

Reading: Question 1

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie's memory. She remembers the girl's thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church's steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn't tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece's plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

The main purpose of the passage is to

- A. examine Emilie’s strategies for facing unexpected changes in her life.
- B. describe Emilie’s disappointment with the path her life has taken.
- C. depict Emilie’s memories of an important day in Eva’s life.
- D. place Emilie’s current musings within the context of her past.

Choice D is the best answer. Throughout the passage, Emilie’s reflections on the past provide context for her present thoughts and feelings. For example, in the second paragraph, Emilie imagines Eva arriving and acting the way she did as a girl, and in the fourth paragraph, Emilie remembers her first impressions of Vermont and wonders whether Eva’s will be similar. The fifth paragraph asks whether Emilie expects Eva “to stand before her as the incarnation of the past.” In the eighth paragraph, Emilie, filled with anticipation, reflects on the “miraculous and fragile” communication from Lebanon, hers as a girl and then Eva’s, and senses how close Eva is that morning through her clear phone call from New York. Taken together, these details reveal that the main purpose of the passage is to place Emilie’s musings within the context of her past.

Choice A is incorrect because only the eleventh paragraph mentions Emilie using a strategy (tidying up) to deal with an unexpected change (Eva’s delayed arrival). Choice B is incorrect because only the tenth and twelfth paragraphs describe Emilie’s disappointment (about Eva’s canceled flight). Choice C is incorrect because Emilie’s memories of Eva (as described in the first, second, and eighth paragraphs) are general impressions, not memories of an important day in Eva’s life.

Question Difficulty: Medium

Reading: Question 2

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie’s memory. She remembers the girl’s thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church’s steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn’t tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece’s plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

The passage most strongly suggests that Emilie regards Eva as someone who is

- A. rebellious and unconventional.
- B. cheerful and animated.
- C. clever and judgmental.
- D. flippant and unpredictable.

Choice B is the best answer. The first paragraph mentions Emilie remembering Eva's ringing laughter, and the second paragraph describes Emilie imagining Eva will speak with "her usual liveliness." These details strongly suggest that Emilie regards Eva as a cheerful, animated person.

Choices A and D are incorrect because although the passage mentions Eva stretching out the elastic of her socks to make them droop, a behavior that could be considered rebellious and unconventional (choice A) or flippant and unpredictable (choice D), Emilie's opinion about this behavior isn't mentioned. Choice C is incorrect because the passage doesn't suggest that Emilie regards Eva as clever and judgmental.

Question Difficulty: Easy

Reading: Question 3

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie’s memory. She remembers the girl’s thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church’s steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn’t tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece’s plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

As used in [line 12](#), “casting” most nearly means

- A. spreading.
- B. molding.
- C. assigning.
- D. discarding.

Choice A is the best answer. The third paragraph begins: “The morning breaks slowly, casting its gray light on the fields swollen with snow.” This describes the morning as extending, or spreading, its light over the snowy fields. Therefore, “casting,” as used in this context, most nearly means spreading.

Choices B, C, and D are incorrect because, in this context, “casting” means spreading, not molding (choice B), assigning (choice C), or discarding (choice D).

Question Difficulty: Easy

Reading: Question 4

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie's memory. She remembers the girl's thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church's steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn't tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece's plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

Based on the passage, which statement best describes Emilie’s belief about the relationship between nature and people?

- A. The characteristics of a space can reflect the uniqueness of its inhabitants.
- B. Wide expanses of land can encourage newcomers to explore fresh opportunities.
- C. Challenging environments can cause unlike communities to work together.
- D. Unfamiliar surroundings can heighten one’s enjoyment of ordinary pleasures.

Choice A is the best answer. The fourth paragraph portrays Emilie thinking about “how different the sky is here, as if the breaths of the people living under it rise together to paint it a different blue, a different gray.” In other words, Emilie imagines that the breaths of local residents have risen to change the colors of Vermont’s sky. This description expresses Emilie’s belief about the relationship between nature and people, and how the characteristics of a space can reflect the uniqueness of its inhabitants.

Choice B is incorrect because the fourth paragraph suggests that Vermont’s wide expanses have made Emilie feel overwhelmed and helpless, not eager to explore new opportunities. Choice C is incorrect because the passage doesn’t mention unlike communities working together. Choice D is incorrect because the passage portrays Emilie as being familiar with her surroundings; it doesn’t make a connection between her lack of such familiarity and the enjoyment of ordinary pleasures.

Question Difficulty: Hard

Reading: Question 5

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie’s memory. She remembers the girl’s thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church’s steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn’t tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece’s plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

Which choice provides the best evidence for the answer to the previous question?

- A. [lines 12-13](#) (“The morning . . . snow”)
- B. [lines 15-17](#) (“From . . . Street”)
- C. [lines 19-20](#) (“Will . . . gray”)
- D. [lines 23-24](#) (“Seemed . . . earth”)

Choice C is the best answer. The previous question asks what Emilie believes about the relationship between nature and people. The answer, that she believes a space's characteristics can reflect the uniqueness of its inhabitants, is best supported in the first sentence of the fourth paragraph: "Will Eva notice how different the sky is here, as if the breaths of the people living under it rise together to paint it a different blue, a different gray?" This suggests that Emilie feels as though the unique character of the people living under the Vermont sky rises from their breaths to change the sky's colors.

Choices A, B, and D are incorrect because the cited lines don't support the answer to the previous question. Instead, they describe daybreak over Vermont's snowy landscape (choice A); features in the landscape such as a farm, a cornfield, and a road (choice B); and how small and helpless the landscape makes Emilie feel (choice D).

Question Difficulty: Medium

Reading: Question 6

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie's memory. She remembers the girl's thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church's steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn't tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece's plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

Which choice best supports the idea that the intensity of Emilie’s eagerness for a reunion with Eva at times borders on fantasy?

- A. [lines 25-26](#) (“At 7:05 . . . minute”)
- B. [lines 26-28](#) (“Is she . . . separation”)
- C. [lines 30-31](#) (“She knows . . . hallway”)
- D. [lines 34-37](#) (“When . . . fragile”)

Choice B is the best answer. The fifth paragraph asks how Emilie is imagining Eva's arrival: "Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?" This question suggests that Emilie is so eager to reunite with Eva that she imagines Eva suddenly appearing before her, magically unchanged. Thus, the intensity of Emilie's eagerness for a reunion with Eva borders on fantasy.

Choices A, C, and D are incorrect because the cited lines don't support the idea that the intensity of Emilie's eagerness for a reunion with Eva at times borders on fantasy. Instead, they describe Emilie's possibly realistic idea of when and where Eva's plane may be landing (choice A), her correct belief that the phone is ringing because Eva is calling (choice C), and her memories of past phone calls with Eva (choice D).

Question Difficulty: Medium

Reading: Question 7

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie’s memory. She remembers the girl’s thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church’s steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn’t tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece’s plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

The narrator’s use of the phrase “feast of words” ([lines 43-44](#)) mainly serves to

- A. underscore Emilie’s melodramatic longing for a particular outcome.
- B. emphasize Emilie’s good-natured domination of the conversation.
- C. restate Emilie’s eagerness to welcome Eva to Vermont.
- D. illustrate Emilie’s anticipation of an abundance of pleasure.

Choice D is the best answer. The ninth paragraph describes how “touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.” This expresses Emilie’s pleasure from conversation with Eva, but Emilie can only sample that pleasure because Eva still hasn’t arrived. Thus, the phrase “feast of words” illustrates Emilie’s anticipation of a greater abundance of pleasure after Eva arrives, when they’ll be able to more fully “feast” by talking with each other as much as they want.

Choices A and B are incorrect because the ninth paragraph indicates that Emilie feels joy, not longing, during her conversation with Eva (choice A) and is happily listening to Eva rather than dominating the conversation (choice B). Choice C is incorrect because the phrase “feast of words” refers to conversation with Eva in general, not just the brief act of welcoming her to Vermont.

Question Difficulty: Hard

Reading: Question 8

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie's memory. She remembers the girl's thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church's steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn't tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece's plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

The narrator’s reference to the gown in [lines 45-46](#) (“And then . . . sink”) mainly serves to

- A. explain the fluctuating volume of Eva’s voice on the phone.
- B. clarify the sudden change in Eva’s travel plans.
- C. signify a major shift in Emilie’s emotional state.
- D. note Emilie’s unexpected kindness toward her daughter.

Choice C is the best answer. The ninth paragraph describes Emilie’s joy at Eva’s nearness. The tenth paragraph then narrates how Emilie’s joy disappears—it “slips off her like a beautiful gown,” her shoulders sinking in sorrow as she suddenly feels that “Eva’s nearness is again huge distance.” Thus, the reference to the gown slipping off signifies a major shift in Emilie’s emotional state, from joy to sadness.

Choice A is incorrect because the passage doesn’t mention Eva’s voice fluctuating in volume. Choice B is incorrect because the reference to the gown doesn’t present new information about the change in Eva’s travel plans. Choice D is incorrect because the cited lines don’t say that Emilie displayed unexpected kindness toward her daughter.

Question Difficulty: Easy

Reading: Question 9

Questions 1-9 are based on the following passage.

This passage is adapted from Thérèse Soukar Chehade, *Loom: A Novel*. ©2010 by Syracuse University Press. Emilie, an immigrant to the United States, awaits the arrival of her niece, Eva, who lives in Lebanon.

Line Eva is coming. Her laughter rings in Emilie’s memory. She remembers the girl’s thick hair falling to her shoulders (although no longer a girl; Eva has been a woman for a long time now), a red headband keeping it away from her face. Her plaid blue and gray school uniform is mostly what she

5 remembers her in, and those droopy navy blue knee socks slipping down her legs like gravity was dragging them, when in fact it was Eva herself who had pulled and stretched to make the elastic give, to make those socks fall.

On the night table, the clock ticks. This time, the waiting is for a purpose. Soon, a line will be drawn between here and there, past and present. The

10 past will be made flesh, and Eva will emerge and ask with her usual liveliness, Khalti Emilie, have you straightened out those Americans yet?

The morning breaks slowly, casting its gray light on the fields swollen with snow. Emilie makes her way to the window, pulling her black woolen shawl about her more from habit than actual chill. Her view is obstructed by the

15 white blur the wind has whipped up. From memory, she makes out where the farm stands behind the cornfields and where the road loops around the hill then drops into a sharp descent all the way to Main Street. Only the tall trees and the church’s steeple are saved from the general drowning.

Will Eva notice how different the sky is here, as if the breaths of the

20 people living under it rise together to paint it a different blue, a different gray? When Emilie saw it the first time, she couldn’t tell exactly where the difference lay. Seemed like she was already losing her memory, slowly becoming submerged in the new skittering light. Seemed like the land stretching ahead was too big not to disappear into, and she a speck

25 tumbling down the sloping earth.

At 7:05, she looks at a point on the horizon where she thinks her niece’s plane must be landing at that precise minute. Is she expecting her to emerge from the whiteness and, taking huge leaps toward the house, to stand before her as the incarnation of the past, untouched by separation?

30 She dozes, waking every once in a while to look at the brooding sky. It is nearly eight when the ring jolts her awake. She knows it is Eva even before she picks up the phone in the hallway.

“I’m in New York and will be coming as soon as I can,” Eva says. “All planes are cancelled on account of the storm. I miss you so, Khalti!”

35 When they talked on the phone before, a scratch in the line, the background noise when Eva called, usually from a public Centrale, reminded them that their communication, Eva in Beirut and Emilie in Vermont, was miraculous and fragile. Emilie would press her ear into the phone, as if doing so made her closer to her niece. She would remember the white walls in the
40 Centrale, the small ceiling fans stirring up an ineffectual breeze, and the people listless with the heat, shuffling through to the next available phone. This morning, Eva’s voice rings clear. Stark, somehow, without the usual undercurrent of noise.

