**TOSS-UP**

1) GENERAL SCIENCE *Short Answer* What is the process that produces a petroleum substitute by converting a mixture of carbon monoxide and hydrogen into liquid hydrocarbons?

ANSWER: FISCHER-TROPSCH PROCESS

**BONUS**

1) GENERAL SCIENCE *Multiple Choice* Most of the US’s biodiesel is made from which vegetable oil?

W) Olive Oil

X) Soybean Oil

Y) Corn Oil

Z) Palm Oil

ANSWER: X) SOYBEAN OIL

**TOSS-UP**

2) GENERAL SCIENCE *Short Answer* Name all of the following disorders that are sex linked.

1: Color Blindness 2: Albinism 3: Duchenne Muscular Dystrophy 4: Hemophilia

ANSWER: 1, 3 and 4

**BONUS**

2) GENERAL SCIENCE *Short Answer* What is the agent most commonly used in agarose gel electrophoresis which fluoresces when exposed to ultraviolet light?

ANSWER: ETHIDIUM BROMIDE

**TOSS-UP**

3) GENERAL SCIENCE *Short Answer* Name all of the following which are similarities between charophytes and land plants.

1: Rosestte shaped cellulose synthesizing complexes 2: Formation of the phragmoplast 3: The production of gametes within gametangia 4:Walled spores

ANSWER: 1 and 2

**BONUS**

3) GENERAL SCIENCE *Short Answer* What aquatic phylum of the kingdom Fungi has been suggested as a principal cause for the worldwide amphibian decline?

ANSWER: CHYTRIDIOMYCOTA (ACCEPT: CHYTRIDS)

**TOSS-UP**

4) GENERAL SCIENCE *Short Answer* What was the last quark flavor to be observed in an accelerator experiment?

ANSWER: TOP QUARK

**BONUS**

4) GENERAL SCIENCE *Short Answer* Which Nobel laureate is generally credited to have proposed the quark model?

ANSWER: MURRAY GELL-MANN

**TOSS-UP**

5) GENERAL SCIENCE *Short Answer* Name all of the following phenomenon which are epigenetic modifications:

1: Gene Silencing 2: X- Inactivation 3: Histone Modifications 4: Maternal Effect

ANSWER: 1, 2, 3, and 4 (ALL)

**BONUS**

5) GENERAL SCIENCE *Short Answer* What is the mathematical setting used with Einstein’s special theory of relativity, in which the three dimensions of space are combined with a single dimension of time to form spacetime?

ANSWER: MINKOWSKI SPACE

**TOSS-UP**

6) GENERAL SCIENCE *Multiple Choice* What type of astronomical object is “Cygnus X-1”?

W) Pulsar X) Planet Y) Black Hole Z) Comet

ANSWER: Y) BLACK HOLE

**BONUS**

6) GENERAL SCIENCE *Short Answer* What is the metal found in the respiratory proteins of mollusks and some arthropods, making their blood blue?

ANSWER: COPPER

**TOSS-UP**

7) GENERAL SCIENCE *Short Answer* What is the name of the event when a subatomic particle collides with its respective antiparticle?

ANSWER: ANNIHILATION

**BONUS**

7) GENERAL SCIENCE *Multiple Choice* What type of radiometric dating is used most when the samples are more than 100,000 years old, and are found in sites with a history of volcanic activity?

W) Carbon 12/Carbon 14

X) Potassium/Argon

Y) Uranium/ Thorium  
Z) Rubidium/Strontium

ANSWER: X) POTASSIUM/ ARGON

**TOSS-UP**

8) GENERAL SCIENCE *Short Answer* What is the layer of the upper mantle of the Earth directly below the lithosphere?

ANSWER: ASTHENOSPHERE

**BONUS**

8) GENERAL SCIENCE *Short Answer* What is the type of nuclear fission reactor in which the primary coolant is a liquid mixture of ionic compounds?

ANSWER: MOLTEN SALT REACTORS

**TOSS-UP**

9) GENERAL SCIENCE *Multiple Choice* What instrument is used to measure the current through a resistor?

