

MCAT Full-Length Practice Test

Form 1

Directions. This is an original independent full-length practice form designed to mirror the current four-section MCAT structure. Select the best answer for each question and observe the section timing. Do not use the answer appendix until the full form is complete. **Timing.** The four content sections total 6 hours 15 minutes: Chemical and Physical Foundations 95 minutes, CARS 90 minutes, Biological and Biochemical Foundations 95 minutes, and Psychological, Social, and Biological Foundations 95 minutes. Breaks and optional tutorial time are separate. This is not an official AAMC form.

MCAT Chemical and Physical Foundations of Biological Systems

Section timing: 95 minutes

Passage 1: Gas exchange

A research team investigated alveolar diffusion using a controlled comparison. The investigators varied the partial-pressure gradient and kept the other stated conditions as constant as possible. Their working model was that increasing the partial-pressure gradient increases the driving force for diffusion across the membrane. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: At the larger gradient, oxygen-transfer rate was 18 percent higher while membrane thickness and surface area were unchanged. The team concluded that a larger gradient provides a larger driving force for net diffusion. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

1. Which observation from the study most directly supports the proposed relationship involving alveolar diffusion?
 - A. Membrane thickness cannot affect the rate of transfer.
 - B. Increasing the partial-pressure gradient increases the driving force for diffusion across the membrane.
 - C. A larger gradient guarantees unlimited transfer regardless of membrane properties.
 - D. The equilibrium constant changes solely because the gradient changes.
2. If the partial-pressure gradient increases while the other stated conditions remain fixed, which result best follows from the passage's model?
 - A. Membrane thickness cannot affect the rate of transfer.
 - B. The rate of oxygen transfer into blood increases.
 - C. A larger gradient guarantees unlimited transfer regardless of membrane properties.
 - D. The equilibrium constant changes solely because the gradient changes.
3. Which comparison would most directly test whether the observed result is caused by the partial-pressure gradient rather than by a competing variable?
 - A. The equilibrium constant changes solely because the gradient changes.
 - B. Measure diffusion with membrane thickness held constant.
 - C. A second sample with the same membrane shows the predicted increase.
 - D. A larger gradient guarantees unlimited transfer regardless of membrane properties.

4. In a related system, the partial-pressure gradient increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. A larger gradient guarantees unlimited transfer regardless of membrane properties.
 - B. Measure diffusion with membrane thickness held constant.
 - C. The equilibrium constant changes solely because the gradient changes.
 - D. The rate of oxygen transfer into blood increases.
5. Which additional result would most strengthen the claim about alveolar diffusion?
- A. A larger gradient guarantees unlimited transfer regardless of membrane properties.
 - B. The equilibrium constant changes solely because the gradient changes.
 - C. Membrane thickness cannot affect the rate of transfer.
 - D. A second sample with the same membrane shows the predicted increase.

Passage 2: Buffer chemistry

A research team investigated acid-base buffering using a controlled comparison. The investigators varied the amount of added strong acid and kept the other stated conditions as constant as possible. Their working model was that a buffer resists a large pH change because its conjugate base consumes much of the added hydrogen ion. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The buffered sample changed by 0.18 pH units after the acid addition, whereas the unbuffered comparison changed by 1.21 units. The team concluded that the conjugate base reacts with added hydrogen ion before free hydrogen ion accumulates. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

6. Which observation from the study most directly supports the proposed relationship involving acid-base buffering?
- A. A buffered sample changes pH by exactly the same amount as pure water.
 - B. Conjugate-base concentration has no bearing on the buffer's pH.
 - C. A buffer resists a large pH change because its conjugate base consumes much of the added hydrogen ion.
 - D. The pH becomes exactly 7 after any amount of added acid.
7. If the amount of added strong acid increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. A buffered sample changes pH by exactly the same amount as pure water.
 - B. Conjugate-base concentration has no bearing on the buffer's pH.
 - C. The pH decreases only modestly after a small acid addition.
 - D. The pH becomes exactly 7 after any amount of added acid.
8. Which comparison would most directly test whether the observed result is caused by the amount of added strong acid rather than by a competing variable?
- A. A buffered sample changes pH by exactly the same amount as pure water.

