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**QUESTION 1**

Which of the following atoms has the highest electronegativity?

- A. Cl
- B. Br
- C. N
- D. F

Correct Answer: D

In the covalent bond, two atoms are joined by sharing electrons. Both nuclei are held by the same electron cloud. However, in most cases the two nuclei do not share the electrons equally. This happens when one atom has more electron withdrawing power than the other atom. At this time the electron cloud is denser on one atom. This result in one end of the bond being relatively negative and the other end being relatively positive. Such a bond is said to be a polar bond or to possess polarity. The bond possesses polarity when joins atoms have different tendency to attract electrons. This property of the atom is called electronegativity. Out of the given choices, fluorine (F) possess the highest electronegativity. $F > O > Cl, N > Br > C, H$

QUESTION 2

A lab requires 0.76 L of a solution. How many 100 mL vials must be used in the lab?

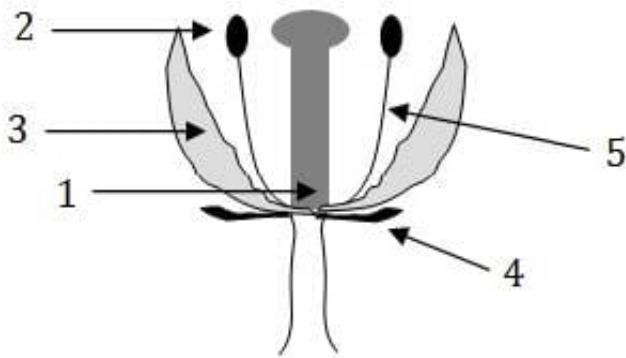
- A. 7
- B. 8
- C. 6
- D. 10

Correct Answer: B

Recall that $100 \text{ mL} = 0.1 \text{ L}$. Because the smaller vials only come in amounts of 100 mL, 8 vials will be needed to provide 0.76 L.

QUESTION 3

The structures composed solely of diploid cells:



- A. 1, 2, and 3
- B. 3, 4, and 5
- C. 1, 4, and 5
- D. 2, 3, and 4
- E. 1, 2, and 4

Correct Answer: B

In flowering plants, the anthers house the male gametophytes (which produce sperm) and the pistils house the female gametophytes (which produce eggs). Eggs and sperm are haploid. All other tissues are solely diploid.

QUESTION 4

For most Americans, the words "Alzheimer's disease" (AD) often mispronounced purposefully or accidentally as "old timers' disease" signify devastating memory loss and stigma. The information about AD often learned solely through the media may lead individuals to believe that AD is inevitable (it isn't), and possibly think that all AD patients receive poor care (there are many remarkably good AD units). Many individuals may envision a future burdened with more dementia patients and fewer societal resources to help support them (a real possibility). In general, pharmacists are well aware of what AD is and isn't. AD is complex and relentlessly progressive; it affects patients, loved ones, and caregivers adversely. Pharmacists can provide pertinent information about AD's myths, realities, and available symptomatic treatments. AD's harbinger is language difficulties, which include aphasia (language disturbance), apraxia (inability to carry out motor functions), and agnosia (failure to recognize or identify objects). Consequently, those with AD will often create new words for items. They may call a pencil a "list writer," or a key a "door turner." Clinicians stage AD as mild, moderate, or severe depending on the patient's cognitive and memory impairment, communication problems, personality changes, behavior, and loss of control of bodily functions. People often dismiss mild AD as normal cognitive decline or senility in other words, "normal" aging. For this reason, most people don't seek treatment and are diagnosed in the late-mild to early-moderate stage. In the severe stage, difficulty swallowing elevates the risk of aspiration pneumonia, which often marks the beginning of the downward spiral that ultimately ends with death; AD has no cure. A handful of pharmacologic treatments acetylcholinesterase inhibitors and N-methyl-D-aspartate antagonists alter the decline trajectory. These treatments slow disease progression, enhance cognitive function, delay cognitive decline, and decrease disruptive behaviors. Not all patients respond to these medications, but experts generally believe that those who do will show mild to moderate improvements for 6 months to a year. Although the drugs' effects are short-lived, they improve patients' quality of life and briefly enable independence. Determining when medications stop providing a therapeutic benefit and should be discontinued is challenging. Clinicians use various methods to monitor decline, including mental status tools, patient self-report, and loved ones' observations. Most clinicians continue drug treatment if the patient seems to tolerate the medication well, can afford it, and if there seems to be a benefit. With disease progression, specific behavioral symptoms including depression, agitation, hallucinations, and sleep disturbances become concerns. Antianxiety drugs, antipsychotics, and antidepressants are sometimes used to alleviate



symptoms, but effective behavioral strategies are much preferred.

Acetylcholinesterase inhibitors and N-methyl-D-aspartate antagonists can do which of the following to help AD patients?

- A. monitor progression
- B. decrease disruptive behavior
- C. stop disease progression
- D. delay cognitive function

Correct Answer: B

The passage states, "A handful of pharmacologic treatments ?acetylcholinesterase inhibitors and Nmethyl-D-aspartate antagonists ?alter the decline trajectory. These treatments slow disease progression, enhance cognitive function, delay cognitive decline, and decrease disruptive behaviors."