W) Voltmeter X) Potentiometer Y) Ohmmeter Z) Ammeter

ANSWER: Z) AMMETER

**BONUS**

9) GENERAL SCIENCE *Short Answer* What is the emissivity of a black body?

ANSWER: ONE

**TOSS-UP**

10) GENERAL SCIENCE *Short Answer* Convert the number 31 to hexadecimal.

ANSWER: 1F

**BONUS**

10) GENERAL SCIENCE *Short Answer* Name all of the following principles that is used when constructing a phylogenetic tree.

1: Maximum Parsimony

2: Maximum Likelihood

3: Least Squares

ANSWER: ALL

**TOSS-UP**

11) GENERAL SCIENCE *Short Answer* How many degrees of freedom would there be in a Chi-square distribution of 6 items?

ANSWER: 5

**BONUS**

11) GENERAL SCIENCE *Short Answer* What is the surname of the British family which was very involved in the discovery of many human archaeological specimens, such as *Homo habilis*, and the Laetoli footprints?

ANSWER: LEAKEY

**TOSS-UP**

12) GENERAL SCIENCE *Multiple Choice* What was the first hominin to migrate out of Africa?

W) *Homo habilis* X) *Homo erectus* Y) *Homo neanderthalensis* Z) *Homo sapiens*

ANSWER: X) HOMO ERECTUS

**BONUS**

12) GENERAL SCIENCE *Short Answer* What animal was the natural reservoir for the SARS virus?

ANSWER: BATS

**TOSS-UP**

13) GENERAL SCIENCE *Short Answer* Name the two of the following statements that are true of main sequence stars as their temperature increases.

1: Their mass increases.

2: Their spectral class stays the same.

3: Their luminosity increases.

ANSWER: 1 and 3

**BONUS**

13) GENERAL SCIENCE *Short Answer* What is the general term given to a structure which is ordered but not periodic, and was the focus of the most recent Nobel Prize in Chemistry?

ANSWER: QUASICRYSTAL

**TOSS-UP**

14) GENERAL SCIENCE *Short Answer* A recent discovery at Mono Lake shows that bacteria that were once thought to need phosphorus to sustain growth, can now substitute what other element?

ANSWER: ARSENIC

**BONUS**

14) GENERAL SCIENCE *Multiple Choice* What was the first space probe to provide detailed images of Neptune?

W) Voyager 1 X) Voyager 2 Y) Pioneer 10 Z) Galileo

ANSWER: X) VOYAGER 2

**TOSS-UP**

15) GENERAL SCIENCE *Short Answer* Denote which of the following gases were used in the Miller-Urey experiment.

1: Hydrogen 2: Methane 3: Carbon Dioxide 4: Hydrogen Sulfide

ANSWER: 1 and 2

**BONUS**

15) GENERAL SCIENCE *Short Answer* What is the hypothesis that states that life exists throughout the universe, and is distributed by meteors, asteroids and planetoids?

ANSWER: PANSPERMIA

**TOSS-UP**

16) GENERAL SCIENCE *Short Answer* Denote which of the following statements are true of paper chromatography.

1: It is used to separate a mixture into its component molecules.

2: To separate the pigments of a chloroplast, you would use an inorganic solvent.

3: One factor that causes molecules to move up the paper at different rates is their molecular mass.

4: It can be used to separate a mixture of amino acids.

ANSWER: 1, 3, and 4

**BONUS**

16) GENERAL SCIENCE *Short Answer* What is the name given to the thermal radiation that almost uniformly fills the universe?

ANSWER: COSMIC MICROWAVE BACKGROUND RADIATION

**TOSS-UP**

17) GENERAL SCIENCE *Short Answer* What is the strain of bacteria that has developed resistance to Beta-lactam antibiotics, such as penicillin, and is a major cause of hospital-acquired infections?

ANSWER: MRSA (ACCEPT: METHICILLIN/MULTIPLE RESISTANT STAPHYLOCOCCUS AUREUS)

**BONUS**

17) GENERAL SCIENCE *Short Answer* What is the z-value of a sample measurement which is equal to the mean measurement in a set of data?