- B. Compare equal-volume buffer samples receiving different known amounts of strong acid while keeping conjugate-base concentration and temperature fixed.
 - C. The unbuffered control shows a much larger pH change.
 - D. The pH becomes exactly 7 after any amount of added acid.
9. In a related system, the amount of added strong acid increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. A buffered sample changes pH by exactly the same amount as pure water.
 - B. The pH decreases only modestly after a small acid addition.
 - C. Compare equal-volume buffer samples receiving different known amounts of strong acid while keeping conjugate-base concentration and temperature fixed.
 - D. The pH becomes exactly 7 after any amount of added acid.
10. Which additional result would most strengthen the claim about acid-base buffering?
- A. The pH becomes exactly 7 after any amount of added acid.
 - B. A buffered sample changes pH by exactly the same amount as pure water.
 - C. Conjugate-base concentration has no bearing on the buffer's pH.
 - D. The unbuffered control shows a much larger pH change.

Passage 3: Enzyme energetics

A research team investigated activation energy using a controlled comparison. The investigators varied the concentration of catalyst and kept the other stated conditions as constant as possible. Their working model was that a catalyst increases reaction rate by lowering the activation-energy barrier without changing the equilibrium constant. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The catalyzed reaction reached the same final product ratio sooner than the uncatalyzed reaction at the same temperature. The team concluded that the catalyst changes the pathway and rate but not the energy difference between reactants and products. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

11. Which observation from the study most directly supports the proposed relationship involving activation energy?
- A. A catalyst increases reaction rate by lowering the activation-energy barrier without changing the equilibrium constant.
 - B. A catalyst changes the equilibrium constant without changing the reaction conditions.
 - C. Only the reverse reaction's activation barrier can be lowered.
 - D. At equilibrium, the products disappear as quickly as they form.
12. If catalyst concentration increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. The system reaches equilibrium sooner while the final equilibrium composition remains the same.
 - B. A catalyst changes the equilibrium constant without changing the reaction conditions.

- C. Only the reverse reaction's activation barrier can be lowered.
 - D. At equilibrium, the products disappear as quickly as they form.
13. Which comparison would most directly test whether the observed result is caused by the concentration of catalyst rather than by a competing variable?
- A. Both reaction directions speed up by comparable factors.
 - B. A catalyst changes the equilibrium constant without changing the reaction conditions.
 - C. Only the reverse reaction's activation barrier can be lowered.
 - D. Compare catalyzed and uncatalyzed reactions at the same temperature and starting concentrations.
14. In a related system, catalyst concentration is increased while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. A catalyst changes the equilibrium constant without changing the reaction conditions.
 - B. Only the reverse reaction's activation barrier can be lowered.
 - C. The system reaches equilibrium sooner while the final equilibrium composition remains the same.
 - D. Compare catalyzed and uncatalyzed reactions at the same temperature and starting concentrations.
15. Which additional result would most strengthen the claim about activation energy?
- A. A catalyst changes the equilibrium constant without changing the reaction conditions.
 - B. Only the reverse reaction's activation barrier can be lowered.
 - C. At equilibrium, the products disappear as quickly as they form.
 - D. Both reaction directions speed up by comparable factors.

Passage 4: Fluid resistance

A research team investigated vascular flow using a controlled comparison. The investigators varied the radius of a vessel and kept the other stated conditions as constant as possible. Their working model was that small changes in vessel radius can produce large changes in flow because resistance is strongly radius-dependent. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Doubling vessel radius increased measured flow by much more than twofold when pressure difference and viscosity were fixed. The team concluded that the radius appears with a high power in the flow relationship. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

16. Which observation from the study most directly supports the proposed relationship involving vascular flow?
- A. Flow is independent of vessel radius when pressure is fixed.
 - B. Viscosity cannot affect flow when radius changes.
 - C. Changing radius forces the pressure difference to reverse.
 - D. Small changes in vessel radius can produce large changes in flow because resistance is strongly radius-dependent.

