

ROUND 1

TOSS-UP

1) BIOLOGY *Multiple Choice* The purine bases are:

- W) adenine and guanine
- X) adenine and cytosine
- Y) thymine and cytosine
- Z) uracil, thymine, and cytosine

ANSWER: W) ADENINE AND GUANINE

BONUS

1) BIOLOGY *Short Answer* In the classification of organisms, four of the 5 Kingdoms are Animalia, Plantae, Fungi, and Protista. What is the fifth?

ANSWER: MONERA

TOSS-UP

2) CHEMISTRY *Multiple Choice* According to *Bronsted-Lowry* definition, a base is:

- W) a proton donor
- X) an electron donor
- Y) a proton acceptor
- Z) an electron acceptor

ANSWER: Y) A PROTON ACCEPTOR

BONUS

2) CHEMISTRY *Short Answer* What element does the symbol Au stand for?

ANSWER: GOLD

TOSS-UP

3) PHYSICS *Multiple Choice* According to the standard model of particle physics, which of the following is a force-carrying particle:

- W) proton
- X) neutron
- Y) quark
- Z) photon

ANSWER: Z) PHOTON

BONUS

3) PHYSICS *Short Answer* Laser is an acronym for what?

ANSWER: LIGHT AMPLIFICATION BY STIMULATED EMISSION OF RADIATION

TOSS-UP

4) ASTRONOMY *Multiple Choice* A solar eclipse can only occur at a:

- W) full moon
- X) new moon
- Y) $\frac{1}{2}$ gibbous moon
- Z) $\frac{1}{4}$ gibbous moon

ANSWER: X) NEW MOON

BONUS

4) ASTRONOMY *Short Answer* Name the part of the Sun that we can see without any instruments:

ANSWER: THE PHOTOSPHERE

TOSS-UP

5) MATH *Multiple Choice* In a normal distribution, approximately what percentage of the cases, to the nearest whole number, falls within 4 standard deviations of the mean:

- W) 68%
- X) 100%
- Y) 99%
- Z) 75%

ANSWER: X) 100%

BONUS

5) MATH *Short Answer* Give the range for the following six values 2, 7, 11, 19, 25, 33:

ANSWER: 31 (ACCEPT: "2 through 33")

TOSS-UP

6) EARTH SCIENCE *Short Answer* In what layer of the Earth's atmosphere does most of our weather occur?

ANSWER: TROPOSPHERE

BONUS

6) EARTH SCIENCE *Multiple Choice* When, in the geological time scale, did dinosaurs first appear:

- W) Jurassic
- X) Triassic
- Y) Cretaceous
- Z) Tertiary

ANSWER: X) TRIASSIC

TOSS-UP

7) GENERAL SCIENCE *Multiple Choice* Tomorrow's weather forecast report for Venus would be:

- W) snow
- X) cold & clear
- Y) hot & humid with clear skies
- Z) overcast & hot

ANSWER: Z) OVERCAST & HOT

BONUS

7) GENERAL SCIENCE *Short Answer* What psychiatrist coined the psychiatric terms id, ego, and superego:

ANSWER: SIGMUND FREUD (ACCEPT: FREUD)

TOSS-UP

8) GENERAL SCIENCE *Multiple Choice* A monitor is rated as 640x480x256 (pronounced 640 by 480 by 256). What does the 256 stand for:

- W) 256 pixels horizontally
- X) 256 pixels vertically
- Y) 256 pixels diagonally
- Z) 256 colors associated with the pixels

ANSWER: Z) 256 COLORS ASSOCIATED WITH THE PIXELS

BONUS

8) GENERAL SCIENCE *Short Answer* What is the name, coined by John McCarthy in 1956, of the branch of GENERAL SCIENCE concerned with making computers behave like humans:

ANSWER: ARTIFICIAL INTELLIGENCE (ACCEPT: AI)

TOSS-UP

9) BIOLOGY *Multiple Choice* Four chromatids would be considered a:

- W) mutation
- X) non-disjunction
- Y) tetrad
- Z) synapses

ANSWER: Y) TETRAD

BONUS

9) BIOLOGY *Multiple Choice* Which of the following is NOT in the class insecta:

- W) bees
- X) moths
- Y) fireflies
- Z) spiders

ANSWER: Z) SPIDERS

TOSS-UP

10) CHEMISTRY *Multiple Choice* Which of the following represents the simplest chemical formula:

- W) empirical formula
- X) molecular formula
- Y) structural formula
- Z) primary formula

ANSWER: W) EMPIRICAL FORMULA

BONUS

10) CHEMISTRY *Short Answer* What are the 4 physical states of matter?

