

## ROUND 2

### TOSS-UP

1) CHEMISTRY *Multiple Choice* The First Law of Thermodynamics equates:

- W) velocity and pressure
- X) entropy and energy
- Y) heat and work
- Z) temperature and energy

ANSWER: Y) HEAT AND WORK

### BONUS

1) CHEMISTRY *Short Answer* Convert an atmospheric pressure of 0.25 atmospheres into mm Hg:

ANSWER: 190

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### TOSS-UP

2) PHYSICS *Short Answer* What is the common name for the instrument consisting of a weighted glass tube or bulb which, when floated in a liquid, indicates the liquid's relative density?

ANSWER: HYDROMETER

### BONUS

2) PHYSICS *Short Answer* According to conventional nomenclature of nuclear science, what case and letter is used to symbolize mass number?

ANSWER: UPPER CASE A

### TOSS-UP

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

ANSWER: SCOLEX

### BONUS

3) BIOLOGY *Multiple Choice* What is the joint that is formed by the articulation of the tibia, fibula, and femur:

- W) wrist
- X) knee
- Y) elbow
- Z) ankle

ANSWER: X) KNEE

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### TOSS-UP

4) ASTRONOMY *Multiple Choice* Olympus Mons, one of the largest volcanoes in our solar system, is located on which planet:

- W) Mars
- X) Venus
- Y) Titan
- Z) Callisto

ANSWER: W) MARS

### BONUS

4) ASTRONOMY *Short Answer* Name the Greek astronomer who ranked the naked-eye stars into six groups of relative brightness in the second century B.C.?

ANSWER: HIPPARCHUS

### TOSS-UP

5) MATH *Short Answer* The number 22.5 is 5 percent of what number?

ANSWER: 450

### BONUS

5) MATH *Multiple Choice* Which of the following numbers is divisible by 9:

- W) 3191
- X) 3527
- Y) 212,526
- Z) 439,327

ANSWER: Y) 212,526

(Solution: sum of the numbers divisible by 9)

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### TOSS-UP

6) EARTH SCIENCE *Short Answer* Many large volcanoes are marked near their summit by a large, basin-shaped volcanic depression, more or less circular in form and steep-walled, which is called?

ANSWER: CALDERA

### BONUS

6) EARTH SCIENCE *Multiple Choice* The governing factor that controls flow within the Hydrologic System is:

- W) humidity
- X) capillary pressure
- Y) vapor pressure
- Z) gravity

ANSWER: Z) GRAVITY

### TOSS-UP

7) GENERAL SCIENCE *Short Answer* How many significant figures are in the number  $3.8400 \times 10^4$ ? (read as: three point eight four zero zero times ten to the fourth power)

ANSWER: 5

### BONUS

7) GENERAL SCIENCE *Short Answer* To the nearest gram, convert 20 ounces into grams:

ANSWER: 567 (ACCEPT: 566 – 568)

(Solution:  $20 \times 28.35 = 567$ )

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### TOSS-UP

8) COMPUTER SCIENCE *Multiple Choice* Which of the following would offer the most protection against power-failure data loss:

- W) UPS
- X) surge protector
- Y) data backup
- Z) line conditioner

ANSWER: W) UPS

### BONUS

8) COMPUTER SCIENCE *Short Answer* What is the name for the measure of memory or storage capacity that is equal to 2 to the 40th power bytes or, in decimal, approximately a thousand gigabytes?

ANSWER: TERABYTE



### TOSS-UP

9) CHEMISTRY *Short Answer* Acid rain, a major environmental problem, results primarily from the production of what aqueous acid?

ANSWER: SULFURIC ACID (ACCEPT:  $\text{H}_2\text{SO}_4$ )

### BONUS

9) CHEMISTRY *Short Answer* What is the name for the apparatus commonly found in chemistry labs that is designed to store materials in dry air that consists of a glass bowl, an air-tight lid, and a place where a drying agent, such as silica gel, is placed:

ANSWER: DESSICATOR

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### TOSS-UP

10) PHYSICS *Short Answer* What is the most common term for a change in velocity divided by the time it takes to make the change?

ANSWER: AVERAGE ACCELERATION

### BONUS

10) PHYSICS *Multiple Choice* How would one compute the change in centripetal force if an object moving with uniform circular motion triples its radius while maintaining the same kinetic energy:

W) multiplying by 3

X) dividing by 3

Y) multiplying by 9

Z) dividing by 9

ANSWER: X) DIVIDING BY 3

(Solution:  $F = mv^2/R$ ; conservation of energy  $\Rightarrow v$  constant)

**TOSS-UP**

11) BIOLOGY *Short Answer* Where is intercellular fluid normally found?

ANSWER: OUTSIDE OF CELLS (ACCEPT: IN BETWEEN CELLS OR IN THE INTERSTITIUM)

**BONUS**

11) BIOLOGY *Multiple Choice* Koch's (read as: Coke's) Postulates have to do mainly with which of the following:

- W) culturing of viruses
- X) causative agents of viral diseases
- Y) proving what bacterial agents cause what diseases
- Z) how to prove that a certain gene causes a certain disease

ANSWER: Y) PROVING WHAT BACTERIAL AGENTS CAUSE WHAT DISEASES

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**TOSS-UP**

12) ASTRONOMY *Short Answer* How many Viking spacecraft have landed on Mars?