17. If the radius of a vessel increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Changing radius forces the pressure difference to reverse.
 - B. Increasing radius increases flow when the pressure difference and viscosity remain fixed.
 - C. Flow is independent of vessel radius when pressure is fixed.
 - D. Viscosity cannot affect flow when radius changes.
18. Which comparison would most directly test whether the observed result is caused by the radius of a vessel rather than by a competing variable?
- A. Viscosity cannot affect flow when radius changes.
 - B. Hold pressure difference, vessel length, and fluid viscosity constant.
 - C. Measured flow rises more than proportionally as radius increases.
 - D. Flow is independent of vessel radius when pressure is fixed.
19. In a related system, the radius of a vessel increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Flow is independent of vessel radius when pressure is fixed.
 - B. Viscosity cannot affect flow when radius changes.
 - C. Increasing radius increases flow when the pressure difference and viscosity remain fixed.
 - D. Hold pressure difference, vessel length, and fluid viscosity constant.
20. Which additional result would most strengthen the claim about vascular flow?
- A. Viscosity cannot affect flow when radius changes.
 - B. Changing radius forces the pressure difference to reverse.
 - C. Measured flow rises more than proportionally as radius increases.
 - D. Flow is independent of vessel radius when pressure is fixed.

Passage 5: Electrochemistry

A research team investigated cell potential using a controlled comparison. The investigators varied the concentration ratio of reaction species and kept the other stated conditions as constant as possible. Their working model was that cell potential depends on the reaction quotient as well as the standard potential. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Changing the reaction quotient shifted the measured cell potential in the direction predicted by the Nernst relationship. The team concluded that the Nernst relationship includes the logarithm of the reaction quotient. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

21. Which observation from the study most directly supports the proposed relationship involving cell potential?
- A. Cell voltage is fixed by electrode labels alone.
 - B. Ion concentration cannot affect cell potential.

- C. Electron transfer cannot occur through the external circuit.
 - D. Cell potential depends on the reaction quotient as well as the standard potential.
22. If the concentration ratio of reaction species increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Cell voltage is fixed by electrode labels alone.
 - B. Ion concentration cannot affect cell potential.
 - C. Electron transfer cannot occur through the external circuit.
 - D. Changing ion concentrations can change the measured cell voltage.
23. Which comparison would most directly test whether the observed result is caused by the concentration ratio of reaction species rather than by a competing variable?
- A. The voltage shifts predictably when the reaction quotient changes.
 - B. Cell voltage is fixed by electrode labels alone.
 - C. Ion concentration cannot affect cell potential.
 - D. Use identical electrodes and temperature while varying only the solution composition.
24. In a related system, the concentration ratio of reaction species increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Ion concentration cannot affect cell potential.
 - B. Changing ion concentrations can change the measured cell voltage.
 - C. Use identical electrodes and temperature while varying only the solution composition.
 - D. Cell voltage is fixed by electrode labels alone.

Passage 6: Optics and imaging

A research team investigated lens formation using a controlled comparison. The investigators varied the curvature of a converging lens and kept the other stated conditions as constant as possible. Their working model was that changing lens curvature changes focal length and therefore the location of a formed image. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The lens with greater curvature formed a sharp image at a shorter focal length when object distance was held constant. The team concluded that focal length is determined by optical power, which depends on curvature and refractive index. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

25. Which observation from the study most directly supports the proposed relationship involving lens formation?
- A. Image distance is always equal to object distance.
 - B. Changing lens curvature changes focal length and therefore the location of a formed image.
 - C. Focal length is determined only by object brightness.
 - D. A curved interface cannot refract light.

26. If the curvature of a converging lens increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. A curved interface cannot refract light.
 - B. Image distance is always equal to object distance.
 - C. A more strongly converging lens has a shorter focal length.
 - D. Focal length is determined only by object brightness.
27. Which comparison would most directly test whether the observed result is caused by the curvature of a converging lens rather than by a competing variable?
- A. Focal length is determined only by object brightness.
 - B. A curved interface cannot refract light.
 - C. Keep object distance and refractive index constant.
 - D. Independent focal-length measurements shift in the predicted direction.
28. In a related system, the curvature of a converging lens increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. A more strongly converging lens has a shorter focal length.
 - B. Keep object distance and refractive index constant.
 - C. Focal length is determined only by object brightness.
 - D. A curved interface cannot refract light.

