

REGIONAL B TIEBREAKERS

1. *BIOLOGY Short Answer* What is the name for a specialized disk-shaped structure on the chromatids that attaches the mitotic spindle to the centromere?

ANSWER: KINETOCHORE

2. *CHEMISTRY Short Answer* At what temperature Celsius does the motion of particles cease?

ANSWER: -273 DEGREES CELSIUS

3. *GENERAL SCIENCE Short Answer* What is the name for an area that contains saturated soil and organic material all year, but has little or no standing water?

ANSWER: BOG

4. *ASTRONOMY Multiple Choice* The magnetic fields of Neptune and Uranus differ from other planets because

- W) they are both much weaker
- X) they are tilted far off of the rotation axis
- Y) they are both much stronger
- Z) They oscillate on and off

ANSWER: X) THEY ARE TILTED FAR OFF OF THE ROTATION AXIS

5. *GENERAL SCIENCE Multiple Choice* The system responsible for growth, reproductive development, and much of our behavior is the

- W) circulatory system
- X) endocrine system
- Y) immune system
- Z) digestive system

ANSWER: X) ENDOCRINE SYSTEM

1. *GENERAL Short Answer* What is the weather term for a low that is long, rather than nearly circular?

ANSWER: TROUGH

2. *CHEMISTRY Short Answer* How many atomic shells are occupied by electrons in the gold atom?

ANSWER: SIX

3. *MATH Short Answer* What is the name of the following formula $\int u dv = uv - \int v du$ (read as: the indefinite integral $u dv$ equals uv minus the integral $v du$)?

ANSWER: INTEGRATION BY PARTS

4. *PHYSICS Short Answer* Two resistors have the same power dissipated in them. The potential measured across resistor A is twice that across resistor B. If the resistance of resistor B is R, what is the resistance of A?

ANSWER: 4R

5. *BIOLOGY Short Answer* Blood is pumped into the pulmonary arteries by what heart chamber?

ANSWER: RIGHT VENTRICLE

1. *PHYSICS Short Answer* Who demonstrated that when heat is gained or lost by a system during some process, the gain or loss can be accounted for by an equivalent quantity of mechanical work done on the system?

ANSWER: JOULE

2. *MATH Short Answer* When will the geometric mean and the arithmetic mean for a set of n numbers be equal?

ANSWER: ALL THE NUMBERS ARE EQUAL

3. *EARTH Short Answer* What is the temperature at which air becomes saturated with water vapor called?

ANSWER: DEW POINT

4. *CHEMISTRY Short Answer* What gas has a density of 0.902 g/L at STP?

ANSWER: NEON

5. *ASTRONOMY Multiple Choice* Astronomers think that the inner core of Jupiter is composed mainly of

- W) Hydrogen
- X) Helium
- Y) Uranium
- Z) Rock and iron

ANSWER: Z) ROCK AND IRON

1. *MATH Short Answer* When solving systems of two linear equations by graphing, if the two

lines are parallel, each with slope $-2/3$, how many solutions are there?

ANSWER: ZERO

2. *PHYSICS Short Answer* The force on a charged particle created by its motion in a magnetic field is maximum at what angle between the particle velocity and field?

ANSWER: 90 DEGREES (ACCEPT: $\pi/2$)

3. *GENERAL Short Answer* The study of how organisms interact with each other and their nonliving environment is called what?

ANSWER: ECOLOGY

4. *EARTH Short Answer* Which kind of volcano has no central peak or steep sides?

ANSWER: SHIELD VOLCANO

5. *ASTRONOMY Multiple Choice* The magnetic fields of Neptune and Uranus differ from other planets because

- W) they are both much weaker
- X) they are tilted far off of the rotation axis
- Y) they are both much stronger
- Z) they blink on and off

ANSWER: X) THEY ARE TILTED FAR OFF OF THE ROTATION AXIS

1. *EARTH Short Answer* What is the ability of a liquid to climb up a surface against the pull of gravity called?

ANSWER: CAPILLARITY

2. *COMPUTER Short Answer* In wide area networks such as the Internet, what is the general term for high speed, high capacity media such as fiber optic lines and microwave relays that are designed to transfer data over hundreds or thousands of miles?

ANSWER: BACKBONE

3. *ASTRONOMY Multiple Choice* Seyfert galaxies are

- W) active galaxies, most of whose energy is emitted by two widely spaced radio lobes
- X) elliptical galaxies whose nuclei resemble quasars
- Y) spiral galaxies whose nuclei resemble quasars
- Z) giant irregular galaxies which have neither spiral arms nor the smooth shape of elliptical galaxies

ANSWER: Y) SPIRAL GALAXIES WHOSE NULEI RESEMBLE QUASARS

4. *CHEMISTRY Short Answer* List the following elements in order of increasing ionization energy: Ar, Br, Te, Bi.