ANSWER: ZERO

**TOSS-UP**

18) GENERAL SCIENCE *Short Answer* If *r* is the sample correlation coefficient, then what is *r*2?

ANSWER: COEFFICIENT OF DETERMINATION

**BONUS**

18) GENERAL SCIENCE *Multiple Choice* After calculating the Chi-square value in an experiment, when would you accept the null hypothesis?

W) If the Chi-square value is greater than the critical value. X) If the Chi-square value is equal to the critical value. Y) If the Chi-square value is less than the critical value. Z) You never accept the null hypothesis.

ANSWER: Y) IF THE CHI-SQUARE VALUE IS LESS THAN THE CRITICAL VALUE.

**TOSS-UP**

19) GENERAL SCIENCE *Multiple Choice* Which of the following organic compounds is widely used as an automotive antifreeze?

W) Oxalic Acid

X) Acetone

Y) Polypropylene  
Z) Ethylene Glycol

ANSWER: Z) ETHYLENE GLYCOL

**BONUS**

19) GENERAL SCIENCE *Short Answer* Denote which of the following statements are true of galvanization.

1: The most common method of galvanization in use is hot-dip galvanization.

2: The two metals most commonly galvanized are steel and iron.

3: It is used to protect against rusting.

4: Electroplated steel is not magnetic.

ANSWER: 1, 2 and 3

**TOSS-UP**

20) GENERAL SCIENCE *Short Answer* What element is added to steel in minute quantities to create stainless steel?

ANSWER: CHROMIUM

**BONUS**

20) GENERAL SCIENCE *Short Answer* Denote all of the following statements which are true of the Bessemer Process.

1: It was the first inexpensive industrial process for the mass production of steel. 2: It removes impurities from molten pig iron by reduction. 3: It removed phosphorus efficiently from the molten steel.

ANSWER: 1

**TOSS-UP**

21) GENERAL SCIENCE *Short Answer* What is the general term for the standard three drug combination given to patients infected with HIV?

ANSWER: (TRIPLE) COCKTAIL

**BONUS**

21) GENERAL SCIENCE *Short Answer* Denote all of the following illnesses which are transmitted by an RNA virus?

1: Smallpox 2: Infectious Mononucleosis 3: Influenza 4: Yellow Fever

ANSWER: 3 and 4

**TOSS-UP**

22) GENERAL SCIENCE *Multiple Choice* Which country produces the most wind energy?

W) China

X) USA

Y) Germany

Z) Spain

ANSWER: W) CHINA

**BONUS**

22) GENERAL SCIENCE *Short Answer* What is the name given to any source of energy that is not continuously available due to factors outside of our control?

ANSWER: INTERMITTENT ENERGY SOURCE

**TOSS-UP**

23) GENERAL SCIENCE *Short Answer* What is the name given to the average period of the moon’s revolution, with respect to the line joining the Earth and Sun?

ANSWER: SYNODIC MONTH

**BONUS**

23) GENERAL SCIENCE *Multiple Choice* What area of a shadow cast by a celestial body is called the umbra?

W) The darkest part of the shadow X) The region in which only a portion of the light source is obscured by the occluding body Y) The farthest visible tip of the shadow Z) The part of the shadow closest to the occluding object

ANSWER: W) THE DARKEST PART OF THE SHADOW

**TOSS-UP**

24) GENERAL SCIENCE *Short Answer* William Rontgen was awarded the first Nobel Prize in Physics for his discovery of what phenomenon?

ANSWER: X- RAYS

**BONUS**

24) GENERAL SCIENCE *Short Answer* What frequency range of electromagnetic waves, between 300 and 3000 Hertz, is used to communicate in mines?

ANSWER: ULTRA LOW FREQUENCY (ULF)

**TOSS-UP**

25) GENERAL SCIENCE *Short Answer* In which season are the Perseids most active?

ANSWER: SUMMER

**BONUS**

25) GENERAL SCIENCE *Multiple Choice* Which is the closest approximation to Earth’s axial tilt?

W) 19 degrees  
X) 23 degrees  
Y) 27 degrees  
Z) 31 degrees

ANSWER: X) 23 DEGREES