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Science Bowl Questions: Lightning Round 2

1. Toss-up: Chemistry: Multiple Choice: Which Bronsted-Lowry acid is not considered to be a strong acid in water?

W. HBr

X. HCl

Y. HNO2

Z. HClO3

ANSWER: Y

1. Toss-up: Biology: Short Answer: What are the names very specialized mutualistic associations between roots and fungi? About 80% on extant land plant species form these associations with fungi which endow the fungus and plant roots with an enormous surface area for absorbing water.

ANSWER: Mycorrhizae

1. Toss-up: Physics: Short Answer: If a charged conductor has a constant electric potential everywhere on its surface, and all points in the conductor are at the same electric potential, then what can be said of the conductor?

ANSWER: Electrostatic equilibrium

1. Toss-up: Math: Multiple Choice: Which of the following is the correct answer for the derivative of the function f(x) = sin(x)cos(x)?

W. sin2x

X. cos2x

Y. sin2x

Z. cos2x

ANSWER: Z

1. Toss-up: ERSC: Multiple Choice: On the rare occasions of abundant rainfall, or snowmelt, in the mountains, streams may flow across the alluvial fans to the center of the basin, converting the basin floor into a shallow lake. What is this lake termed?

W. Drainage Lake

X. Ephemeral Lakes

Y. Playa Lake

Z. Trellis Lake

ANSWER: Y

1. Toss-up: Astro: Short Answer: What type of line spectrum will most likely be formed when an incandescent solid, such as a light bulb, shines light through a cool gas, which travels through a prism?

W. Bright-line spectrum

X. Dark-line spectrum

Y. Continuous spectrum

Z. Gas spectrum

ANSWER: X

1. Toss-up: GENSCI: Multiple Choice: What was the name of the American physicist who won the Nobel prize in 1927 in Physics for his discovery in 1922 that x-ray wavelengths increase due to scattering of free energy by radiant free-standing electrons in collisions?

W. Arthur Compton

X. Robert Millikan

Y. Neils Bohr

Z. Walther Nernst

ANSWER: W

1. Toss-up: Chemistry: Multiple Choice: How will the osmotic pressure of an aqueous solution change as evaporation occurs?

W. Increase

X. Not change

Y. Decrease

Z. Increase or Decrease until equals vapor pressure of water

ANSWER: W

1. Toss-up: Biology: Multiple Choice: What is the name of the phenomenon where the transport protein in the cell couples the diffusion of one solute, for example H+, with another, such as glucose?

W. Potential Transport

X. Cotransport

Y. Facilitated Diffusion

Z. Active Transport

ANSWER: X

1. Toss-up: Physics: Multiple Choice: If C is a point outside a concave mirror and V is the center of the spherical concave mirror segment, what is the name of the line drawn between C and V if it also passes through I, the image point of the mirror?

W. Mirror Axis

X. Transmission Axis

Y. Image Axis

Z. Principal Axis

ANSWER: Z

1. Toss-up: Math: Short Answer: Calculus the positive solutions of x to the equation x2-7x+12.

ANSWER: x=3, 4

1. Toss-up: ERSC: Short Answer: What is the ultimate source of all wind, which causes the high pressure and low pressure gradients that cause wind?

ANSWER: Solar Radiation

1. Toss-up: Astro: Short Answer: In physical cosmology, what term refers to the production of nuclei other than those of H-1 during the early phases of the universe?

ANSWER: Big-bang Nucleosynthesis

1. Toss-up: GENSCI: Multiple Choice: In powers of ten, how many dynes are in one Newton?

W. 103

X. 104

Y. 105

Z. 106

ANSWER: Y

1. Toss-up: Chemistry: Multiple Choice: Which of the following is the most powerful oxidizing agent?

W.VCl5

X. CrO3

Y. KMnO4

Z. MnO2

ANSWER: Y

1. Toss-up: Biology: Short Answer: The processing of visual information begins in the retina itself, where both rods and cones form synapses with what kind of neurons?

ANSWER: Bipolar Cells

1. Toss-up: Physics: Which of the following is NOT true?

W. Kepler second law directly correlates the square of a planets semi-major axis to the cube of its period

X. The rotational Kinetic Energy of a disk is proportional to the square of its angular speed

Y. Osmosis is the diffusion of water across a semi-permeable membrane from a high water concentration to a low water concentration

Z. Two objects at thermal equilibrium with each other are at the same temperature

ANSWER: W

1. Toss-up: Math: Short Answer: Find the following infinite summation:

1, 2/5, 4/25, 8/125…

ANSWER: 5/3

1. Toss-up: ERSC: Multiple Choice: What is the form of precipitation where the subfreezing air near the ground is not thick enough to allow raindrops to freeze, forcing them to become supercooled as they fall through the cold air and turn into ice upon colliding with solids?

W. Sleet

X. Hail

Y. Rime

Z. Glaze

ANSWER: Z

1. Toss-up: Astro: Short Answer: Name the type of nebula and the constellation of the Horsehead Nebula.

ANSWER: Dark Nebula, Orion

1. Toss-up: GENSCI: Short Answer: The need for a smaller and more portable measuring instrument for air pressure led to the development of this type of barometer, which has a partially evacuated metal chamber instead of a mercury column held up by air pressure.

ANSWER: Anaeroid Barometer

1. Toss-up: Chemistry: Multiple Choice: What is the hybridization of boron in diborane B2H6.

W. sp2

X. sp3

Y. dsp3

Z. d2sp3

ANSWER: X

1. Toss-up: Biology: Short Answer: The brainstem contains several centers for controlling arousal and sleep. One such regulator is this, a diffuse network of neurons in the core of the brainstem, acting as a sensory filter to determine the information that reaches the cerebral cortex.

ANSWER: Reticular Formation

1. Toss-up: Physics: Short Answer: Find the angular velocity of a ball of mass 2 kg on a rope of 2 meters that is pulled with a centripetal force of 400 N.

ANSWER: 10 s-1