Yet she is near. But for the blizzard she would be here. And at this, touched by joy, Emilie gives herself to it, laughs and chatters, samples at the feast of words before her.

And then it is gone. Slips off her like a beautiful gown, and at once Emilie’s shoulders sink. What, a moment ago, was Eva’s nearness is again huge distance. Emilie lifts her head and sees her daughter leaning against the wall waiting her turn to talk, and hands her the receiver.

Back in her room, Emilie tidies up to pass the time. She smooths a ripple in the bedspread, a blue mercerized cotton coverlet with a diamond pattern in the middle she had brought with her from Lebanon, pushes a chair against the window and sits. Folding her hands in her lap, she waits for the house to wake.

A world hopeful under its thick blanket of snow. A world cleaned to the bone, at the ready. More waiting. At her age, this is no less than hateful.

The passage indicates that Emilie considers waiting to be a

- A. necessary test of character.
- B. welcome form of distraction.
- C. useful and self-imposed discipline.
- D. familiar and heavy burden.

Choice D is the best answer. Through the first six paragraphs, Emilie is described as impatiently waiting for Eva to arrive. The phone call from Eva briefly distracts Emilie from her frustration at waiting. In the tenth paragraph, Emilie again feels the burden of waiting. The last paragraph concludes, "More waiting. At her age, this is no less than hateful." In other words, for Emilie, waiting is a familiar and heavy burden.

Choices A and C are incorrect. The passage indicates that Emilie is waiting because of Eva's flight cancellation, not because she considers it to be a test of character (choice A) or that it is self-imposed (choice C). Choice B is incorrect because Emilie is repeatedly described using memories and fantasy to distract herself from the discomfort of waiting.

Question Difficulty: Medium

Reading: Question 10

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

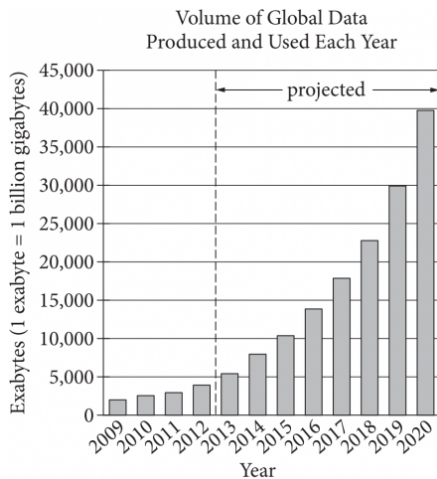
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a "God's eye view" of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook's \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of "shoot-out acquisitions" that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, "Dealing with Information Growth and Dark Data—Six Practical Steps." ©2017 by Oyster IMS.

Throughout the passage, the repeated references to the five technology companies as "giants" serve mainly to

- A. reinforce the scale of the companies' influence.
- B. emphasize the magnitude of the companies' past mistakes.
- C. establish the degree of hostility the companies have for one another.
- D. offer a reason why one company cannot take full control of the market.

Choice A is the best answer. The first paragraph introduces the five technology companies by mentioning concerns about the wealth and power of “the giants that deal in data, the oil of the digital era.” The second paragraph states that these companies’ “dominance has prompted calls for the tech giants to be broken up.” The fifth paragraph explains how “technology giants have always benefited from network effects” resulting from their size. And the sixth paragraph says that “the giants’ surveillance systems span the entire economy.” Thus, when the passage refers to the companies as “giants,” it does so to reinforce the scale of the companies’ influence.

Choices B and C are incorrect because the passage doesn’t discuss mistakes by (choice B) or hostility among (choice C) the companies. Choice D is incorrect because the passage refers to the companies as “giants” only when emphasizing their collective power and dominance over the rest of society. It doesn’t state that one company can’t take full control over the market.

Question Difficulty: Easy

Reading: Question 11

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

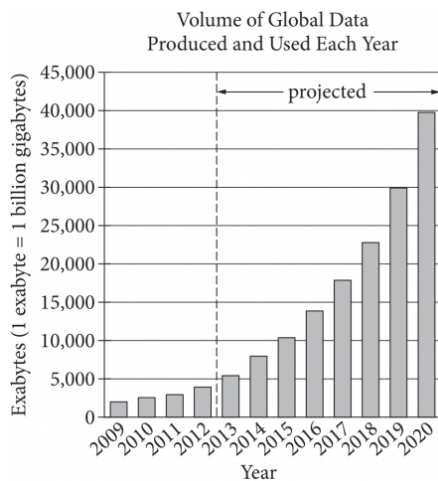
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

The passage states that the concern over the portion of the market held by large technology firms is partially alleviated by the

- A. presence of offline competitors.
- B. predictability of the market.
- C. cost of their services.
- D. diligence of antitrust regulators.

Choice A is the best answer. The second paragraph states that the five firms' "market shares look less worrying" when offline rivals are taken into account. In other words, the presence of offline competitors partially alleviates the concern over the portion of the market held by large technology firms.

Choice B is incorrect because the sixth paragraph explains why the five firms' ability to predict the market using their surveillance systems raises concern about their market dominance. Choice C is incorrect because while the free services may make the firms' market dominance less of a concern for some people, this is more than offset by consumers having to hand over their personal data in exchange for these "free" services. Choice D is incorrect because the passage doesn't address the diligence of antitrust regulators.

Question Difficulty: Hard

Reading: Question 12

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

 Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

 But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

 What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

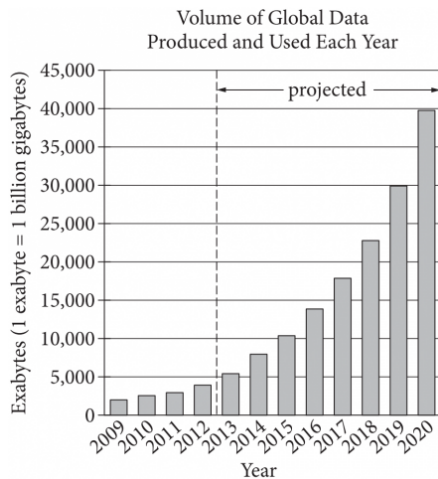
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

 This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

In comparing oil and data, which argument does the passage make?

- A.
The rate at which oil became a popular commodity is not the same as the rate at which data has become a popular commodity.
- B.
The enforcement of regulations on oil companies was difficult, so the enforcement of regulations on large technology companies will be even more difficult.
- C.
A policy that redistributed ownership of oil should be examined as a possible solution to the current limited ownership of data.
- D.
A precedent that addressed a problem for oil does not completely solve a very similar problem for data.

Choice D is the best answer. The second paragraph says the five companies' dominance has prompted calls for them "to be broken up, as Standard Oil was in the early 20th century." But the third paragraph questions this strategy, asserting that "old ways of thinking about competition, devised in the era of oil, look outdated in what has come to be called the 'data economy.' A new approach is needed." The fourth through sixth paragraphs support this position by explaining how the firms' control of data raises unprecedented problems. Thus, the passage argues that although the precedent of breaking up dominant firms addressed a problem for oil, it doesn't completely solve a very similar problem for data.

Choices A and B are incorrect because the passage neither compares the rates at which oil and data became popular commodities (choice A) nor mentions any difficulty in enforcing regulations on oil companies (choice B). Choice C is incorrect because the second paragraph discusses a policy of breaking up oil companies, which might not have involved redistributing ownership of oil. Additionally, the third paragraph claims this policy would be inadequate for addressing concerns about the firms' control of data.

Question Difficulty: Medium

Reading: Question 13

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

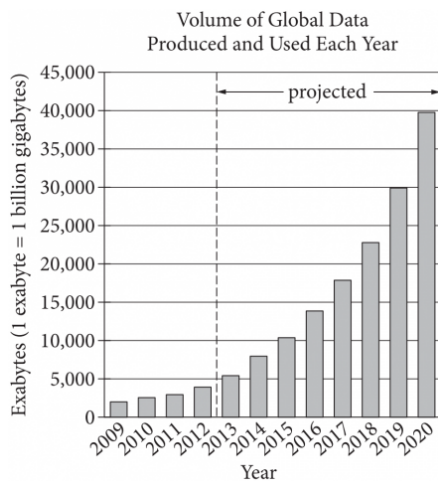
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

Which choice provides the best evidence for the answer to the previous question?

- A. [error] (“A new . . . flow”)
- B. [error] (“Now . . . unstoppable”)
- C. [lines 9-10](#) (“Such . . . century”)
- D. [lines 19-20](#) (“Old . . . economy”)

Choice D is the best answer. The previous question asks which argument the passage makes in comparing oil and data. The answer, that a precedent that addressed a problem for oil doesn't completely solve a very similar problem for data, is best supported in the third sentence of the third paragraph: “Old ways of thinking about competition, devised in the era of oil, look outdated in what has come to be called the ‘data economy.’” In context, this means that addressing the problem of oil companies' excessive power by breaking them up is among the “old ways of thinking about competition” and is relying on a precedent too “outdated” to fully solve the similar problem of data companies' excessive power.

Choices A, B, and C are incorrect because the cited lines don't support the answer to the previous question. Instead, they introduce the general idea of efforts to regulate a lucrative new industry (choice A), clarify that the data industry is now raising concerns as the oil industry once did (choice B), and explain that there are now calls to break up tech companies just as oil companies were once broken up (choice C).

Question Difficulty: Medium

Reading: Question 14

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

 Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

 But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

 What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

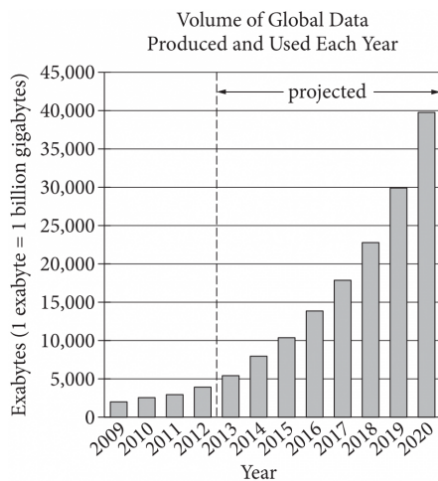
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

 This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

In the passage, the discussion of Tesla serves which main purpose?

- A.
It offers an example of a company that is likely to overtake the market share currently held by its competitors.
- B. It suggests the company's growth is linked to its consumers' degree of risk taking.
- C.
It demonstrates the relationship between a company's collection of data on consumer behavior and its technological advancements.
- D.
It argues that the company's innovative product is more popular than its competitors' standard products.

Choice C is the best answer. The fifth paragraph discusses how collecting more data helps companies improve their products through technological advancements. It presents Tesla as an example of a company that has done this successfully by gathering data from its self-driving cars to make them better at driving themselves. Thus, the discussion of Tesla mainly serves to demonstrate the relationship between a company's collection of data on consumer behavior and that company's technological advancements.

Choices A and D are incorrect because the fifth paragraph indicates that Tesla's car sales have been a tiny fraction of the number sold by GM, one of its rivals. This implies that Tesla is unlikely to overtake its competitors' market share (choice A) and that its innovative cars are less popular than GM's standard cars (choice D). Choice B is incorrect because the passage doesn't mention Tesla's customers taking risks.

Question Difficulty: Medium

Reading: Question 15

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

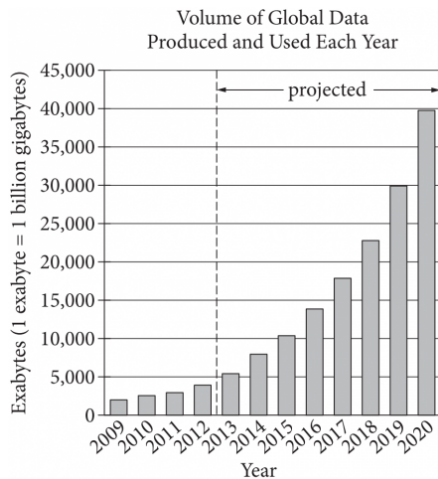
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

In [line 50](#), “stifle” most nearly means

- A. conceal.
- B. isolate.
- C. withhold.
- D. impede.