ANSWER: Bi ,Te ,Br ,Ar

5. *PHYSICS Short Answer* If a proton is released at the equator and falls toward the Earth under the influence of gravity, the magnetic force on the proton will be toward which of the four cardinal directions?

ANSWER: EAST

1. *BIOLOGY Short Answer* Absorbed fats are transported into the lacteals of which body system?

ANSWER: LYMPHATIC

2. *MATH Short Answer* In electromagnetism, what is the derivative, with respect to time, of the quantity of charge crossing a surface?

ANSWER: CURRENT

3. *CHEMISTRY Short Answer* What rule states that the major product in the formation of alkenes by elimination reactions will be the more highly substituted alkene?

ANSWER: ZAITSEV RULE

4. *COMPUTER Short Answer* What is the term used to describe the method used for defining a three-dimensional object by rotating its 2-dimensional outline figure 360 degrees?

ANSWER: LATHING

5. *PHYSICS Short Answer* The speed at which a wave propagates down a string is 250 meters per second. If the wavelength of this wave is 2.5 meters, what is the frequency of this wave in hertz?

ANSWER: 100

1. *GENERAL Short Answer* What is the term for agents of disease transmission?

ANSWER: VECTORS

2. *CHEMISTRY Short Answer* When used as a functional group in organic chemistry, the C=O group is called what kind of group?.

ANSWER: CARBOXYL

3. *ASTRONOMY Multiple Choice* The total luminosity of the Sun can be calculated from its

- W) Rotation period and temperature
- X) Diameter and distance from the Earth
- Y) Diameter and the solar energy at Earth's distance
- Z) Distance from Earth and the solar energy detected at Earth's distance

ANSWER: Z) DISTANCE FROM EARTH AND THE SOLAR ENERGY DETECTED AT EARTH'S DISTANCE

4. *EARTH Short Answer* Who was the first scientist to state the theory of continental drift?

ANSWER: ALFRED WEGENER (ACCEPT: WEGENER)

5. *COMPUTER Short Answer* In a spreadsheet program, a cell, a range of cells, or an entire file that prevents you from altering the contents is said to be what?

ANSWER: PROTECTED

1. *ASTRONOMY Multiple Choice* What is meant by the Solar Nebula?

- W) A cloud of hot gas in the Sun's atmosphere
- X) The cloud surrounding the Sun from which comets come

- Y) The rotating disk of dust and gas from which the Sun and planets formed
- Z) The glow of light we see around the Sun at a total solar eclipse

ANSWER: Y) THE ROTATING DISK OF DUST AND GAS FROM WHICH THE SUN AND PLANETS FORMED

2. *BIOLOGY Short Answer* Who discovered that heated amino acids formed proteinoid microspheres?

ANSWER: SIDNEY FOX

3. *EARTH Short Answer* What term describes the kind of desalination in which water is changed quickly into steam without boiling the water?

ANSWER: FLASH DISTILLATION

4. *CHEMISTRY Short Answer* What general term describes the process of hydrolyzing an ester under basic conditions to form a carboxylate anion and an alcohol?

ANSWER: SAPONIFICATION

5. *COMPUTER Short Answer* The forerunner of the modern hypertext system, this automated device was used for collecting and organizing scientific literature. What is it?

ANSWER: MEMEX

1. *ASTRONOMY Multiple Choice* Near the core of Jupiter, hydrogen is

- W) a low-temperature gas.
- X) a high-temperature gas.
- Y) a solid.
- Z) a liquid metal.

ANSWER: Z) A LIQUID METAL

2. *EARTH Short Answer* In which kind of climate does the average temperature for any month does not go below 18 degrees C (64 degrees F)?

ANSWER: TROPICAL

3. *BIOLOGY Short Answer* Cholesterol is a precursor to which vitamin?

ANSWER: VITAMIN D

4. *GENERAL Short Answer* What type of cytokine is produced by infected cells and limits the replication of viruses by limiting protein synthesis?

ANSWER: INTERFERONS

5. *CHEMISTRY Short Answer* What is the correct name for BrO_3^- (Read as: B R O three minus)?

ANSWER: BROMATE ION

1. *CHEMISTRY Short Answer* What is a column of elements in the periodic table called?

ANSWER: GROUP

2. *COMPUTER Short Answer* What is the term used to describe the terminal protocol that enables a user at a remote location to access a computer as if the remote computer were directly connected (hardwired) to the computer?

ANSWER: COMMUNICATIONS TERMINAL PROTOCOL OR CTERM

3. *BIOLOGY Short Answer* What is the name of specialized structures that anchor mosses to their substrate?

ANSWER: RHIZOIDS

4. *MATH Short Answer* The radix of a counting system or system of logarithms is another name for what?

ANSWER: BASE

5. *GENERAL Short Answer* What is the term for a closed depression in glacial drift created by the melting out of a mass of underlying ice?

ANSWER: KETTLE