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

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
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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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)

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: $20 \times 28.35 = 567$)

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:  H₂SO₄)

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

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=mv²/R; conservation of energy => 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

**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

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

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:  \( I = \frac{V}{R}, \ R = \frac{V}{I}, \ R = \frac{120}{8} = 15 \))
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) cillia
Y) cytoskeleton
Z) cell wall

ANSWER: Y) CYTOSKELETON

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

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

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