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QUESTION 1

What does 4x – 1/2y equal if x = 9 and y = 6

A. 36

B. 33

C. 30

D. 26

Correct Answer: B

(4 × 9) ? (1/2 × 6) = 36 ? 3 = 33.

QUESTION 2

Which of the following has the highest melting point?

A. Ethane

B. 2,2-Dimethylpropane

C. Propane

D. Butane

E. Pentane

Correct Answer: B

The general trend is the higher # of carbons, the higher the boiling point and melting point. There is a specific rule for this however that involves symmetry and branching. If the compound has branching and symmetry, then it has a higher melting point than its non-branched and symmetrical counterpart, which, in this example, 2,2-dimethylpropane (having 5 carbons) and pentane (also having 5 carbons, but lacking any branches).

QUESTION 3

Two cars driving in opposite directions collide. If you ignore friction and any other outside interactions, which of the following statements is always true?

A. The total momentum is conserved.

B. The sum of the potential and kinetic energy is conserved.

C. The total velocity of the cars is conserved.

D. The total impulse is conserved.

Correct Answer: A

In a closed system (when you ignore outside interactions), the total momentum is constant and conserved. The total energy would also be conserved, although not the sum of the potential and kinetic energy. Some of the energy from the collision would be turned into thermal energy (heat) for example. Nor is the total velocity conserved, even though the velocity is a component of the momentum, since the momentum also depends on the mass of the cars. The impulse is a force over time that causes the momentum of a body to change. It doesn\\'t make sense to think of impulse as conserved, since it\\'s not necessarily constant throughout a collision.

QUESTION 4

Which of the following possesses the highest ionization energy?

A. Lithium

B. Carbon

C. Nitrogen

D. Sodium

E. Fluorine

Correct Answer: E

Ionization energy increases as you go right and up in the periodic table. Fluorine is the right and uppermost choice.

QUESTION 5

What is the value of r in the following equation?

29 + r = 420

A. r = 29/420

B. r = 420/29

C. r = 391

D. r = 449

Correct Answer: C

29 + r = 420 29 + r - 29 = 420 ?29 r = 391