Choice D is the best answer. The passage's last sentence states that "by providing barriers to entry and early-warning systems, data can stifle competition." In other words, data can obstruct, or impede, competition by preventing new companies from entering the market and by giving giant tech firms advance warning of challenges from potential rivals. Therefore, "stifle," as used in this context, most nearly means impede.

Choices A, B, and C are incorrect because, in this context, "stifle" means impede, not conceal (choice A), isolate (choice B), or withhold (choice C).

Question Difficulty: Medium

Reading: Question 16

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

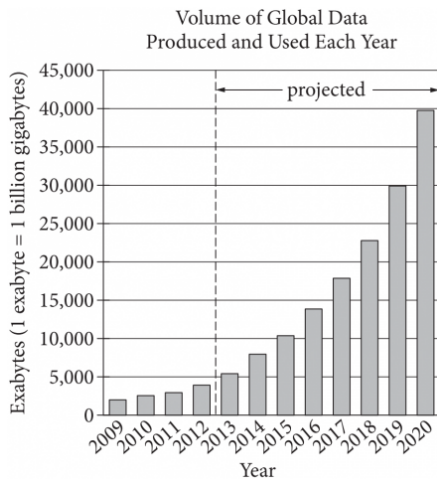
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

According to the graph, the volume of global data projected for 2016 is between

- A. 10,000 and 15,000 exabytes.
- B. 15,000 and 20,000 exabytes.
- C. 20,000 and 25,000 exabytes.
- D. 25,000 and 30,000 exabytes.

Choice A is the best answer. The graph displays the annual volumes in exabytes of global data produced and used from 2009 to 2012 and those projected from 2013 to 2020. The bar for the year 2016 shows about 14,000 exabytes of global data projected to be produced and used. Thus, the volume of global data projected for 2016 is between 10,000 and 15,000 exabytes.

Choices B, C, and D are incorrect because according to the graph, only about 14,000 exabytes of global data are projected for 2016. The graph shows that between 15,000 and 20,000 exabytes of global data are projected for 2017 (choice B), between 20,000 and 25,000 exabytes are projected for 2018 (choice C), and between 25,000 and 30,000 exabytes are projected for 2019 (choice D).

Question Difficulty: Easy

Reading: Question 17

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

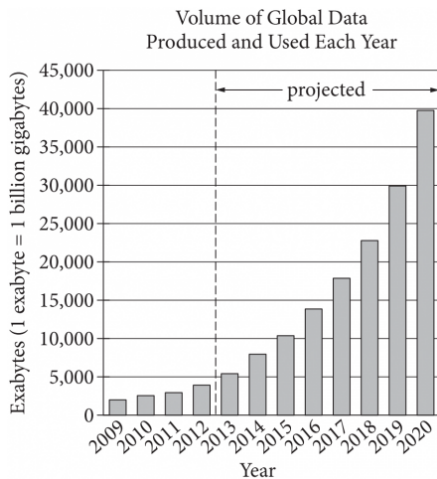
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

The information in the graph best supports which conclusion about the volume of global data between 2009 and 2012?

- A.
The volume of data produced and used in this period was less than technology companies had projected.
- B.
The volume of data produced and used in this period increased more slowly than it is projected to increase in later years.
- C.
During this period, the largest technology companies were struggling to attract users to their products.
- D.
During this period, the largest technology companies were unable to generate enough data to improve their products.

Choice B is the best answer. The graph displays the annual volumes of global data produced and used (in exabytes) between 2009 and 2012 and those projected between 2013 and 2020. The four bars for the years 2009 through 2012 show that the annual volume of global data approximately doubled from about 2,000 exabytes in 2009 to about 4,000 in 2012. For each of the next two four-year periods, however, the projected annual volumes of global data more than doubled: from about 5,500 exabytes in 2013 to about 14,000 in 2016 and then from about 18,000 exabytes in 2017 to just under 40,000 in 2020. Thus, the graph shows that the volume of global data produced and used between 2009 and 2012 increased more slowly than it is projected to increase in the two later four-year periods shown.

Choice A is incorrect because the graph doesn't show tech companies' projections of the volume of global data that would be produced and used between 2009 and 2012. Choices C and D are incorrect because the graph indicates only that the volume of global data produced and used between 2009 and 2012 was less than the volume projected for later periods. The reasons for and effects of the lower numbers can't be determined from the information provided in the graph. Thus, it's impossible to know whether the companies were struggling to attract users to their products (choice C) or were unable to generate enough data to improve their products (choice D).

Question Difficulty: Easy

Reading: Question 18

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

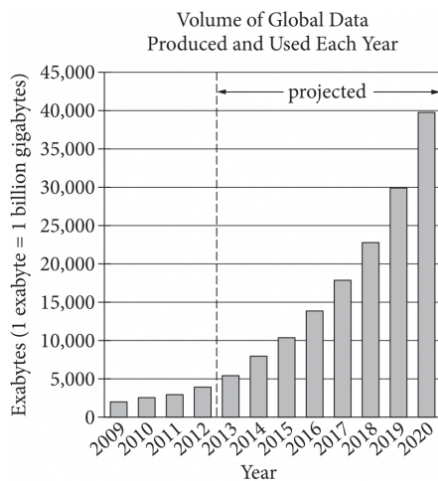
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a "God's eye view" of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook's \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of "shoot-out acquisitions" that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, "Dealing with Information Growth and Dark Data—Six Practical Steps." ©2017 by Oyster IMS.

Based on information in the passage, the projected increase in the volume of global data from 2013 to 2020 shown in the graph can be attributed in part to the

- A. strengthening of restrictions imposed by antitrust regulators.
- B. growing daily use of digital devices by consumers.
- C. increasing competition from technology start-ups.
- D. rising prices consumers pay to access technology services.

Choice B is the best answer. The graph shows the annual volume of global data projected to increase from about 5,500 exabytes in 2013 to about 40,000 in 2020. The fourth paragraph explains how consumers' growing daily use of digital devices is increasing data production and use. The paragraph states that "smartphones and the internet have made data abundant, ubiquitous and far more valuable"; that because of these devices, "virtually every activity creates a digital trace—more raw material for the data distilleries"; and that as more devices connect to the internet, the volume of data generated is increasing. Thus, the paragraph suggests that the projected increase in the volume of global data the graph shows from 2013 to 2020 can be attributed at least in part to consumers' growing daily use of digital devices.

Choice A is incorrect because the second paragraph indicates that there have only been calls for strengthened antitrust regulations for tech firms, not that these regulations have been strengthened effectively. Choice C is incorrect because the sixth paragraph indicates that, overall, competition from tech startups is being stifled. Choice D is incorrect because the second paragraph states that consumers receive many tech services that are free. Furthermore, the passage doesn't suggest that increases in the strength of antitrust regulations (choice A), in competition from tech startups (choice C), or in prices for tech services (choice D) would increase the volume of global data.

Question Difficulty: Easy

Reading: Question 19

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from the editors of *The Economist*, “The World’s Most Valuable Resource Is No Longer Oil, but Data.” ©2017 by The Economist Newspaper Limited.

Line A new commodity spawns a lucrative, fast-growing industry, prompting antitrust regulators to step in to restrain those who control its flow. A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era. These titans—

5 Alphabet (Google’s parent company), Amazon, Apple, Facebook and Microsoft—look unstoppable. They are the five most valuable listed firms in the world. Their profits are surging: they collectively racked up over \$25 billion in net profit in the first quarter of 2017.

Such dominance has prompted calls for the tech giants to be broken up,

10 as Standard Oil was in the early 20th century. Size alone is not a crime. The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed. Nor do these firms raise the alarm when standard antitrust tests are applied. Far from gouging consumers, many of their services are free (users pay, in effect,

15 by handing over yet more data). Take account of offline rivals, and their market shares look less worrying. And the emergence of upstarts like Snapchat suggests that new entrants can still make waves.

But there is cause for concern. Internet companies’ control of data gives them enormous power. Old ways of thinking about competition, devised in

20 the era of oil, look outdated in what has come to be called the “data economy.” A new approach is needed.

What has changed? Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a

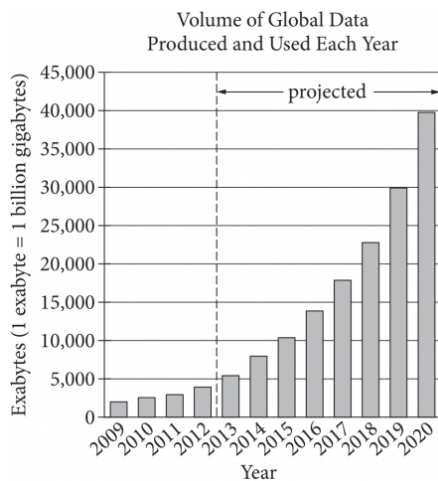
25 digital trace—more raw material for the data distilleries. As devices from watches to cars connect to the internet, the volume is increasing: some estimate that a self-driving car will generate 100 gigabytes per second.

This abundance of data changes the nature of competition. Technology giants have always benefited from network effects: the more users Facebook

30 signs up, the more attractive signing up becomes for others. With data there

are extra network effects. By collecting more data, a firm has more scope to improve its products, which attracts more users, generating even more data, and so on. The more data Tesla gathers from its self-driving cars, the better it can make them at driving themselves—part of the reason the firm, which sold
 35 only 25,000 cars in the first quarter, is now worth more than GM, which sold 2.3 million. Vast pools of data can thus act as protective moats.

Access to data also protects companies from rivals in another way. The case for being sanguine about competition in the tech industry rests on the potential for incumbents to be blindsided by a startup in a garage or an
 40 unexpected technological shift. But both are less likely in the data age. The giants' surveillance systems span the entire economy: Google can see what people search for, Facebook what they share, Amazon what they buy. They own app stores and operating systems, and rent out computing power to startups. They have a “God’s eye view” of activities in their own markets and beyond. They can see when a new product or service gains traction, allowing them to copy it or simply buy the upstart before it becomes too great a threat. Many think Facebook’s \$22 billion purchase in 2014 of WhatsApp, a messaging app with fewer than 60 employees, falls into this category of “shoot-out acquisitions” that eliminate potential rivals. By providing barriers to entry and early-warning systems, data can stifle competition.



Adapted from Oyster IMS, “Dealing with Information Growth and Dark Data—Six Practical Steps.” ©2017 by Oyster IMS.

Which choice provides the best evidence for the answer to the previous question?

- A. [lines 13-15](#) (“Far . . . data”)
- B. [lines 15-17](#) (“Take . . . waves”)
- C. [lines 22-25](#) (“Smartphones . . . distilleries”)
- D. [line 28](#) (“This . . . competition”)

Choice C is the best answer. The previous question asks what the projected increase in the volume of global data the graph shows from 2013 to 2020 can be partly attributed to, based on the passage. The answer, that this projected increase can be attributed in part to growing daily use of digital devices by consumers, is best supported in the second and third sentences of the fourth paragraph: “Smartphones and the internet have made data abundant, ubiquitous and far more valuable. Whether you are going for a run, watching TV or even just sitting in traffic, virtually every activity creates a digital trace—more raw material for the data distilleries.”

Choices A, B, and D are incorrect because the cited lines don’t support the answer to the previous question. Instead, they state that many tech services are provided free to consumers in exchange for data (choice A), that the five giant tech firms face competition from offline rivals and some tech startups (choice B), and that abundant data affect the way tech firms compete (choice D). None of these statements suggests that consumers’ daily use of digital devices is growing and thereby increasing the volume of global data.

Question Difficulty: Medium

Reading: Question 20

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly, yes.