QUESTION 5

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.

What causes tissue to convert into soft semi-fluid material?

- A. The attacking bacilli breaking through the cicatricial tissue
- B. Air distributed through the bronchi in the lungs
- C. Further extension by the lymphatics
- D. Additional movement caused by coughing

Correct Answer: A



Immediately following the discussion of the cicatricial tissue and how it blocks the progression of infection, the passage states, "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."

QUESTION 6

Simplify the following:

$$\frac{(4x^{-3})(10x^3)}{(5y^{-56})(9y^{56})}$$

- A. $\frac{5}{6}$
- B. $\frac{8}{9}$
- C. $\frac{10}{15}$
- D. $\frac{7}{3}$

A. Option A

B. Option B

C. Option C

D. Option D

Correct Answer: B

$$\frac{4 \times 10}{9 \times 5} = \frac{8}{9}$$

QUESTION 7

Which of the following statements regarding energy production is true?

- A. There is a net total of 4 ATP produced in glycolysis.
- B. The GTP made in the TCA cycle does not become ATP.
- C. The cell requires energy to move NADH into the mitochondria.
- D. The net gain of ATP from each NADH is 2.

Correct Answer: C



Transport of the NADH into the mitochondria in most cases requires 1 ATP. This is the reason that prokaryotes often have a higher yield of ATP per glucose when compared to eukaryotes. Usually 38 ATP are produced per glucose for prokaryotes, and 36 per glucose for eukaryotes.

QUESTION 8

_____ law states that the _____ is the sum of _____ in a gas compound.

- A. Dalton's, partial pressure, total pressure
- B. Henry's, partial pressure, total pressure
- C. Dalton's, total pressure, partial pressures
- D. Henry's, total pressure, partial pressures

Correct Answer: C

Dalton's law states that the total pressure of a gaseous compound is the sum of the partial pressures of each gas making up the compound:

$$P_{total} = \sum_{i=1}^n p_i$$

QUESTION 9

For most Americans, the words "Alzheimer's disease" (AD) often mispronounced purposefully or accidentally as "old timers' disease" signify devastating memory loss and stigma. The information about AD often learned solely through the media may lead individuals to believe that AD is inevitable (it isn't), and possibly think that all AD patients receive poor care (there are many remarkably good AD units). Many individuals may envision a future burdened with more dementia patients and fewer societal resources to help support them (a real possibility). In general, pharmacists are well aware of what AD is and isn't. AD is complex and relentlessly progressive; it affects patients, loved ones, and caregivers adversely. Pharmacists can provide pertinent information about AD's myths, realities, and available symptomatic treatments. AD's harbinger is language difficulties, which include aphasia (language disturbance), apraxia (inability to carry out motor functions), and agnosia (failure to recognize or identify objects). Consequently, those with AD will often create new words for items. They may call a pencil a "list writer," or a key a "door turner." Clinicians stage AD as mild, moderate, or severe depending on the patient's cognitive and memory impairment, communication problems, personality changes, behavior, and loss of control of bodily functions. People often dismiss mild AD as normal cognitive decline or senility in other words, "normal" aging. For this reason, most people don't seek treatment and are diagnosed in the late-mild to early-moderate stage. In the severe stage, difficulty swallowing elevates the risk of aspiration pneumonia, which often marks the beginning of the downward spiral that ultimately ends with death; AD has no cure. A handful of pharmacologic treatments acetylcholinesterase inhibitors and N-methyl-D-aspartate antagonists alter the decline trajectory. These treatments slow disease progression, enhance cognitive function, delay cognitive decline, and decrease disruptive behaviors. Not all patients respond to these medications, but experts generally believe that those who do will show mild to moderate improvements for 6 months to a year. Although the drugs' effects are short-lived, they improve patients' quality of life and briefly enable independence. Determining when medications stop providing a therapeutic benefit and should be discontinued is challenging. Clinicians use various methods to monitor decline, including mental status tools, patient self-report, and loved ones' observations. Most clinicians continue drug treatment if the patient seems to tolerate the medication well, can afford it, and if there seems to be a benefit. With disease progression, specific behavioral symptoms including depression, agitation, hallucinations, and sleep disturbances become concerns. Antianxiety drugs, antipsychotics, and antidepressants are sometimes used to alleviate symptoms, but effective behavioral strategies are much preferred.



Which of the following is NOT something pharmacists can provide information about?

- A. myths about AD
- B. truths about AD
- C. cures for AD
- D. treatments for AD

Correct Answer: C

The passage states, "Pharmacists can provide pertinent information about AD's myths, realities, and available symptomatic treatments." The passage mentions that Alzheimer's is currently incurable.

QUESTION 10

Separation of compounds by distillation is more efficient when:

- A. carried out under reduced pressure
- B. more condensation-vaporization cycles occur
- C. carried out quickly
- D. the condenser is very cold

Correct Answer: B

Separation of compounds in distillation occurs because of their differential rates of evaporation and condensation equilibria. The more often the vapors in the apparatus can condense and evaporate, the more distinct the separation of the components will be. The more quickly a distillation process is carried out, the less distinct the separation of the components will be, making the process less efficient. A very cold condenser temperature has the effect of forcing the vapor through the system before it can condense and evaporate again, decreasing both the separation of the components and the efficiency of the process. Reduced pressure decreases the temperatures at which the components will distill, without affecting the separation behavior.