ANSWER: SOLID, LIQUID, GAS, PLASMA

TOSS-UP

11) PHYSICS *Short Answer* By primarily using what simple machine did Galileo come to the conclusion on the existence of friction?

ANSWER: INCLINED PLANE

BONUS

11) PHYSICS *Short Answer* What formula is most appropriate to compute the kinetic energy of a block of ice sliding down an inclined plane?

ANSWER: $KE = \frac{1}{2} mv^2$ (ACCEPT: KINETIC ENERGY = $\frac{1}{2}$ MASS x VELOCITY SQUARED)

TOSS-UP

12) ASTRONOMY *Multiple Choice* Which of the following constellations cannot be seen in the summer sky of the northern hemisphere?

- W) Libra
- X) Orion
- Y) Ursa Major
- Z) Cygnus

ANSWER: X) ORION

BONUS

12) ASTRONOMY *Short Answer* All of Saturn's moons are composed predominantly of what substance?

ANSWER: ICE (ACCEPT: WATER)

(Solution: 30-40% rock and 60-70% ice)

TOSS-UP

13) MATH *Multiple Choice* Assuming “N” is a real number, which of the following is an incorrect property of zero:

W) $N \div 0 = N$

X) $0 \div N = 0$, $N \neq 0$ (read as: N does not = 0)

Y) $N + 0 = N$

Z) $N - 0 = N$

ANSWER: W) $N \div 0 = N$

BONUS

13) MATH *Short Answer* π (pronounced: PIE) radians encompass what percent of a circle?

ANSWER: 50%

TOSS-UP

14) EARTH SCIENCE *Multiple Choice* These clouds are named for their smooth, round, lens-like shape and commonly form over mountains:

W) lenticular

X) contrails

Y) stratocumulus

Z) mackerel

ANSWER: W) LENTICULAR

BONUS

14) EARTH SCIENCE *Short Answer* Name 2 places on earth where continental glaciers exist:

ANSWER: ANTARCTICA AND GREENLAND

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* An autoclave is designed to sterilize with:

- W) dry heat and methane gas
- X) steam and pressure
- Y) boiling water
- Z) dessication

ANSWER: X) STEAM AND PRESSURE

BONUS

15) GENERAL SCIENCE *Short Answer* What are the 6th, 7th, and 8th letters of the Greek alphabet?

ANSWER: ZETA, ETA, THETA

TOSS-UP

16) GENERAL SCIENCE *Multiple Choice* Using the binary system, a 1 kilobyte file contains how many bytes:

- W) 256
- X) 1024
- Y) 1.44
- Z) 512

ANSWER: X) 1024

BONUS

16) GENERAL SCIENCE *Short Answer* In operating systems which support PnP, the PnP stands for:

ANSWER: PLUG AND PLAY

TOSS-UP

17) **BIOLOGY** *Multiple Choice* Plant cells differ from animal cells in that only plant cells possess:

- W) a nucleus
- X) mitochondria
- Y) a cell wall
- Z) lysosomes

ANSWER: Y) A CELL WALL

BONUS

17) **BIOLOGY** *Multiple Choice* Which of the following has the lowest blood pressure:

- W) aorta
- X) carotid artery
- Y) femoral artery
- Z) posterior vena cava

ANSWER: Z) POSTERIOR VENA CAVA

TOSS-UP

18) **CHEMISTRY** *Short Answer* The general term for the removal of salts from brackish water or seawater to make it useable is called:

ANSWER: DESALINATION

BONUS

18) **CHEMISTRY** *Short Answer* What is the common name of the molecule dihydrogen dioxide?