In a study published in *The European Journal of Physics*, scientists dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned this task as a project for some of her students after learning how water droplets bounced off super-water-repelling surfaces in a 2014 study by Julia Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing. At higher speeds, the drop will flatten like a pancake then retract into a cigarlike shape before leaving the surface. But when microscopic spikes or some other structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the surface. It flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made possible when the water, held together by surface tension, interacted with those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an additional water-repellent coating. The idea can be seen in nature: When water hits a hairy lotus leaf, it beads up and rolls off. It’s called a superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

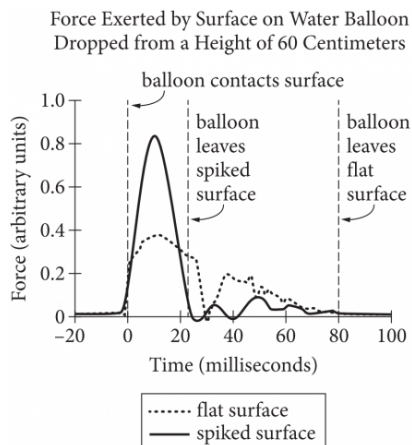
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

Which choice best describes the overall structure of the passage?

- A.
A summary of a recent research study is followed by an explanation of practical applications of that study's findings.
- B.
A hypothesis is presented and then supported with summaries of several research studies independently confirming that hypothesis.
- C.
Descriptions of two activities are followed by an argument in favor of further research on the concept demonstrated in the activities.
- D.
Explanations of a phenomenon and a method for demonstrating that phenomenon are followed by instructions for conducting that demonstration.

Choice D is the best answer. The third through sixth paragraphs of the passage introduce and explain the phenomenon of "pancake bouncing," in which water droplets bounce off certain surfaces in a distinctive way. The seventh through ninth paragraphs explain how bouncing water balloons off beds of nails, as described in the first two paragraphs, is a method for demonstrating the pancake bouncing phenomenon. Finally, the tenth through thirteenth paragraphs present instructions for conducting such a demonstration.

Choice A is incorrect because the passage doesn't explain practical applications of either Hecksher's water-balloon study or Yeomans's earlier study of water droplets. Choice B is incorrect because the passage describes pancake bouncing as a phenomenon discovered in Yeomans's study and then demonstrated on a larger scale in Hecksher's study, not as a hypothesis confirmed by either study. Choice C is incorrect because the passage concludes with instructions for demonstrating pancake bouncing, not with an argument in favor of further research into the concept of pancake bouncing.

Question Difficulty: Easy

Reading: Question 21

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly, yes.

In a study published in *The European Journal of Physics*, scientists dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned this task as a project for some of her students after learning how water droplets bounced off super-water-repelling surfaces in a 2014 study by Julia Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing. At higher speeds, the drop will flatten like a pancake then retract into a cigarlike shape before leaving the surface. But when microscopic spikes or some other structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the surface. It flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made possible when the water, held together by surface tension, interacted with those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an additional water-repellent coating. The idea can be seen in nature: When water hits a hairy lotus leaf, it beads up and rolls off. It’s called a superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

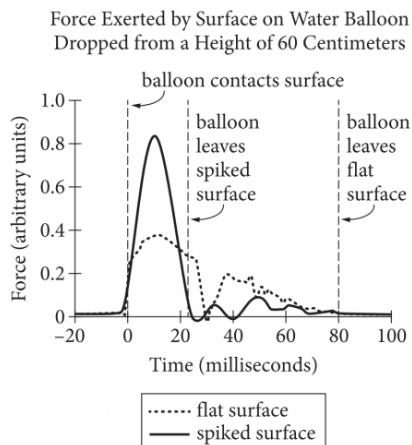
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

The question in [line 1](#) ("Is it . . . nails") primarily serves to

- A. raise doubts about the findings of an experiment.
- B. generate interest in the main topic discussed in the passage.
- C. propose a different way of thinking about a long-held theory.
- D. describe a paradox that continues to confound physicists.

Choice B is the best answer. The first paragraph asks, “Is it possible to bounce a water balloon off a bed of nails?” and then answers, “Surprisingly, yes.” By raising this question and then immediately giving an unexpected answer, the author is trying to provoke the reader’s curiosity about how the water-balloon trick could be possible. The passage continues to explain how a water balloon bouncing off a bed of nails is related to the broader phenomenon of pancake bouncing. Thus, the question in the first paragraph serves to generate interest in the main topic of the passage.

Choice A is incorrect because the author states that it’s possible to bounce a water balloon off a bed of nails, just as Hecksher’s experiment found. Choice C is incorrect because the selected text doesn’t suggest that the water-balloon observations lead to thinking differently about a long-held theory. Choice D is incorrect because the fourth through ninth paragraphs suggest that physicists clearly understand the phenomenon of pancake bouncing demonstrated by the water-balloon observations.

Question Difficulty: Easy

Reading: Question 22

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly, yes.

In a study published in *The European Journal of Physics*, scientists dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned this task as a project for some of her students after learning how water droplets bounced off super-water-repelling surfaces in a 2014 study by Julia Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing. At higher speeds, the drop will flatten like a pancake then retract into a cigarlike shape before leaving the surface. But when microscopic spikes or some other structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the surface. It flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made possible when the water, held together by surface tension, interacted with those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an additional water-repellent coating. The idea can be seen in nature: When water hits a hairy lotus leaf, it beads up and rolls off. It’s called a superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

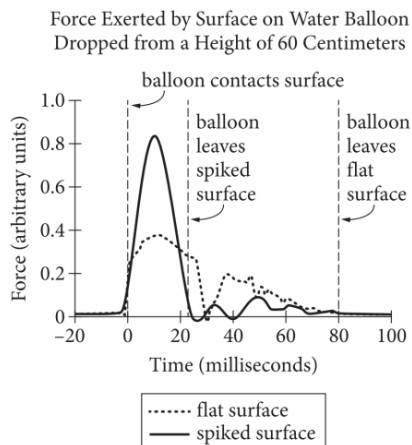
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,
"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

As used in [line 9](#), "hitting" most nearly means

- A. discovering by chance.
- B. having a negative effect on.
- C. coming into contact with.
- D. launching an attack on.

Choice C is the best answer. The fourth paragraph states: “Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing.” This sentence describes a drop of water colliding, or coming into contact, with a surface. Therefore, “hitting,” as used in this context, most nearly means coming into contact with.

Choices A, B, and D are incorrect because, in this context, “hitting” means coming into contact with, not discovering by chance (choice A), having a negative effect on (choice B), or launching an attack on (choice D).

Question Difficulty: Easy

Reading: Question 23

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly, yes.

In a study published in *The European Journal of Physics*, scientists dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned this task as a project for some of her students after learning how water droplets bounced off super-water-repelling surfaces in a 2014 study by Julia Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing. At higher speeds, the drop will flatten like a pancake then retract into a cigarlike shape before leaving the surface. But when microscopic spikes or some other structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the surface. It flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made possible when the water, held together by surface tension, interacted with those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an additional water-repellent coating. The idea can be seen in nature: When water hits a hairy lotus leaf, it beads up and rolls off. It’s called a superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

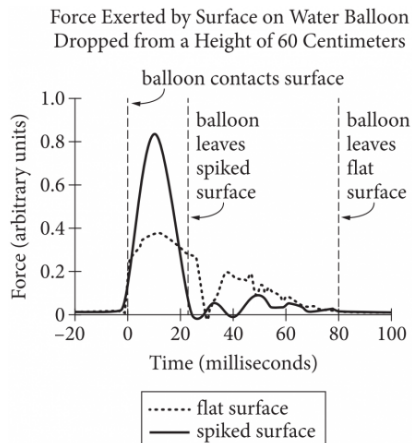
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

The passage most strongly implies that one reason water droplets bounced off certain spiked surfaces in the particular shape Yeomans observed is that the droplets

- A. didn't spend enough time on the surface to change from that shape before leaving the surface.
- B. were essentially punctured by the spikes and never returned to their original shape.
- C. had assumed that shape before they reached the spiked surface.
- D. hadn't yet undergone maximal deformation when they left the surface.

Choice A is the best answer. The fourth paragraph describes Yeomans and her colleagues' observations of water droplets. In their study, "microscopic spikes or some other structure" on certain surfaces made water droplets hitting them undergo "maximal deformation" and then quickly leave the surface. The paragraph explains that a water droplet hitting such a spiked surface "flattens like a pancake when it lands, then bounces and doesn't have time to retract until it's up in the air." In other words, the droplets Yeomans observed bouncing off certain spiked surfaces didn't spend enough time on those surfaces to change from their flattened shapes before leaving the surfaces.

Choice B is incorrect because the sixth paragraph states that some water from the droplets was only briefly forced between the microscopic spikes before being ejected, not that the spikes punctured the droplets. Choices C and D are incorrect because the fourth paragraph states that the droplets underwent maximal deformation into a flattened shape upon landing on the surfaces (choice D), but not beforehand (choice C).

Question Difficulty: Easy

Reading: Question 24

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly, yes.

In a study published in *The European Journal of Physics*, scientists dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned this task as a project for some of her students after learning how water droplets bounced off super-water-repelling surfaces in a 2014 study by Julia Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing. At higher speeds, the drop will flatten like a pancake then retract into a cigarlike shape before leaving the surface. But when microscopic spikes or some other structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the surface. It flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made possible when the water, held together by surface tension, interacted with those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an additional water-repellent coating. The idea can be seen in nature: When water hits a hairy lotus leaf, it beads up and rolls off. It’s called a superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

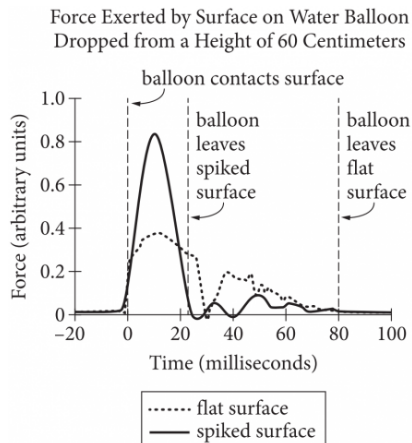
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

Which choice provides the best evidence for the answer to the previous question?

- A. [lines 5-8](#) (“Tina . . . colleagues”)
- B. [lines 14-16](#) (“It flattens . . . the air”)
- C. [lines 23-25](#) (“During . . . coating”)
- D. [lines 28-29](#) (“When . . . droplet”)

Choice B is the best answer. The previous question asks about an implied reason for Yeomans’s observations of water droplets bouncing off certain spiked surfaces in a particular shape. The answer, that the passage implies that the droplets didn’t spend enough time on the surfaces to change their shape before leaving the surfaces, is best supported in the fourth sentence of the fourth paragraph, which states that a water drop “flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.” This sentence describes how a droplet acted when bouncing off certain spiked surfaces in the study by Yeomans and her colleagues.

Choices A, C, and D are incorrect because the cited lines don’t support the answer to the previous question. Instead, they explain how Yeomans’s study inspired Hecksher’s study (choice A), state that water in droplets hitting certain spiked surfaces is ejected quickly from between the spikes (choice C), and report that the water balloons in Hecksher’s study changed shape the same way the water droplets in Yeomans’s study did (choice D).

Question Difficulty: Easy

Reading: Question 25

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly, yes.

