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QUESTION 1

What is the percent composition of potassium in potassium dichromate?

A. 26.5%

B. 35.4%

C. 33.3%

D. 38.1%

E. Cannot be determined.

Correct Answer: A

The molecular formula of potassium dichromate is K2Cr2O7. To find the percent composition, calculate

the weight of the entire molecule:

(2 × 39 g/mol) + (2 × 52 g/mol) + (7 × 16 g/mol) = 294 g/mol

Then divide the weight of the potassium in the molecule by the entire molecular weight:

(2 × 39 g/mol) / 294 g/mol = 0.265

Multiply ×100 to produce the percentage value: 0.265 × 100 = 26.5%

QUESTION 2

A population of 1000 individuals has 110 births and 10 deaths in a year. Its growth rate (r) is equal to:

A. 0.01 per year

B. 0.11 per year

C. 0.1 per year

D. 0.09 per year

E. 0.009 per year

Correct Answer: C

The growth rate is equal to the difference between births and deaths divided by population size.

QUESTION 3

Which of the following paracrine signaling molecules increases gastric acid production in the stomach?

A. Somatostatin

B. Prostaglandins

C. Histamine

D. GIP

E. None of the above

Correct Answer: C

Histamine induces gastric acid secretion in the stomach. Somatostatins inhibit gastric acid secretion, as does GIP.

QUESTION 4

You blow up a rubber balloon and hold the opening tight with your fingers. You then release your fingers, causing air to blow out of the balloon. This pushes the balloon forward, causing the balloon shoots across the room. Which of Newton\\'s laws best explains the cause of this motion?

A. First law

B. Second law

C. Third law

D. Law of gravity

Correct Answer: C

All three laws are operating, but the third law (forces come in equal and opposite pairs) best explains the motion. The first law (inertia) is shown from the fact that the balloon doesn\\'t move until a force acts upon it. The second law (F = ma) is shown because you can see the force and the acceleration. The force comes from the contraction of the rubber balloon. The stretched rubber exerts a force on the air inside the balloon. This causes the air to accelerate in accordance with the second law. You can\\'t see this acceleration because the air is invisible and because it is all the air in the room that the balloon is exerting a force on. However, the air in the room exerts and equal and opposite force on the balloon (this is Newton\\'s third law), which causes the balloon to accelerate in the direction it did.

QUESTION 5

Which of the following is NOT a monosaccharide?

A. Glucose

B. Dextrose

C. Sucrose

D. Galactose

E. B and C

Correct Answer: C

All other answers are indeed monosaccharides. Dextrose and glucose are the same thing.