ANSWER: 2

**BONUS**

12) ASTRONOMY *Multiple choice* Which star is the next nearest neighbor to the Sun beyond the Alpha Centauri system having the largest known proper motion of any star:

- W) Wolf 359
- X) Sirius
- Y) Barnard's Star
- Z) 61 Cygni

ANSWER: Y) BARNARD'S STAR

**TOSS-UP**

13) MATH *Multiple Choice* Which of the following is a rational number:

W)  $1+\sqrt{4}$

X)  $2+\sqrt{5}$

Y)  $\sqrt{6}$

Z)  $\pi$

ANSWER: W)  $1+\sqrt{4}$

**BONUS**

13) MATH *Short Answer* If the average of 5 numbers is 16, what is the sum of the 5 numbers?

ANSWER: 80

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**TOSS-UP**

14) EARTH SCIENCE *Short Answer* What is the name of the layer lying between the base of the Earth's lithosphere and a depth of about 2900 kilometers, where rock exists in a hot, weak, plastic-like form?

ANSWER: ASTHENOSPHERE

**BONUS**

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

W) Cambrian

X) Cretaceous

Y) Tertiary

Z) Devonian

ANSWER: W) CAMBRIAN

**TOSS-UP**

15) GENERAL SCIENCE *Short Answer* Pure gold is how many karats?

ANSWER: 24

**BONUS**

15) GENERAL SCIENCE *Short Answer* How many yards are in 1 rod?

ANSWER: 5.5

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**TOSS-UP**

16) COMPUTER SCIENCE *Short Answer* What does the acronym SRAM stand for?

ANSWER: STATIC RANDOM ACCESS MEMORY

**BONUS**

16) COMPUTER SCIENCE *Multiple Choice* What is the hexadecimal equivalent of the binary number 1011 (read as: one, zero, one, one)?

W) 7

X) 8

Y) A

Z) B

ANSWER: Z) B

### TOSS-UP

17) CHEMISTRY *Short Answer* Which acid-base theory states that any molecule or ion that can produce a proton is an acid, and any that can take up a proton is a base:

ANSWER: BRØNSTED-LOWRY THEORY (ACCEPT: BRØNSTED)

### BONUS

17) CHEMISTRY *Short Answer* What general chemical term best describes a metal that can be drawn out into thin wire or threads without breaking?

ANSWER: DUCTILE

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### TOSS-UP

18) PHYSICS *Short Answer* When mixing equal proportions of green and red light, what color light is produced?

ANSWER: YELLOW

### BONUS

18) PHYSICS *Short Answer* For an electric saw that draws 8 amps on a 120 volt line, what is the resistance of the saw?

ANSWER: 15 OHMS

(Solution:  $I = V/R$ ,  $R = V/I$ ,  $R = 120/8 = 15$ )



**TOSS-UP**

19) BIOLOGY *Short Answer* The stigma, style, and ovary make up what part of a plant?

ANSWER: CARPEL (ACCEPT: PISTIL)

**BONUS**

19) BIOLOGY *Multiple Choice* Microtubules, intermediate filaments, and microfilaments are integral components of what basic infrastructure of a eukaryotic cell?

W) flagella

X) cilia

Y) cytoskeleton

Z) cell wall

ANSWER: Y) CYTOSKELETON

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**TOSS-UP**

20) ASTRONOMY *Multiple Choice* The geology of the surface of Venus appears to be dominated by:

W) volcanoes

X) plate tectonics

Y) erosion by flowing water

Z) old impact craters

ANSWER: W) VOLCANOES

**BONUS**

20) ASTRONOMY *Short Answer* At the Sun's distance of 8 kiloparsecs from the Galactic center, how many years would it take for material here to complete one rotational circuit?

ANSWER: 225 MILLION

**TOSS-UP**

21) MATH *Short Answer* Convert  $\frac{5\pi}{3}$  radians into degrees:

ANSWER: 300°

**BONUS**

21) MATH *Short Answer* What are the median, mean and mode of the following set of numbers:  
2, 3, 3, 8, 8, 8, 10, 14

ANSWER: MEDIAN = 8.; MEAN = 7; MODE = 8

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**TOSS-UP**

22) GENERAL SCIENCE *Short Answer* If you cut a Mobius Strip in half down the center of the strip, how many pieces do you end up with?

ANSWER: ONE

**BONUS**

22) GENERAL SCIENCE *Short Answer* If a woman's mass on Earth is 60 kg, what is her mass, in kilograms, on a planet where the gravity is six times less?

ANSWER: 60 (ACCEPT: THE SAME)

### TOSS-UP

23) CHEMISTRY *Multiple Choice* Of the following, which is the strongest base:

- W) potassium hydroxide
- X) barium hydroxide
- Y) calcium hydroxide
- Z) sodium hydroxide

ANSWER: Z) SODIUM HYDROXIDE

### BONUS

23) CHEMISTRY *Short Answer* In a flame test for lithium, sodium, potassium, and magnesium, which gives off a red color:

ANSWER: LITHIUM

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### TOSS-UP

24) PHYSICS *Multiple Choice* Total distance traveled divided by total elapsed time is most commonly called:

- W) velocity
- X) acceleration
- Y) average velocity
- Z) average speed

ANSWER: Z) AVERAGE SPEED

### BONUS

24) PHYSICS *Short Answer* If a wave has a frequency of 50 hertz, what is its period, in seconds?

ANSWER: 0.02 SECONDS

(Solution: period =  $1 / f$ )

### TOSS-UP

25) BIOLOGY *Short Answer* In an autologous tissue transplant, from whom does the person receive the tissue?

ANSWER: THEMSELVES

### BONUS

25) BIOLOGY *Multiple Choice* The margin of an ash tree leaf would most generally be called:

W) divided

X) entire

Y) serrate

Z) lacerate

ANSWER: Y) SERRATE