In a study published in *The European Journal of Physics*, scientists dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned this task as a project for some of her students after learning how water droplets bounced off super-water-repelling surfaces in a 2014 study by Julia Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing. At higher speeds, the drop will flatten like a pancake then retract into a cigarlike shape before leaving the surface. But when microscopic spikes or some other structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the surface. It flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made possible when the water, held together by surface tension, interacted with those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an additional water-repellent coating. The idea can be seen in nature: When water hits a hairy lotus leaf, it beads up and rolls off. It’s called a superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

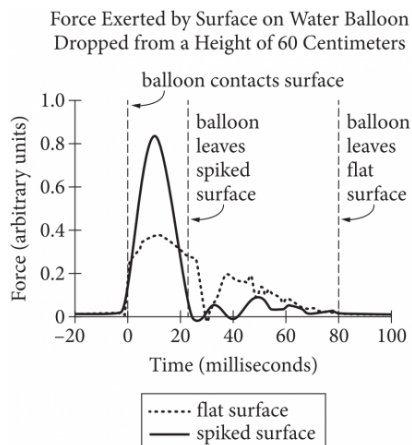
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

In the passage, the author's use of the phrase "beads up and rolls off" (line 26) mainly serves to

- A. explain the mechanism that attracts water droplets to superhydrophobic surfaces.
- B. illustrate how water droplets assume a rounded shape on certain kinds of surfaces.
- C. indicate why water droplets roll rather than bounce when they land on a hairy lotus leaf.
- D. describe how water droplets are repelled by superhydrophobic surfaces.

Choice D is the best answer. The sixth paragraph gives an example of how water interacts with a surface covered with microscopic spikes: “When water hits a hairy lotus leaf, it beads up and rolls off” and explains that the hairy lotus leaf is a superhydrophobic surface. With this example, the author implies that water droplets interact similarly with other superhydrophobic surfaces. Thus, the phrase “beads up and rolls off” describes how water droplets are repelled by superhydrophobic surfaces.

Choice A is incorrect because the sixth paragraph indicates that superhydrophobic surfaces have a water-repellent coating; therefore, they repel rather than attract water droplets. Choice B is incorrect because the phrase “beads up” doesn’t illustrate how water droplets assume a rounded shape on certain surfaces, and the phrase “rolls off” describes a motion, not a change of shape. Choice C is incorrect because the phrase “beads up and rolls off” indicates that water droplets roll rather than bounce off hairy lotus leaves and doesn’t explain why.

Question Difficulty: Medium

Reading: Question 26

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly, yes.

In a study published in *The European Journal of Physics*, scientists dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned this task as a project for some of her students after learning how water droplets bounced off super-water-repelling surfaces in a 2014 study by Julia Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will deform slightly and return to its original shape before bouncing. At higher speeds, the drop will flatten like a pancake then retract into a cigarlike shape before leaving the surface. But when microscopic spikes or some other structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the surface. It flattens like a pancake when it lands, then bounces and doesn’t have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made possible when the water, held together by surface tension, interacted with those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an additional water-repellent coating. The idea can be seen in nature: When water hits a hairy lotus leaf, it beads up and rolls off. It’s called a superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

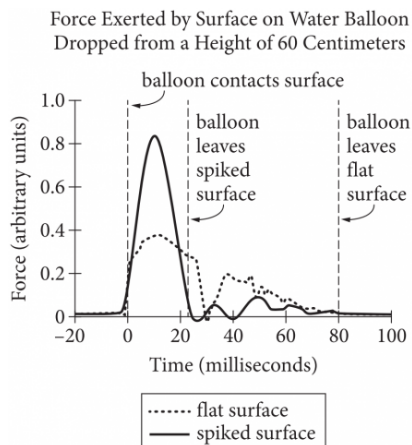
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

Which scenario involves a technique most similar to that used by Hecksher and her students?

- A. Using a microscope to observe the growth of a bacterial colony in a petri dish
- B. Throwing water balloons to find out who can throw a balloon the greatest distance
- C. Tossing balls into a pool of water to create overlapping ripples to simulate how waves of light interfere with one another
- D. Using a computer simulation to study the arcing paths that a football might travel under various conditions

Choice C is the best answer. The ninth paragraph explains that Hecksher and her students used a “scaling tactic”—observing and measuring interactions between large objects to understand similar microscopic phenomena that can’t easily be observed or measured directly. This tactic involved bouncing water balloons off beds of nails to understand the similar behavior of tiny water droplets bouncing off surfaces coated with microscopic spikes. A similar scaling tactic would be to toss balls into a pool of water to create overlapping ripples, simulating how waves of light interfere with each other. Interference among overlapping ripples in water is much easier to observe than interference among microscopic ripples in waves of light, just as the changing shapes of water balloons bouncing off beds of nails are much easier to observe than the changing shapes of water droplets bouncing off superhydrophobic surfaces.

Choices A and B are incorrect because neither directly observing microscopic phenomena (choice A) nor determining who can throw a water balloon the farthest (choice B) is a scaling technique that leads to understanding microscopic phenomena. Choice D is incorrect because a computer simulation of football arcing paths isn’t a direct observation of interactions among large objects and thus can’t be used as a scaling technique for understanding interactions among microscopic phenomena.

Question Difficulty: Medium

Reading: Question 27

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly,
yes.

In a study published in *The European Journal of Physics*, scientists
dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned
this task as a project for some of her students after learning how water
droplets bounced off super-water-repelling surfaces in a 2014 study by Julia
Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will
deform slightly and return to its original shape before bouncing. At higher
speeds, the drop will flatten like a pancake then retract into a cigarlike shape
before leaving the surface. But when microscopic spikes or some other
structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the
surface. It flattens like a pancake when it lands, then bounces and doesn’t
have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come
down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat
and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made
possible when the water, held together by surface tension, interacted with
those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an
additional water-repellent coating. The idea can be seen in nature: When
water hits a hairy lotus leaf, it beads up and rolls off. It’s called a
superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

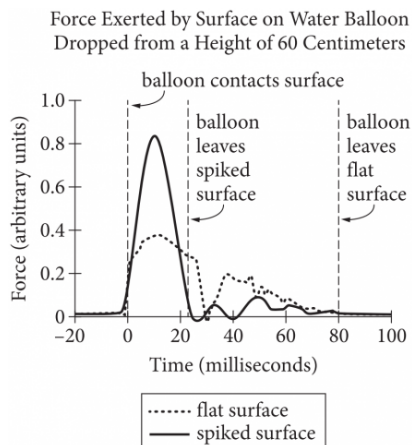
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

Assume that one of the balloons dropped in the students' project returned to its original shape before bouncing. Based on the information in the passage, from which of the following heights would the balloon most likely have been dropped?

- A. 20 centimeters (0.2 meter)
- B. 60 centimeters (0.6 meter)
- C. 100 centimeters (1.0 meter)
- D. 150 centimeters (1.5 meters)

Choice A is the best answer. The fourth paragraph describes how water droplets hitting water-repellent surfaces change shape differently depending on the speed of the collision. A droplet hitting such a surface “at low speed will deform slightly and return to its original shape before bouncing,” whereas during collisions at higher speeds, a droplet will flatten like a pancake. The sixth through eighth paragraphs explain that the water balloons that were dropped onto beds of nails changed shape in the same way water droplets hitting superhydrophobic surfaces do. Finally, the twelfth paragraph says that Hecksher and her students dropped the water balloons onto the beds of nails from heights of 20 centimeters to 150 centimeters—the greatest height from which the balloons would bounce without breaking. Taken together, this information suggests that a water balloon, like a water droplet, would most likely return to its original shape before bouncing if it hit the bed of nails at a low speed. The lower the height from which a balloon was dropped, the lower its speed would be when it hit the bed of nails. Therefore, a water balloon dropped by the students would most likely return to its original shape before bouncing if it had been dropped from the lowest height the students tried—20 centimeters.

Choices B, C, and D are incorrect because the passage suggests that a water balloon that returned to its original shape before bouncing would have most likely been dropped from the lowest height tried. The twelfth paragraph says this height was 20 centimeters, not 60 (choice B), 100 (choice C), or 150 (choice D).

Question Difficulty: Medium

Reading: Question 28

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly,
yes.

In a study published in *The European Journal of Physics*, scientists
dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned
this task as a project for some of her students after learning how water
droplets bounced off super-water-repelling surfaces in a 2014 study by Julia
Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will
deform slightly and return to its original shape before bouncing. At higher
speeds, the drop will flatten like a pancake then retract into a cigarlike shape
before leaving the surface. But when microscopic spikes or some other
structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the
surface. It flattens like a pancake when it lands, then bounces and doesn’t
have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come
down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat
and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made
possible when the water, held together by surface tension, interacted with
those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an
additional water-repellent coating. The idea can be seen in nature: When
water hits a hairy lotus leaf, it beads up and rolls off. It’s called a
superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

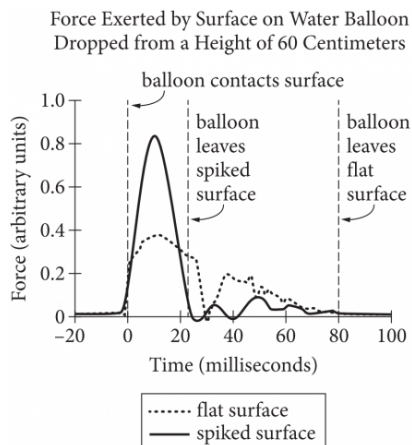
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

When taken in conjunction with [lines 45-48](#) ("Next . . . broke"), which choice provides the best evidence for the answer to the previous question?

- A. [lines 9-10](#) (“Normally . . . bouncing”)
- B. [lines 10-12](#) (“At higher . . . surface”)
- C. [lines 17-19](#) (“It’s . . . retracting”)
- D. [lines 27-28](#) (“To make . . . droplet”)

Choice A is the best answer. The previous question asks from which height a water balloon that returned to its original shape before bouncing would have most likely been dropped. The answer, that it would most likely have been dropped from a height of 20 centimeters, is best supported in the first sentence of the fourth paragraph, which describes the behavior of dropped water, when that sentence is taken in conjunction with the twelfth paragraph, which describes how the experiment was conducted: “The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.” A water balloon dropped from the lowest height the students tried (20 centimeters) would have collided with the surface at the lowest speed observed, and thus would have been more likely than a water balloon dropped from any greater height to behave like a drop of water colliding with a superhydrophobic surface at low speed.

Choices B, C, and D are incorrect because the cited lines don’t support the answer to the previous question. Instead, they state that water droplets colliding with a flat, repellent surface at higher speeds flatten and then retract into a cigarlike shape before leaving the surface (choice B), quote Hecksher’s explanation of why a pancake bounce is counterintuitive (choice C), and explain why Hecksher and her students studied water balloons rather than water droplets (choice D).

Question Difficulty: Medium

Reading: Question 29

Questions 20-29 are based on the following passage and supplementary material.

This passage is adapted from Joanna Klein, “When Water Balloons Hit a Bed of Nails and Don’t Pop.” ©2016 by The New York Times Company.

Line Is it possible to bounce a water balloon off a bed of nails? Surprisingly,
yes.

In a study published in *The European Journal of Physics*, scientists
dropped water balloons on a grid of 256 nails and filmed them bouncing off
5 in slow motion.

Tina Hecksher, a physicist at Roskilde University in Denmark, assigned
this task as a project for some of her students after learning how water
droplets bounced off super-water-repelling surfaces in a 2014 study by Julia
Yeomans, a physicist at the University of Oxford, and her colleagues.

10 Normally, a drop of water hitting a flat, repellent surface at low speed will
deform slightly and return to its original shape before bouncing. At higher
speeds, the drop will flatten like a pancake then retract into a cigarlike shape
before leaving the surface. But when microscopic spikes or some other
structure is added to the surface, the water droplet undergoes what
15 physicists call maximal deformation and ends up spending less time on the
surface. It flattens like a pancake when it lands, then bounces and doesn’t
have time to retract until it’s up in the air.

“It’s a quite counterintuitive bounce,” Dr. Hecksher said. “You come
down, you spread out, and then you jump off immediately after spreading out
20 without retracting.” It would be like jumping off a table, landing in a flat squat
and then bouncing back up still in the squat position.

“Pancake bouncing,” as it was called in the 2014 study, was made
possible when the water, held together by surface tension, interacted with
those tiny spikes, or microstructure. During impact, some of the water from
25 the droplet is forced in between the spikes, but is ejected quickly by an
additional water-repellent coating. The idea can be seen in nature: When
water hits a hairy lotus leaf, it beads up and rolls off. It’s called a
superhydrophobic surface.

