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QUESTION 1

An element whose atomic number is 16 would have how many unpaired electrons?

A. 0

B. 1

C. 2

D. 4

Correct Answer: C

The atomic number indicates the number of protons (and electrons). Writing the electron configuration: 1s2 2s2 2p6 3s2 3p4 (2 + 2 + 6 + 2 + 4 = 16). The 3p orbital will contain 1 filled orbital, and 2 half-filled orbitals, which indicates 2 unpaired electrons.

QUESTION 2

Lead ?non-biodegradable, soft, malleable, as well as heat and corrosion resistant ?is environmentally omnipresent. Its known properties make it an ideal metal for automobiles, paint, smelting, ceramics, and plastics. Not many years ago, it was also utilized in the toy industry. Unfortunately, lead is toxic to humans. Humans neither need lead nor derive benefits from it. Although lead toxicity has been a global concern since the industrial revolution in the late 1800s, civilization has been unable to prevent or control it satisfactorily. Overall incidence of lead poisoning among American children has fallen from 4.4% in the early 1990s to 1.4% in 2004. In 2002, around 10 out of every 100,000 of adults had lead toxicity. Venous blood lead levels (BLLs) of 10 mcg/dL and 25 mcg/dL were considered toxic in children and adults, respectively. But, since any level of lead can cause toxicity, the CDC announced a new, lower reference value for children in June 2012: 5 mcg/dL. Infants and children absorb a higher fraction of lead than adults do when exposed, increasing their vulnerability. Approximately 450,000 American children have BLLs >5 mcg/dL. Consequently, lead poisoning is still a problem. Lead exposure can start with prenatal maternal-fetal transmission. Outside the womb, children may inhale (or eat) lead dust, often present in street debris, soil, and most frequently, aged house paint. Lead-based paint was phased out in the 1970s, lowering, but not eliminating, risk of exposure. Old pipes sometimes leach lead into drinking water. Lead hazards are disproportionately found in low-income housing. Adults rarely develop lead poisoning, but risk is increased for industrial workers who use or manufacture lead-based products. Health care providers use many tests to identify lead poisoning. In addition to the BLL, a blood smear may show basophilic stippling ribosomal clusters. Increased urinary aminolaevulinic acid concentrations are also reliable indicators. Plain film radiographs can reveal visible lead lines in patients\\' long bones. Astute clinicians sometimes diagnose lead poisoning after seeing a blue line along patients\\' gums (Burton\\'s line) that forms when lead reacts with sulfur ions released by oral bacteria. Lead affects every organ system and causes an unpredictable variety of symptoms. The nervous system is most sensitive (centrally in children, peripherally in adults), but lead affects hematopoietic, hepatic, and renal systems, producing serious disorders. Acute lead poisoning\\'s classic symptoms include colic, encephalopathy, anemia, neuropathy, and Fanconi syndrome (abnormal glucose, phosphates, and amino acid excretion). Sometimes, classic signs and symptoms are absent, confusing the clinical picture.

What is NOT a test to detect lead poisoning?

A. aminolaevulinic

B. blood smear

C. BLL

D. radiographs

Correct Answer: A

This is not the name of a test or a method for detecting lead poisoning. It may be a word from the passage, but it does not answer the specific question posed. The other answer choices are all mentioned as tests for detecting lead poisoning.

QUESTION 3

A 50mL solution of HCl is diluted to 250mL at 10M. What was the initial concentration of the HCl?

A. 500M

B. 50M

C. 5M

D. 0.5M

Correct Answer: B

The product of the initial concentration and the initial volume is equal to the product of the final concentration and the final volume of the solution. This can be remembered as: c1 ?v1 = c2 ?v2 Substitute the known quantities and solve for the unknown: c1 : c1 ?50mL = 10M ?250mL ?gt; c1 = 50M

QUESTION 4

Which algebraic expression best represents the following statement: the number of books Brian read over the summer (B) is 2 less than 3 times the number of books his brother Adam read over the summer (A)?

A. B = 3A - 2

B. B = 3A + 2

C. A = 3B - 2

D. A = 3B + 2

Correct Answer: A

QUESTION 5

Which of the following is NOT a result of sympathetic stimulation?

A. increase in blood pressure

B. increase of blood flow to intestines

C. increase in blood flow to the brain

D. dilation of pupils

Correct Answer: B

Sympathetic stimulation, associated with the fight-or-flight response, results in an increased blood pressure to help the body deal with a stressful situation. The body diverts blood away from digestion and the digestive system in favor of the skin, the muscles, and the brain.