ANSWER: HYDROGEN PEROXIDE (DO NOT ACCEPT: H₂O₂)

TOSS-UP

19) PHYSICS *Multiple Choice* How is the index of refraction computed:

- W) the speed of light in a vacuum is divided by the speed of light in the material
- X) the speed of light in the material is divided by the speed of light in a vacuum
- Y) the speed of light in water is divided by the speed of light in a vacuum
- Z) the speed of light in a vacuum is divided by the speed of light in water

ANSWER: W) THE SPEED OF LIGHT IN A VACUUM IS DIVIDED BY THE SPEED OF LIGHT IN THE MATERIAL

BONUS

19) PHYSICS *Short Answer* To two significant figures, what is the index of refraction of air?

ANSWER: 1.0

TOSS-UP

20) ASTRONOMY *Multiple Choice* A parsec is equal to which of the following:

- W) 100 Astronomical Units
- X) 3.26 light years
- Y) 100 light years
- Z) 140 million kilometers

ANSWER: X) 3.26 LIGHT YEARS

BONUS

20) ASTRONOMY *Short Answer* Rounded off to the nearest trillion, how many miles is in a light year?

ANSWER: 6

TOSS-UP

21) MATH *Multiple Choice* Irrational numbers do not include:

- W) pi
- X) the square root of 2
- Y) the square root of 169
- Z) non-repeating, non-terminating decimals

ANSWER: Y) THE SQUARE ROOT OF 169

BONUS

21) MATH *Short Answer* Convert 3/20 into a percentage:

ANSWER: 15%

(Solution = $15/100 = 15\%$)

TOSS-UP

22) EARTH SCIENCE *Multiple Choice* It is estimated that the temperature of the Earth's core is:

- W) as hot as the surface of the sun
- X) much hotter than the surface of the sun
- Y) much cooler than the surface of the sun
- Z) it cannot be estimated

ANSWER: W) AS HOT AS THE SURFACE OF THE SUN

BONUS

22) EARTH SCIENCE *Short Answer* This mineral has the nickname "bloodstone" because it gives a deep red color on a streak test. What is its chemical formula?

ANSWER: Fe₂O₃ (read as: F, E two O three) (DO NOT ACCEPT: IRON OXIDE)

TOSS-UP

23) BIOLOGY *Multiple Choice* Barbara McClintock is famous for discovering which of the following:

- W) the structure of DNA with Watson and Crick
- X) introns
- Y) jumping genes
- Z) exons

ANSWER: Y) JUMPING GENES

BONUS

23) BIOLOGY *Multiple Choice* Which of the following is NOT true of the Calvin-Benson Cycle:

- W) it is also sometimes called the dark reactions of photosynthesis
- X) it is also sometimes called the light independent reactions of photosynthesis
- Y) it converts energy trapped in the light reactions into sugar
- Z) it does not require stores of potential energy

ANSWER: Z) IT DOES NOT REQUIRE STORES OF POTENTIAL ENERGY

TOSS-UP

24) CHEMISTRY *Multiple Choice* Which of the following instruments would typically be used to measure the smallest quantities of mass:

- W) double-pan balance
- X) triple-beam hanging balance
- Y) triple-beam platform balance
- Z) analytic balance

ANSWER: Z) ANALYTIC BALANCE

BONUS

24) CHEMISTRY *Short Answer* Knowing that Iron has an atomic number of 26, how many protons and how many electrons does Fe^{+2} have?

ANSWER: 26 PROTONS, 24 ELECTRONS (ACCEPT: 26 p⁺; 24 e⁻)

TOSS-UP

25) PHYSICS *Multiple Choice* Which of the following units is a measure of potential difference:

- W) erg
- X) ohm
- Y) joule
- Z) volt

ANSWER: Z) VOLT

BONUS

25) PHYSICS *Short Answer* How many femtometers are in a nanometer?

ANSWER: ONE MILLION (ACCEPT: 10 TO THE SIXTH POWER)

(Solution: femto = 10^{-15} , nano = 10^{-9})