To make this phenomenon easier to fathom, Dr. Hecksher and her
30 students substituted a balloon drop for a water droplet. When the water

balloon hit the surface, it underwent the same shape changes as the tiny water droplet. But this time the balloon's rubber membrane held the water together, not surface tension.

35 "The mechanisms are slightly different, but the physics is the same," Dr. Hecksher said.

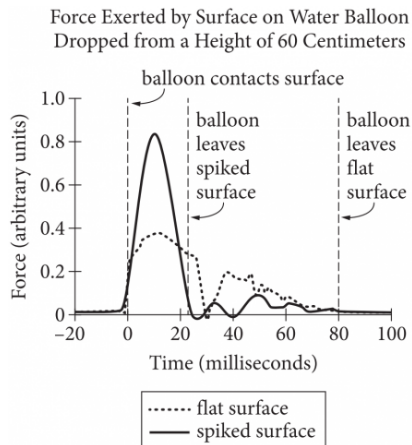
This scaling tactic isn't new to physics, which strives to understand how different systems behave similarly. By making tiny things giant, Dr. Hecksher and her students produced observations and measurements that couldn't easily be made at the microscopic level.

40 You can do it too, although you'll need a slow-motion camera if you want to see a pancake bounce in action.

Start by filling balloons from a party-supply store with water. Try different balloon sizes and fill them with varying amounts of water. Then make your bed of nails. You want it to be big enough so that when the balloon flattens like a pancake, the large number of nails will support its whole surface. Too few nails, and your balloon is more likely to break.

Next, drop your balloon over the nails from different heights. The researchers started at 20 centimeters above the nails, and worked their way up by that increment until they reached 1.5 meters, or about five feet. After that, the force was too much, and the balloons broke.

50 A word of caution before getting too excited: This won't work every time. Balloons should have a uniform thickness, but some don't. The inconsistent ones will most likely pop.



Adapted from Jonas Andersen Bro et al.,

"The Macroscopic Pancake Bounce." ©2016 by IOP Publishing Ltd.

Which statement about the students' project is most clearly supported by the information in the graph?

- A.
The spiked surface exerted a greater maximum force on the water balloon than the flat surface did.
- B. The water balloon burst when dropped from a height that exceeded 60 centimeters.
- C.
The water balloon dropped on the flat surface was heavier than the water balloon dropped on the spiked surface.
- D. The spiked surface drop height was greater than the flat surface drop height.

Choice A is the best answer. The graph shows that a flat surface and a spiked surface each exert differing levels of force on a water balloon dropped from a height of 60 centimeters. The line representing the levels of force exerted by the spiked surface shows a peak of just over 0.8 units of force about 10 milliseconds after the balloon contacts the surface, while the line representing the levels of force exerted by the flat surface shows a peak of just under 0.4 units of force, also at about 10 milliseconds after contact. Thus, the graph shows that the spiked surface exerts a maximum force on the balloon that is greater than the maximum force that the flat surface exerts on the balloon. The situation shown in the graph is presumably true for the balloons in the students' project.

Choices B and D are incorrect because the graph's title and legend indicate that the data are for a water balloon dropped on each surface from exactly 60 centimeters, not higher. Choice C is incorrect because the graph doesn't indicate whether the water balloons dropped on the two surfaces differed in weight.

Question Difficulty: Easy

Reading: Question 30

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

accordance with Article 51 of the United Nations Charter, and subject to
30 such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

In Passage 1, Truman employs the phrase “blood and conflict” ([line 8](#)) in support of his point that

- A. the history of the twentieth century is characterized by frequent strife between nations.
- B. Russia is better prepared to defend against military hostilities than Europe currently is.
- C. the prior experience of war served to motivate the United States to join the treaty.
- D. war needs to be avoided at all costs because of the magnitude of destruction it can cause.

Choice C is the best answer. In the first two paragraphs of Passage 1, Truman explains why the United States has joined the North Atlantic Treaty. He says the people of the United States have learned that they “cannot achieve peace independently” and that the oceans no longer protect them from aggression. These remarks refer to the United States’s experiences of twentieth-century war, in which the country achieved peace only by working with other nations. In the third paragraph, Truman continues: “We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.” Here, “we” refers to the people of the United States, and the phrase “blood and conflict” supports and emphasizes Truman’s point in the first two paragraphs—that the prior experience of war served to motivate the United States to join the treaty.

Choice A is incorrect because in Passage 1 Truman doesn’t characterize the history of the twentieth century, but rather makes the point that the people of the United States learned from their wartime experiences. Choice B is incorrect because it isn’t Truman in Passage 1 but rather Taft in Passage 2 who raises military concerns about Russia. Choice D is incorrect because Truman doesn’t argue that war must always be avoided at all costs. Instead, he states in the seventh paragraph of Passage 1 that the treaty reflects the member nations’ right to fight for themselves and each other in collective self-defense, taking action if they feel peace is broken.

Question Difficulty: Medium

Reading: Question 31

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our
15 people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

20 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements,
25 within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

30 accordance with Article 51 of the United Nations Charter, and subject to
such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

In Passage 1, Truman suggests that the decision of the United States to take part in the North Atlantic Treaty results from

- A. a concern that war in Europe may be imminent.
- B. a desire to minimize Russia's influence on European markets.
- C. a recognition of cultural affinities between the United States and Western Europe.
- D. a resolve on the part of citizens of the United States to use power to achieve moral aims.

Choice D is the best answer. In the fourth paragraph of Passage 1, Truman explains that the decision to join the treaty is motivated by the United States' determination to maintain peace, a goal he describes in moral terms as a "great responsibility." He then emphasizes "the overwhelming will" of the people of the United States to use the nation's strength and influence for a moral aim, "the cause of peace, justice and freedom." In the sixth paragraph, he states that "the North Atlantic Treaty is further evidence of our determination to work for a peaceful world." Taken together, these statements imply that the United States' decision to take part in the treaty results from a resolve on the part of US citizens to use the nation's power to achieve moral aims.

Choice A is incorrect because Truman doesn't mention in Passage 1 any concerns that war in Europe may be imminent, but rather suggests that the treaty's purpose is to help preserve world peace over the long term. Choice B is incorrect because Truman says nothing in Passage 1 about Russian influence on European markets. Choice C is incorrect because in Passage 1, Truman discusses economic and military cooperation, not cultural affinities, between the United States and Western Europe.

Question Difficulty: Medium

Reading: Question 32

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

30 accordance with Article 51 of the United Nations Charter, and subject to
such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

As used in [lines 28-29](#), “measures” most nearly means

- A. estimates.
- B. patterns.
- C. quotas.
- D. actions.

Choice D is the best answer. In the cited sentence of Passage 1, Truman states that the twelve nations that have signed the treaty intend to exercise their right of self-defense “subject to such measures as the Security Council may take to maintain and restore international peace and security.” In other words, when the twelve nations exercise their right of self-defense, the Security Council may engage in responses, or actions, to maintain and restore international peace and security. Therefore, “measures,” as used in this context, most nearly means actions.

Choices A, B, and C are incorrect because, in this context, “measures” means actions, not estimates (choice A), patterns (choice B), or quotas (choice C).

Question Difficulty: Easy

Reading: Question 33

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

30 accordance with Article 51 of the United Nations Charter, and subject to
such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

Taft puts forth his arguments in Passage 2 mainly in order to

- A. provide a rationale for a decision he made in regard to the Atlantic Pact.
- B. prove that his position on the Atlantic Pact is based on patriotism and not self-interest.
- C. suggest that some of his colleagues in Congress do not know history as well as they should.
- D. emphasize that idealism alone is not sufficient as a basis for American foreign policy.

Choice A is the best answer. Taft starts Passage 2 by asking, “Why did I vote against the Atlantic Pact?” The rest of the passage provides his answer, that he believes US foreign policy “should be aimed primarily at security and peace” and that the Atlantic Pact will undermine that aim. In the first paragraph he acknowledges that the Atlantic Pact would warn Russia that the United States would go to war if Russia attacked Europe. He grants that this warning alone might deter aggression against Europe just as a similar strategy, the Monroe Doctrine, deterred aggression against Latin America. But in the second through fourth paragraphs he argues that the Atlantic Pact is much more expansive than the Monroe Doctrine and is likely to threaten Russia, thereby increasing the risk of war in Europe. Thus, Taft puts forth his arguments in Passage 2 mainly in order to provide a rationale for his decision to vote against the Atlantic Pact.

Choice B is incorrect because in Passage 2, Taft doesn’t imply that his position is based on either patriotism or self-interest. Choice C is incorrect because Taft doesn’t suggest that his colleagues in Congress are ignorant of history, but rather that some may have drawn the wrong lessons from the success of the Monroe Doctrine. Choice D is incorrect because Taft explicitly accepts that American foreign policy should serve the idealistic goal of promoting peace and argues that the Atlantic Pact may undermine that goal.

Question Difficulty: Medium

Reading: Question 34

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

30 accordance with Article 51 of the United Nations Charter, and subject to
such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

It can reasonably be inferred from Passage 2 that one reason that Taft finds the Monroe Doctrine appealing is that it

- A. offered the United States an opportunity to improve its relations with neighboring nations.
- B. afforded the United States flexibility in determining whether to act in defense of another country.
- C. was approved by a clear majority in both houses of the United States Congress.
- D. allowed the United States to enforce the terms of its agreements whenever they appeared likely to be violated.

Choice B is the best answer. In the first paragraph of Passage 2, Taft remarks that even though the Monroe Doctrine imposed no treaty obligations, it was still “one of the most effective peace measures in the history of the world.” Thus, he implies that the Monroe Doctrine’s success showed that treaty obligations for mutual defense, such as those imposed by the Atlantic Pact, are unnecessary for promoting peace. In the second paragraph, he explains why the lack of treaty obligations in the Monroe Doctrine was desirable: it meant that “we could change our policy at any time” and that rather than being obligated to defend other countries from attack, the United States could “judge whether perhaps one of the countries had given cause for the attack.” This indicates that Taft finds the Monroe Doctrine appealing because it afforded the United States flexibility in determining whether to act in defense of another country.

Choice A is incorrect because in the first paragraph of Passage 2, Taft suggests only that the Monroe Doctrine helped the United States prevent foreign attacks on neighboring nations, not that it improved relations with those nations. Choice C is incorrect because Taft says that the Monroe Doctrine “was only a President’s message to Congress,” not a vote of approval by both houses of Congress. Choice D is incorrect because Taft says the Monroe Doctrine didn’t involve treaty obligations, which suggests that the doctrine didn’t involve international agreements whose terms might be violated.

Question Difficulty: Medium

Reading: Question 35

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

accordance with Article 51 of the United Nations Charter, and subject to
30 such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

Which choice provides the best evidence for the answer to the previous question?

- A. [lines 41-42](#) (“But it . . . world”)
- B. [lines 42-43](#) (“I would . . . Europe”)
- C. [lines 46-48](#) (“Under . . . attack”)
- D. [lines 51-52](#) (“To my . . . Doctrine”)

Choice C is the best answer. The previous question asks what can reasonably be inferred from Passage 2 to be a reason Taft finds the Monroe Doctrine appealing. The answer, that he finds it appealing because it afforded the United States flexibility in determining whether to act in defense of another country, is best supported in the third and fourth sentences of the second paragraph: “Under the Monroe Doctrine we could change our policy at any time. We could judge whether perhaps one of the countries had given cause for the attack.”

Choices A, B, and D are incorrect because the cited lines don’t support the answer to the previous question. Instead, they state that the Monroe Doctrine was a highly effective peace measure (choice A), that Taft would favor a similar doctrine for Western Europe (choice B), and that the expansiveness of the Atlantic Pact makes it very different from the Monroe Doctrine (choice D).

