**TOSS-UP**

1) BIOLOGY *Short Answer* What is the most common lethal genetic disease in the United States?

ANSWER: Cystic Fibrosis

**TOSS-UP**

2) CHEMISTRY *Multiple Choice* What bond angle does phosphine have?

W) 107 degrees

X) 109.5 degrees

Y) 120 degrees

Z) 94 degrees

ANSWER: Z) 94 degrees (Zumdahl pg. 390)

**TOSS-UP**

3) PHYSICS *Short Answer* What is the formula for time dilation, known as gamma?

ANSWER: Gamma = sqrt(1 - v2/c2)

**TOSS-UP**

4) ASTRONOMY *Short Answer* On average, how often do supernovae occur in a Milky Way-sized galaxy?

W) Once every 50 years

X) Once every 200 years

Y) Once every 1000 years

Z) Once every 5000 years

ANSWER: W) Once every 50 years

**TOSS-UP**

5) EARTH SCIENCE *Multiple Choice* Half Dome in Yosemite Park is an example of a/an

W) Batholith

X) Monolith

Y) Laccolith

Z) Volcanic plug

ANSWER: X) Monolith

**TOSS-UP**

6) MATH *Short Answer* Convert 240 degrees into radians.

ANSWER: 4π/3

**TOSS-UP**

7) GENERAL SCIENCE *Short Answer* What is the response of a plant to touch called?

ANSWER: Trigmotropism

**TOSS-UP**

8) BIOLOGY *Short Answer* For one molecule of glucose, what is the maximum number of ATP molecules available after cellular respiration?

ANSWER: 36-38

**TOSS-UP**

9) CHEMISTRY *Short Answer* In the Haber process, what is the end product?

ANSWER: Ammonia

**TOSS-UP**

10) PHYSICS *Short Answer* What is the centripetal acceleration of an object moving at a rate of 20 m/s with a radius of 5m?

ANSWER: 80 m/s^2

**TOSS-UP**

11) ASTRONOMY *Multiple Choice* The Very Large Arrary in New Mexico is what type of telescope?

W) Optical

X) High energy particle  
Y) Gravitational wave  
Z) Radio

ANSWER: Z) Radio

**TOSS-UP**

12) EARTH SCIENCE *Multiple Choice* What is the measure of the capacity of a soil for ion exchange between the soil and the soil solution?

ANSWER: Cation Exchange Capacity

**TOSS-UP**

13) MATH *Multiple Choice* What is the derivative of 2x ?

W) x(2x-1)

X) x(ln 2)

Y) ln 2 (2x)

Z) 2x

ANSWER: Y) ln 2 (2x)

**TOSS-UP**

14) GENERAL SCIENCE *Short Answer* Who invented the crescograph, used to measure the rate of growth of a plant?

ANSWER: Jagdish Bose

**TOSS-UP**

15) BIOLOGY *Short Answer* Amino acids or fatty acids in the duodenum trigger what hormone which stimulates the release of digestive enzymes from the pancreas and bile from the gallbladder?

ANSWER: Cholescystokinin

**TOSS-UP**

16) CHEMISTRY *Multiple Choice* Who was awarded the first Nobel Prize in Chemistry in 1901 for discovering the relationship between the moles of particles in solution and the moles of solute dissolved?

ANSWER: J. H. van’t Hoff

**TOSS-UP**

17) PHYSICS *Multiple Choice* What does Kepler’s third law state?

W) A line from the Sun to any planet sweeps equal areas in equal time intervals.

X) All planet move in elliptical orbits.

Y) The square of the average distance from the planet to the Sun is proportional to the cube of the orbital period.

Z) The square of the orbital period is proportional to the cube of the average distance from the planet to the Sun.

ANSWER: Z) The square of the orbital period is proportional to the cube of the average distance from the planet to the Sun.

**TOSS-UP**

18) ASTRONOMY *Multiple Choice* What are the three main classes of galaxies described by Edwin Hubble in 1936?

ANSWER: Spiral galaxy, elliptical galaxy, lenticular galaxy

**TOSS-UP**

19) EARTH SCIENCE *Short Answer* What are the highest clouds in the Earth’s atmosphere, located around 76 to 85 km above Earth’s surface?

ANSWER: Noctilucent clouds

**TOSS-UP**

20) MATH *Multiple Choice* What is the function that is its own derivative?

ANSWER: y = ex

**TOSS-UP**

21) GENERAL SCIENCE *Short Answer* What is a hydrometer used to test milk called?

ANSWER: Lactometer

**TOSS-UP**

22) BIOLOGY *Short Answer* Lymphocytes develop into what kinds of specialized cells which produce the immune response?

ANSWER: B cells and T cells

**TOSS-UP**

23) CHEMISTRY *Short Answer* How many nodes does the 5s orbital have?

ANSWER: 4

**TOSS-UP**

24) PHYSICS *Short Answer* What is the torque exerted on an object when a force of 625 N is used 1.20 meters from the object’s center?

ANSWER: 750 Newton x meter

**TOSS-UP**

25) ASTRONOMY *Multiple Choice* What effect occurs when a source sending out waves is moving towards an observer?

ANSWER: Blue shift