QUESTION 11

Express 8% as a fraction.

- A. $\frac{4}{25}$
- B. $\frac{4}{100}$
- C. $\frac{2}{50}$
- D. $\frac{2}{25}$

Correct Answer: D

$8\% = \frac{8}{100} = \frac{2}{25}$.



QUESTION 12

A virus contains all of the following except?

- A. mitochondria
- B. RNA
- C. amino acids
- D. DNA

Correct Answer: A

A virus is neither eukaryotic nor prokaryotic, but similar to prokaryotes, viruses lack organelles. They are composed primarily of nucleic acids, DNA and RNA, and proteins. Viruses lack mitochondria.

QUESTION 13

In which of the following stages of embryo development are the three primary germ layers first present?

- A. Blastula
- B. Zygote
- C. Gastrula
- D. Coelomate
- E. Morula

Correct Answer: C

The gastrula is formed from the blastocyst, which contains a bilayered embryonic disc. One layer of this disc's inner cell mass further subdivides into the epiblast and the hypoblast, resulting in the three primary germ layers (endoderm, mesoderm, ectoderm).

QUESTION 14

For most Americans, the words "Alzheimer's disease" (AD) are often mispronounced purposefully or accidentally as "old timers' disease" and signify devastating memory loss and stigma. The information about AD often learned solely through the media may lead individuals to believe that AD is inevitable (it isn't), and possibly think that all AD patients receive poor care (there are many remarkably good AD units). Many individuals may envision a future burdened with more dementia patients and fewer societal resources to help support them (a real possibility). In general, pharmacists are well aware of what AD is and isn't. AD is complex and relentlessly progressive; it affects patients, loved ones, and caregivers adversely. Pharmacists can provide pertinent information about AD's myths, realities, and available symptomatic treatments. AD's harbinger is language difficulties, which include aphasia (language disturbance), apraxia (inability to carry out motor functions), and agnosia (failure to recognize or identify objects). Consequently, those with AD will often create new words for items. They may call a pencil a "list writer," or a key a "door turner." Clinicians stage AD as mild, moderate, or severe depending on the patient's cognitive and memory impairment, communication problems, personality changes, behavior, and loss of control of bodily functions. People often dismiss mild AD as normal



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In paragraph 2, "harbinger" most nearly means?

- A. token
- B. precursor
- C. messenger
- D. problem

Correct Answer: B

The author states that "AD\\'s harbinger is language difficulties." A harbinger, by definition, is a messenger or forerunner of information. In this case, the language difficulties indicate the arrival of the more serious symptoms of the disease.

These difficulties act as a precursor to these more serious issues.

QUESTION 15

For most Americans, the words "Alzheimer\\'s disease" (AD) ?often mispronounced purposefully or accidentally as "old timers\\' disease" ?signify devastating memory loss and stigma. The information about AD ?often learned solely through the media ?may lead individuals to believe that AD is inevitable (it isn\\'t), and possibly think that all AD patients receive poor care (there are many remarkably good AD units). Many individuals may envision a future burdened with more dementia patients and fewer societal resources to help support them (a real possibility). In general, pharmacists are well aware of what AD is and isn\\'t. AD is complex and relentlessly progressive; it affects patients, loved ones, and caregivers adversely. Pharmacists can provide pertinent information about AD\\'s myths, realities, and available symptomatic treatments. AD\\'s harbinger is language difficulties, which include aphasia (language disturbance), apraxia (inability to carry out motor functions), and agnosia (failure to recognize or identify objects). Consequently, those with AD will often create new words for items. They may call a pencil a "list writer," or a key a "door turner." Clinicians stage AD as mild, moderate, or severe depending on the patient\\'s cognitive and memory impairment, communication problems, personality changes, behavior, and loss of control of bodily functions. People often dismiss mild AD as normal cognitive decline or senility ?in other words, "normal" aging. For this reason, most people don\\'t seek treatment and are diagnosed in the late-mild to early-moderate stage. In the severe stage, difficulty swallowing elevates the risk of aspiration pneumonia, which often marks the beginning of the downward spiral that ultimately ends with death; AD has no cure. A handful of pharmacologic treatments ?acetylcholinesterase inhibitors and N-methyl-D-aspartate antagonists ?alter the decline trajectory. These treatments slow disease progression, enhance cognitive function, delay cognitive decline, and decrease disruptive behaviors. Not all patients respond to these medications, but experts generally believe



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The tone of the passage could best be described as?

- A. erudite
- B. gloomy
- C. intimate
- D. didactic

Correct Answer: D

Throughout the passage, the author attempts to eliminate misconceptions and myths about Alzheimer's disease while elucidating factual details about it. The author covers the public's views of the disease as well as its progression and the difficulties faced by those impacted by the disease. The passage as a whole is very instructive.

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