Question Difficulty: Easy

Reading: Question 36

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

30 accordance with Article 51 of the United Nations Charter, and subject to
such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

Based on the argument in Passage 1, how would Truman most likely characterize Taft’s advocacy in Passage 2 of “a Monroe Doctrine for Western Europe” ([lines 42-43](#))?

- A. Counterproductive, because such an arrangement would surely be censured by the United Nations
- B. Inadequate, because contemporary challenges demand a more cooperative approach
- C. Alarming, because such a strategy would be viewed by allies of the United States as provocative
- D. Risky, because such a plan could lead to an overreliance on the United States by its allies

Choice B is the best answer. In the first paragraph of Passage 2, Taft indicates that the Monroe Doctrine was a policy the United States took on independently, without entering any treaties with other nations. Presumably the “Monroe Doctrine for Western Europe” that Taft advocates, like the original Monroe Doctrine, would also be an attempt by the United States to achieve peace independently. But in the second paragraph of Passage 1, Truman says that twentieth-century events have shown that the United States “cannot achieve peace independently” because now “the world has grown too small.” Truman’s statements imply that collaboration with other nations is now necessary to maintain international peace. So based on the argument in Passage 1, Truman would most likely characterize Taft’s proposed Monroe Doctrine for Western Europe as inadequate, because contemporary challenges demand a more cooperative approach.

Choice A is incorrect because in the sixth and seventh paragraphs of Passage 1, Truman suggests that the United Nations works to promote international peace, the same goal as the Monroe Doctrine for Western Europe that Taft proposes in Passage 2. Thus, neither passage suggests that the United Nations would censure a Monroe Doctrine for Western Europe. Choices C and D are incorrect because Passage 2 suggests that Taft’s proposed Monroe Doctrine for Western Europe would be a nonbinding announcement that the United States would defend its allies in Western Europe against Russian aggression. Since the North Atlantic Treaty that Truman supports in Passage 1 is similar but far more expansive and binding, nothing in either passage suggests Truman would feel concerned that US allies would find the relatively modest Monroe Doctrine for Western Europe provocative (choice C) or that such a doctrine could make these allies overreliant on the United States (choice D).

Question Difficulty: Medium

Reading: Question 37

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

accordance with Article 51 of the United Nations Charter, and subject to
30 such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

Based on Passage 2, how would Taft most likely respond to Truman’s description of the North Atlantic Treaty in [lines 20-25](#), Passage 1 (“The North . . . security”)?

- A. The treaty does not ensure that other members will come to the aid of the United States.
- B. The treaty is likely to be superseded by even more restrictive arrangements.
- C. The treaty will probably result in the opposite of its stated purpose.
- D. The treaty cannot last long given the competing interests of its members.

Choice C is the best answer. In the sixth paragraph of Passage 1, Truman explains that the North Atlantic Treaty reflects the determination of the United States “to work for a peaceful world,” as shown by the Senate’s approval of US participation in collective international arrangements “designed to safeguard peace and security.” Thus, Truman indicates that the North Atlantic Treaty’s purpose is to promote and protect international peace. But later in Passage 2, Taft argues that the treaty will increase the risk of war with Russia. He warns that “such an alliance is more likely to produce war than peace” by stimulating an arms race with Russia and by making Russia feel threatened. This suggests that Taft would most likely respond to Truman’s description of the North Atlantic Treaty in the sixth paragraph of Passage 1 by asserting that the treaty will probably result in war—the opposite of the treaty’s stated purpose of promoting and protecting international peace.

Choice A is incorrect because Taft implies in the second paragraph of Passage 2 that as “an offensive and defensive military alliance,” the North Atlantic Treaty requires all its member nations to come to each other’s military defense. Choices B and D are incorrect because Taft doesn’t mention the possibility of the treaty being replaced by other, more restrictive arrangements (choice B) or falling apart as a result of its members’ competing interests (choice D).

Question Difficulty: Medium

Reading: Question 38

Questions 30-38 are based on the following passages.

Passage 1 is adapted from a message delivered to the US Senate in 1949 by President Harry S. Truman, “Special Message to the Senate Transmitting the North Atlantic Treaty.” Passage 2 is adapted from a radio address delivered in 1949 by Senator Robert A. Taft, “Radio Address on the North Atlantic Treaty.” ©2006 by The Kent State University Press. The treaty established the North Atlantic Treaty Organization (NATO), a mutual defense alliance.

Line **Passage 1**

This Treaty is an expression of the desire of the people of the United States for peace and security, for the continuing opportunity to live and work in freedom.

5 Events of this century have taught us that we cannot achieve peace independently. The world has grown too small. The oceans to our east and west no longer protect us from the reach of brutality and aggression.

We have also learned—learned in blood and conflict—that if we are to achieve peace we must work for peace.

10 This knowledge has made us determined to do everything we can to insure that peace is maintained. We have not arrived at this decision lightly, or without recognition of the effort it entails. But we cannot escape the great responsibility that goes with our great stature in the world. Every action of this Nation in recent years has demonstrated the overwhelming will of our people that the strength and influence of the United States shall be used in the cause of peace, justice and freedom.

15 . . . In the last year we have embarked on a great cooperative enterprise with the free nations of Europe to restore the vitality of the European economy—so important to the prosperity and peace of our country and the world.

20 The North Atlantic Treaty is further evidence of our determination to work for a peaceful world. It is in accord with the action of the Senate last June when it signified its approval of our country’s associating itself in peacetime with countries outside the Western Hemisphere in collective arrangements, within the framework of the United Nations Charter, designed to safeguard peace and security.

The twelve nations which have signed this Treaty undertake to exercise their right of collective or individual self-defense against armed attack, in

30 accordance with Article 51 of the United Nations Charter, and subject to
such measures as the Security Council may take to maintain and restore
international peace and security. The Treaty makes clear the determination of
the people of the United States and of our neighbors in the North Atlantic
community to do their utmost to maintain peace with justice and to take such
action as they may deem necessary if the peace is broken.

35 **Passage 2**

Why did I vote against the Atlantic Pact? I wanted to vote for it—at least I
wanted to vote to let Russia know that if she attacked Western Europe, the
United States would be in the war. I believe that would be a deterrent to war.
. . . We issued just this warning in the Monroe Doctrine, and though we were
40 a much less powerful nation, it prevented aggression against Central and
South America. That was only a President's message to Congress, and there
were no treaty obligations, and no arms for other nations. But it was one of
the most effective peace measures in the history of the world. I would favor a
Monroe Doctrine for Western Europe.

45 But the Atlantic Pact goes much further. It obligates us to go to war if at
any time during the next twenty years anyone makes an armed attack on any
of the twelve nations. Under the Monroe Doctrine we could change our
policy at any time. We could judge whether perhaps one of the countries had
given cause for the attack. Only Congress could declare a war in pursuance
50 of the Doctrine. Under the new Pact the President can take us into war
without Congress. But, above all the treaty is a part of a much larger program
by which we undertake to arm all these nations against Russia. . . . To my
mind this turns the whole project into something completely different from
the Monroe Doctrine. I found that at least some of the European nations were
55 induced to sign the pact by the promise of arms. A joint military program has
already been made. . . . It thus becomes an offensive and defensive military
alliance against Russia. I believe our foreign policy should be aimed primarily
at security and peace; and I believe such an alliance is more likely to produce
war than peace. . . .

60 We cannot build up the armaments of Western Europe without stimulating
the Russians to increase still further their development of war forces. Every
armament race in history has finally ended in war. . . .

There is another consideration. If we undertake to arm all the nations around Russia from Norway on the north to Turkey on the south, and Russia sees itself ringed about gradually by so-called defensive arms from Norway and Denmark to Turkey and Greece, it may form a different opinion. It may decide that the arming of western Europe, regardless of its present purpose, looks to an attack upon Russia.

Which choice provides the best evidence for the answer to the previous question?

- A. [lines 35-37](#) (“Why . . . war”)
- B. [lines 37-40](#) (“We issued . . . America”)
- C. [line 48](#) (“Only . . . Doctrine”)
- D. [lines 55-57](#) (“I believe . . . peace”)

Choice D is the best answer. The previous question asks how Taft would most likely respond to Truman’s description of the North Atlantic Treaty in the sixth paragraph of Passage 1. The answer, that Taft would most likely assert that the treaty will probably result in the opposite of its stated purpose, is best supported in the last sentence of the second paragraph: “I believe our foreign policy should be aimed primarily at security and peace; and I believe such an alliance is more likely to produce war than peace. . . .” Truman indicates in the sixth paragraph of Passage 1 that the purpose of the North Atlantic Treaty is to promote and maintain peace, while Taft’s statement expresses his opinion that the treaty will probably lead to war, the opposite of peace.

Choices A, B, and C are incorrect because the cited lines don’t support the answer to the previous question. Instead, they explain why Taft felt tempted to support the North Atlantic Treaty (choice A), state that the Monroe Doctrine was effective at preventing foreign aggression against Central and South America (choice B), and indicate that only Congress could declare war under the Monroe Doctrine (choice C).

Question Difficulty: Medium

Reading: Question 39

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue

35 food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red

40 males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail

45 down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful

50 experiments like those above, we cannot really glimpse the past processes that brought about this match.

In the context of the passage as a whole, the first sentence serves primarily as

- A. a hypothesis disproved by the experiments described in the passage.
- B. a theory called into question by the results put forth in the passage.
- C. an assertion accepted by the researchers discussed in the passage.
- D. a phenomenon discovered by the scientists profiled in the passage.

Choice C is the best answer. The first sentence in the passage asserts: "Female guppies prefer males with more orange color markings on their bodies." The next three sentences clearly indicate that observations have established that this preference exists and varies in strength in different wild guppy populations. The passage doesn't mention specific researchers who made these observations. The second paragraph introduces a group of researchers, Helen Rodd and her colleagues, who suggested that the female guppies' preference for orange males may result from guppies' preference for orange fruit, and they conducted an experiment to test that hypothesis. The second paragraph also introduces two more researchers, John Endler and Gemma Cole, who conducted another experiment to test Rodd and her colleagues' hypothesis of why female guppies prefer orange males. By proposing this hypothesis and by testing it, the

researchers discussed in the passage show that they already accept that female guppies prefer orange males, as the first sentence in the passage asserts.

Choices A and B are incorrect because the results of the two experiments described in the passage didn't disprove (choice A) or even call into question (choice B) the claim that female guppies prefer males with more orange color markings. Choice D is incorrect because the passage doesn't say or imply that Endler, Cole, or Rodd and her colleagues were among the scientists who discovered that female guppies prefer males with more orange color markings.

Question Difficulty: Medium

Reading: Question 40

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red food and decreased in the lines selected to prefer blue food. Of course, the males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful experiments like those above, we cannot really glimpse the past processes that brought about this match.

As used in the passage, which word's meaning is closest to the meaning of "foundation" in [line 10](#)?

- A. "aesthetic" ([line 10](#))
- B. "root" ([lines 13-14](#))
- C. "conclusion" ([line 22](#))
- D. "domain" ([line 24](#))

Choice B is the best answer. The last sentence of the first paragraph asks, "What is the foundation for the sexual aesthetic of orange?" In other words, what is the underlying cause of female guppies' preference for orange males? In the second sentence of the second paragraph, Rodd and her colleagues answer this question by suggesting that "the preference for food is at the root of the guppies' preference for orange males." That is, the guppies' preference for orange fruit is the underlying cause of female guppies' preference for orange males. Therefore, "foundation," as used in the last sentence of the first paragraph, is closest in meaning to "root," as used in the second sentence of the second paragraph: both words are used to mean underlying cause.

Choice A is incorrect because in the last sentence of the first paragraph, “aesthetic” is used to mean preference, whereas “foundation” is used to mean underlying cause. Choices C and D are incorrect because in the sixth sentence of the second paragraph, “conclusion” is used to mean interpretation (choice C) and “domain” is used to mean context (choice D).

