystalline substance made of just one element or compound, such as halite or calcite, that are the constituents of rocks that make up the Earth?

ANSWER: MINERAL

**BONUS**

24) CHEMISTRY *Short Answer* What is the name for a long, calibrated glass tube with a tap at one end that is used vertically, with the tap at the bottom, and whose main use is as a reservoir for a chemical during titration?

ANSWER: BURETTE

### TOSS-UP

25) BIOLOGY *Short Answer* If whole blood is allowed to clot, what is the fluid that is remaining once the clot is removed?

ANSWER: SERUM (DO NOT ACCEPT: PLASMA)

### BONUS

25) BIOLOGY *Multiple Choice* Which of the following is a monocot (Pron: mon-o-kot):

W) *Acer rubrum* (Pron: ay-ser roo-brum)

X) *Quercus rubra* (Pron: uer-kus roo-bra)

Y) *Triticum aestivum* (Pron: Trit-e-cum A-stiv-e-um)

Z) *Echinacea angustifolia* (Pron: eck-in-A-sha an-gust-ti-fowl-ia)

ANSWER: Y) TRITICUM AESTIVUM