

### **Tiebreakers**

The APC/C, or cyclosome, is activated at the end of this process, and cyclin B is attached to ubiquitin, which marks it to be destroyed by proteasomes. This deactivates maturation-promoting factor. Sister chromatids are held together by cohesin, and the inhibition of separase through the presence of securin during this process prevents cohesin from breaking down. A checkpoint during it detects any failure of fibers from the mitotic spindle to attach to kinetochores. For ten points, name this phase of mitosis in which the condensed sister chromatids align at the equatorial plate, and occurs between prophase and anaphase.

ANSWER: **metaphase** <AK>

The synthesis of this substance often takes place in young leaves and cotyledons, and bulk flow causes the movement of these in plants to be rapid. One receptor of these is the F-box protein TIR-1. The most common form of this substance, indole-3-acetic acid, is chemically similar to and is derived from the amino acid tryptophan. Plant growth in abnormal directions is caused by the shade avoidance effect, which in turn is caused by these substances. For ten points, identify these plant hormones that control cell elongation and development of the roots and seeds, and are not cytokinins.

ANSWER: **auxins** <AK>

Adolph-Strecker amino acid synthesis is one process that creates amino acids naturally from these, and these can be fully reduced to alkanes when they undergo the Wolff-Kishner reduction. Acyloins are a special type of these that react with the Tollen's reagent, and the Wittig reaction produces alkenes from these. Unlike aldehydes, they have two hydrocarbon groups attached to the carbon atom of their carbonyl group. Types of these include di-, cyclic, and unsaturated. For ten points, name these substances that are formed from the oxidation of alcohols, the simplest example of which is the solvent acetone.

ANSWER: **ketones** <AK>

The success of fractional distillation depends this value for substances in a solution. An isoteniscope is used to measure this for a liquid, and partial pressure is equal to the amount of this provided by a component of a mixture. One way to calculate this for varying temperatures is via the Antoine equation, which is derived from the Clausius-Clapeyron equation. The boiling point of a liquid is the temperature at which this is equal to atmospheric pressure, and this value has a direct relationship with the volatility of a solution. For ten points, name this pressure, the pressure at equilibrium of the gas resulting from the boiling of a liquid.

ANSWER: **vapor pressure** <AK>

The source of this force is the stress-energy tensor, a second-rank tensor that suggests that the particles that mediate this force must be massless spin-2 particles. In string theory, the aforementioned particles are described as closed strings in a low energy state. Its namesake waves are radiated during interactions between large masses, and a quantum theory of this could allow for the formulation of a "theory of everything." The namesake potential energy is equal to the amount of work necessary to bring an object from infinity to a given radius. For ten points, name this weakest fundamental force, which causes a downward acceleration of 9.8 m/s on Earth.

ANSWER: **gravity** <AK>

Basal slip occurs when glaciers slide on a soft bed of sediment, and moraines appear as long dark bands on the edges of glaciers as they carry along debris. The cirque type of these form on the sides of mountains, and the tidewater type extend all the way to the sea. The continental type of these expands outward from a central point. Firn are layers of snow that survive through a full melt season and are a major component of these. Icebergs form from the calving of these. For ten points, name these natural features in which the accumulation of snow exceeds the rate of ablation, melting, or calving.

ANSWER: **glaciers** <AK>