Question Difficulty: Easy

Reading: Question 41

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue

35 food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red

40 males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail

45 down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful

50 experiments like those above, we cannot really glimpse the past processes that brought about this match.

Which choice best supports the idea that the results of the experiment conducted by Rodd and her colleagues were not what the researchers had anticipated?

- A. [lines 12-13](#) ("Helen . . . fruit")
- B. [lines 13-14](#) ("The researchers . . . males")
- C. [lines 20-22](#) ("Somewhat . . . population")
- D. [lines 22-24](#) ("The conclusion . . . foraging")

Choice C is the best answer. The second paragraph describes the experiment Rodd and her colleagues conducted on different guppy populations to test the hypothesis that female guppies' preferences for orange males resulted from guppies' general attraction to orange food. The paragraph's fifth sentence presents the experiment's results: "Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population." The phrase "somewhat amazingly" suggests that the results were not what Rodd and her colleagues had anticipated; the results surprised the researchers by supporting their hypothesis more than they had expected.

Choices A, B, and D are incorrect because the cited lines don't support the idea that the results were not what the researchers had anticipated. Instead, choice A presents a fact the researchers pointed out before conducting the experiment and choice B presents a hypothesis the researchers formed based on that fact. Choice D is incorrect because it doesn't suggest that the experimental results were unanticipated, but rather explains how the researchers interpreted those results.

Question Difficulty: Medium

Reading: Question 42

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue

35 food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red

40 males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail

45 down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful

50 experiments like those above, we cannot really glimpse the past processes that brought about this match.

The sentences in [lines 24-26](#) ("One could . . . fruit") serve mainly to

- A. introduce a lingering scientific question.
- B. provide evidence in support of a scientific hypothesis.
- C. challenge the methodology of a scientific experiment.
- D. question the objectivity of a group of scientific researchers.

Choice A is the best answer. In the second paragraph, the author describes the study conducted by Rodd and her colleagues and states in the sixth sentence the researchers' conclusion that "males evolved orange coloration due to a general attraction to orange." However, the author goes on to suggest in the seventh and eighth sentences that it was unclear whether this was actually the case or whether it may have been the other way around and that females "initially evolved a preference for orange males that then predisposed them to prefer orange fruit." The paragraph ends by stating that this question was finally resolved with a subsequent lab experiment. Therefore, the cited lines serve mainly to introduce a lingering scientific question.

Choice B is incorrect because although the cited lines raise a scientific question, they don't provide any evidence in support of a hypothesis. Choices C and D are incorrect because the

author never challenges the methodology used in a scientific experiment (choice C) or questions the objectivity of a group of researchers (choice D).

Question Difficulty: Medium

Reading: Question 43

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue

35 food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red

40 males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail

45 down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful

50 experiments like those above, we cannot really glimpse the past processes that brought about this match.

As used in [lines 39-40](#), "constrained" most nearly means

- A. compelled.
- B. limited.
- C. threatened.
- D. compressed.

Choice B is the best answer. The seventh sentence of the third paragraph says that in the guppy breeding experiment, "the males were constrained in their color change by available genes, so they could not actually turn red or blue." In other words, the guppies' available genes restricted, or limited, how the males' colors could change over generations of breeding. Therefore, "constrained," as used in this context, most nearly means limited.

Choices A, C, and D are incorrect because, in this context, "constrained" means limited, not compelled (choice A), threatened (choice C), or compressed (choice D).

Question Difficulty: Easy

Reading: Question 44

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red food and decreased in the lines selected to prefer blue food. Of course, the males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful experiments like those above, we cannot really glimpse the past processes that brought about this match.

Which choice best describes the relationship between the two experiments described in the passage?

- A. Endler and Cole replicate the results achieved by Rodd and her colleagues in a different environment.
- B. Endler and Cole demonstrate that the conclusions reached by Rodd and her colleagues should be considered tentative.
- C. Endler and Cole reinterpret the data collected by Rodd and her colleagues and suggest a different outcome.
- D. Endler and Cole confirm a hypothesis put forth by Rodd and her colleagues.

Choice D is the best answer. The second paragraph notes how the experimental results that Rodd and her colleagues obtained could be explained by either their hypothesis that female guppies prefer orange males because guppies are generally attracted to orange fruit or an alternative hypothesis that the attraction to orange males caused the preference for orange fruit.

The second paragraph ends with a statement that Endler and Cole “resolved this issue” by conducting a different experiment. The third paragraph says that Endler and Cole’s “experimental results seem to nail down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.” In other words, Endler and Cole confirmed the hypothesis put forth by Rodd and her colleagues.

Choice A is incorrect because Rodd and her colleagues obtained experimental results regarding how long guppies from different wild populations inspected orange poker chips. Endler and Cole didn’t replicate those results but rather examined how breeding different guppy populations to prefer different foods changed the male guppies’ coloration over generations. Choice B is incorrect because the third paragraph indicates that Endler and Cole verified the conclusions reached by Rodd and her colleagues. Choice C is incorrect because the third paragraph explains how Endler and Cole derived their own experimental data rather than reinterpreting the data from Rodd and her colleagues. It also suggests that both sets of researchers reached identical interpretations of their separate experimental results.

Question Difficulty: Medium

Reading: Question 45

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue

35 food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red

40 males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail

45 down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful

50 experiments like those above, we cannot really glimpse the past processes that brought about this match.

Which choice provides the best evidence for the answer to the previous question?

- A. [lines 26-28](#) ("John . . . lab")
- B. [lines 29-31](#) ("Endler . . . color")
- C. [lines 35-36](#) ("Rodd's . . . color")
- D. [lines 44-46](#) ("These . . . males")

Choice D is the best answer. The previous question asks what best describes the relationship between the two experiments described in the passage. The answer, that Endler and Cole confirm a hypothesis put forth by Rodd and her colleagues, is best supported by the last sentence of the third paragraph: "These experimental results seem to nail down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males." That is, Endler and Cole's experimental results confirm the interpretation, or hypothesis, put forth by Rodd and her colleagues.

Choices A, B, and C are incorrect because the cited lines don't support the answer to the previous question. Instead, they state that Endler and Cole resolved the question of which of two alternative hypotheses is correct (choice A), describe Endler and Cole's experimental method

(choice B), and explain what result Rodd and her colleagues' study would predict for Endler and Cole's experiment (choice C).

Question Difficulty: Medium

Reading: Question 46

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue

35 food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red

40 males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail

45 down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful

50 experiments like those above, we cannot really glimpse the past processes that brought about this match.

Which conclusion about "sexual beauty" ([line 47](#)) does the passage best support?

- A. Sexual beauty has become increasingly difficult for researchers to define.
- B. Many of the causes that led to present-day preferences related to sexual beauty are unknown.
- C. Sexual beauty has evolved into something unthinkably complex.
- D. Reactions to sexual beauty generally occur on an unconscious level.

Choice B is the best answer. The last paragraph states that what we can observe of "sexual beauty and the preferences that favor it" is merely the present "tips of long branches on the tree of life that have been evolving for millennia," and that without more experimental data, "we cannot really glimpse the past processes that brought about" the match between sexual beauty and preferences for it. In other words, many of the causes of specific present-day preferences for sexual beauty remain unknown.

Choice A is incorrect because the passage suggests that researchers have been improving their understanding of sexual beauty through experiments like those the passage discusses, not that it

has become increasingly difficult to define. Choice C is incorrect because the last paragraph implies that sexual beauty, while complex, may be more clearly understood after further careful experimentation. Choice D is incorrect because the passage doesn't discuss whether reactions to sexual beauty occur on a conscious or unconscious level.

Question Difficulty: Hard

Reading: Question 47

Questions 39-47 are based on the following passage.

This passage is adapted from Michael J. Ryan, *A Taste for the Beautiful: The Evolution of Attraction*. ©2018 by Princeton University Press.

Line Female guppies prefer males with more orange color markings on their bodies. Females vary in how attractive they find orange. Different populations in the guppies' resident mountain streams of Trinidad show variation in both the strength of this preference by females and the amount
5 of orange in males. As we might expect, the strength of the females' preference for orange and the amount of orange sported by the males are correlated among the river systems: in rivers where males have abundant orange coloration, females have strong preferences for orange; in rivers where the males are more dully colored, females have less of a preference
10 for orange color. But what gives rise to variation in the preference? What is the foundation for the sexual aesthetic of orange?

Helen Rodd and her colleagues pointed out that guppies often feed on orange fruit. The researchers suggested that the preference for food is at the root of the guppies' preference for orange males. The females are not fooled
15 into thinking the males are fruits, but instead, the researchers hypothesized, the females develop a gestalt attraction to orange that spills over from their food preference into their mating preference. They tested this hypothesis by placing poker chips of different colors in tanks of male and female guppies from different populations whose females showed varying degrees of
20 preferences for orange coloration in males. Somewhat amazingly, the time inspecting orange chips by both sexes predicted the strength of females' preferences for orange courtship coloration in each population. The conclusion was that males evolved orange coloration due to a general attraction to orange that evolved in the domain of foraging. One could argue,
25 however, that the direction of cause-and-effect might be reversed. Perhaps females initially evolved a preference for orange males that then predisposed them to prefer orange fruit. John Endler and Gemma Cole resolved this issue by recreating this evolutionary scenario in the lab.

Endler and Cole's approach was to artificially select for guppies to prefer
30 certain colors of food and then ask if this would result in an evolutionary

change in the male's color. They separated guppies into different groups, or "lines," and then presented them with a simulated food item that was either blue or red. The preference for food color evolved, and the subsequent generations of the two lines differed in their preferences for red versus blue food. Rodd's study would predict a correlated change in the female's preference for male color. And that is indeed what seemed to happen. As the food preference evolved across generations, so did the amount of orange sported by males: it increased in the lines that were selected to prefer red food and decreased in the lines selected to prefer blue food. Of course, the males were constrained in their color change by available genes, so they could not actually turn red or blue, but orange and red stimulate very similar patterns of photoreceptors, while blue is quite different. The only obvious agent that could cause an increase in the male's coloration in this experiment was female preference. These experimental results seem to nail down the earlier interpretation by Rodd and her colleagues: preferences for orange fruits give rise to preferences for orange males.

When we observe sexual beauty and the preferences that favor it, we are seeing only the present, the mere tips of long branches on the tree of life that have been evolving for millennia. Without more information from careful experiments like those above, we cannot really glimpse the past processes that brought about this match.

The last paragraph of the passage represents a shift from a

- A. discussion about specific experiments to an assertion of why these experiments are of value.
- B. celebration of a past scientific achievement to a lament regarding the future of scientific progress.
- C. consideration of the work of a group of scientists to a caution against using their results inappropriately.
- D. scrutiny of a controversial scientific claim to a reflection on the overall applicability of that claim.

Choice A is the best answer. The second and third paragraphs of the passage discuss two specific experiments—one conducted by Rodd and her colleagues and the other by Endler and Cole. The last paragraph then suggests that "more information from careful experiments like

those above” may enable researchers to “glimpse the past processes” that made the connection between sexual beauty and preferences for it. This implies that the two specific experiments discussed are of value because their data provide insight into the evolutionary processes that resulted in at least one species’ matching “sexual beauty” and sexual preferences. Therefore, the last paragraph represents a shift from the preceding paragraphs’ discussion of specific experiments to an assertion of why these experiments are of value.

Choice B is incorrect because the last paragraph doesn’t lament the future of scientific progress but instead suggests that careful experimentation may yield progress in understanding the evolution of sexual beauty and sexual preferences. Choice C is incorrect because the last paragraph doesn’t raise concerns about inappropriate uses of the experimental results discussed in the second and third paragraphs. Choice D is incorrect because much of the passage scrutinizes the claim that female guppies’ preference for orange males evolved from guppies’ general preferences for orange food, and the last paragraph reflects on the broader value of experiments such as those used to investigate the claim, not that claim’s overall applicability.

Question Difficulty: Medium