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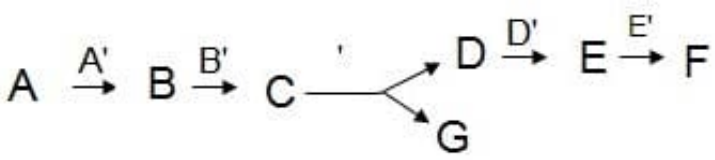
QUESTION 1



The diagram below depicts a metabolic pathway. When product D accumulates, the production of product C decreases, D is an inhibitor of which enzyme?

A. C\\'

B. B\\'

C. A\\'

D. D\\'

E. E\\'

Correct Answer: B

This is an example of negative feedback, a process whereby an increase in an outcome causes a decrease or slowing in the pathways that led to the outcome.

QUESTION 2

The primary seat of tubercular infection is generally in the upper part of the lung. The invading organisms settle on the surface here and cause a multiplication of the cells and an inflammatory exudate in a small area. With the continuous growth of the bacilli in the localized region, adjoining areas of the lung become affected, and there is further extension into the immediate vicinity by means of the lymphatics. Small nodules form and then coalesce to create a larger area. The body primarily defends itself with the formation of dense masses of cicatricial tissue, which function to wall off the affected area. This results in unfavorable growth conditions for the bacilli. This mode of defense, combined with the production of substances antagonistic to the toxins produced by the bacilli, is so efficacious that in the great majority of cases no further extension of the process takes place. In certain cases, however, the growth of the bacilli in the focus area is unchecked, then the surrounding tissue is killed and converted into a soft semi-fluid material; further extension then takes place. All parts of the enormous surface of the lungs are connected by a system of air tubes or bronchi, and as a result, the bacilli have favorable opportunity for distribution. This opportunity is facilitated by sudden movements of the air currents in the lung produced by coughing. The body\\'s defense; however, can still keep pace with the attack, and even in an advanced stage, the infection can sometimes be permanently checked; in other cases, the check is temporary, the process of softening continues, and large cavities are produced by the destruction of the tissue. On the inner surface of these cavities there may be a rapid growth of bacilli. From the lungs, the bacilli are carried by the lymphatics to the lymph nodes at the root of the lungs, in which a similar process takes place; this, on the whole, is favorable, because further extension by this route is for a time blocked. The extension across surfaces continues and the abundant sputum, which is formed in the lungs and contains large numbers of bacilli, becomes the vehicle of transportation. The windpipe and larynx may become infected, as the back parts of each are more closely in contact with the sputum and are the parts most generally infected. A large part of the sputum is swallowed and infection of the intestine takes place with the lesions taking the form of large ulcers. From the intestinal ulcers there is further extension by means of the lymphatics to the large lymph nodes in the back of the abdominal cavity.

Based on the information in paragraph 1, it is likely that sneezing would:

A. Expedite the progression of the infection

B. Impede the growth of the bacteria

C. Aid the body in the removal of the infection

D. Obstruct further passage for the bacteria

Correct Answer: A

At the end of paragraph 1, the passage reads, "This opportunity is facilitated by sudden movements of the air currents in the lung produced by coughing." Given that a sneeze is mechanically similar to coughing, it is likely that a sneeze would have a similar effect as a cough. Only answer choice [Expedite the progression of the infection] describes the effect of a cough.

QUESTION 3

Since 1997, the American Heart Association (AHA) has attempted to increase awareness about cardiovascular disease (CVD) among women. Fortunately, great progress has been made to educate individuals about CVD and its consequences. According to the AHA\\'s 2011 Guidelines for Prevention of Cardiovascular Disease in Women, the misconception that CVD is a "man\\'s disease" has been somewhat disproved, as awareness among the general public increased from 30% in 1997 to 54% in 2009. Unfortunately, CVD continues to be the leading cause of death in the United States for both men and women. Since 1984, the number of deaths related to CVD in women exceeded those in men. In the United States, CVD death rates among women aged 35 to 54 years appear to be increasing by 1% annually, which is most likely attributable to the escalating obesity epidemic. According to the AHA, even though CVD is the number 1 cause of death among women, only 13% of women perceive CVD as a health threat. CVD is responsible for more deaths among women than the next 3 leading causes of death combined, including all forms of cancer. Due to the ongoing prevalence of CVD, increasing awareness and understanding of CVD, especially among the female population, is still a top priority for many health care professionals. As one of the most accessible health care professionals, pharmacists are in a pivotal position to educate and inform their patients of the risks associated with CVD, possible drug therapies, and preventive measures. The AHA has set a goal for 2020 to improve cardiovascular health in all Americans by 20%, while reducing deaths from CVD and stroke by 20%. According to the American Heart Association, in the United States a woman dies of some form of CVD every minute and more than 1 in 3 females have some form of CVD. Studies have demonstrated that gender differences may play an important role in the diagnosis, treatment, and prevention of CVD. Unfortunately, many women may not always recognize the warning signs and symptoms of a heart attack because they sometimes appear more subtle when compared with those typically experienced by men. Results from a study of 515 women who had heart attacks report that 43% did not experience any type of chest pain or pressure during the heart attack. Although the classic symptoms include chest pain, tingling in the left arm, sweating, and shortness of breath, women may also experience some "atypical" symptoms, such as extreme fatigue, nausea, dizziness, indigestion, vomiting, and pain in the neck or back. By learning and recognizing the warning signs, women can take a proactive approach to their cardiovascular health and get treatment earlier to prevent further complications.

Awareness of cardiovascular disease (CVD) among women was partially limited because:

A. The American Heart Association did not do enough to raise awareness prior to 1997.

B. There was a prevailing misconception that AVD was a "man\\'s disease."

C. The Guidelines for Prevention of Cardiovascular Disease in Women was not published until 1997.

D. The AHA was ill-informed about the statistics of CVD occurrence in men and women.

Correct Answer: B

The passage states, "the misconception that CVD is a "man\\'s disease" has been somewhat disproved, as awareness among the general public increased."

QUESTION 4

Which of the following has the largest bond order?

A. O_2
B. NO_3^-
C. NO_2^+
D. CN^-

A. Option A

B. Option B

C. Option C

D. Option D

Correct Answer: D

Bond order for diatomic molecules is found by determining the type of bonds between the 2 atoms. In cases where there are more than two atoms involved, count the number of bonds, then count the number of bond groups between atoms, then calculate the ratio of the number of bonds to the total number of bond groups. The Lewis structure for (A) shows a double bond between oxygen atoms, and its bond order is 2.

(B)

Shows a double bond between N and O, and 2 single bonds between N and O:

(C)

Shows 2 double bonds between N and O: 4 ?2 = 2. (D) Shows 1 triple bond between C and N and a bond order of 3. (D) has the largest bond order.

$$\frac{\text{total number of bonds}}{\text{number of groups}} = \frac{4}{3} = 1.33$$

QUESTION 5

Which of the following is the same as log 85?

A. log 35 + log 50

B. ln 1/85

C. log 255 - log 3

D. ln 85

Correct Answer: C

Recall the rules for condensing and expanding logarithms:

log a + log b = log (ab)

and

log a - log b = log (a/b).

Answer choice [log 255 - log 3] can be rewritten as: log (255/3) which is equal to log 85.