Passage 7: Organic functional groups

A research team investigated carbonyl reactivity using a controlled comparison. The investigators varied the electron-withdrawing strength near a carbonyl and kept the other stated conditions as constant as possible. Their working model was that electron-withdrawing groups can increase the electrophilic character of a carbonyl carbon. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The substrate with the stronger electron-withdrawing group reacted faster with the same nucleophile under matched conditions. The team concluded that electron withdrawal leaves the carbonyl carbon more electron-poor. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

29. Which observation from the study most directly supports the proposed relationship involving carbonyl reactivity?
- A. Substituents cannot alter electron density near a carbonyl.
 - B. Electron-withdrawing groups can increase the electrophilic character of a carbonyl carbon.
 - C. The carbonyl carbon acts as a nucleophile in every reaction.
 - D. Related carbonyl compounds must have identical reaction rates.
30. If the electron-withdrawing strength near a carbonyl increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. A nucleophile attacks the carbonyl carbon more readily.
 - B. The carbonyl carbon acts as a nucleophile in every reaction.

- C. Related carbonyl compounds must have identical reaction rates.
- D. Substituents cannot alter electron density near a carbonyl.
31. Which comparison would most directly test whether the observed result is caused by the electron-withdrawing strength near a carbonyl rather than by a competing variable?
- A. Compare substrates with the same carbon skeleton and different substituents.
- B. The more electron-poor substrate reacts faster under matched conditions.
- C. The carbonyl carbon acts as a nucleophile in every reaction.
- D. Related carbonyl compounds must have identical reaction rates.
32. In a related system, the electron-withdrawing strength near a carbonyl increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Related carbonyl compounds must have identical reaction rates.
- B. A nucleophile attacks the carbonyl carbon more readily.
- C. The carbonyl carbon acts as a nucleophile in every reaction.
- D. Compare substrates with the same carbon skeleton and different substituents.

Passage 8: Thermodynamics

A research team investigated free-energy change using a controlled comparison. The investigators varied the temperature of a reaction with a favorable entropy change and kept the other stated conditions as constant as possible. Their working model was that at fixed enthalpy, increasing temperature makes the negative entropy term more influential in the Gibbs free-energy change. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The process became favorable only above the temperature at which the entropy term outweighed the unfavorable enthalpy term. The team concluded that Gibbs free energy combines enthalpy with the temperature-weighted entropy change. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

33. Which observation from the study most directly supports the proposed relationship involving free-energy change?
- A. Enthalpy and entropy are interchangeable measures of energy.
- B. At fixed enthalpy, increasing temperature makes the negative entropy term more influential in the Gibbs free-energy change.
- C. A positive entropy change guarantees spontaneity at every temperature.
- D. Temperature cannot affect the Gibbs free-energy change.
34. If the temperature of a reaction with a favorable entropy change increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. A positive entropy change guarantees spontaneity at every temperature.
- B. Temperature cannot affect the Gibbs free-energy change.
- C. Enthalpy and entropy are interchangeable measures of energy.
- D. The process becomes more favorable as temperature rises when the entropy change is positive.

35. Which comparison would most directly test whether the observed result is caused by the temperature of a reaction with a favorable entropy change rather than by a competing variable?
- A. Compare the same reaction at several temperatures while holding pressure and reactant amounts constant and estimating enthalpy and entropy under each condition.
 - B. The reaction becomes favorable only above a temperature threshold.
 - C. A positive entropy change guarantees spontaneity at every temperature.
 - D. Temperature cannot affect the Gibbs free-energy change.
36. In a related system, the temperature of a reaction with a favorable entropy change increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. The process becomes more favorable as temperature rises when the entropy change is positive.
 - B. Compare the same reaction at several temperatures while holding pressure and reactant amounts constant and estimating enthalpy and entropy under each condition.
 - C. A positive entropy change guarantees spontaneity at every temperature.
 - D. Temperature cannot affect the Gibbs free-energy change.

Passage 9: Membrane transport

A research team investigated electrochemical gradients using a controlled comparison. The investigators varied the concentration gradient of an ion and kept the other stated conditions as constant as possible. Their working model was that net ion movement reflects both concentration and electrical gradients across the membrane. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: With voltage fixed, increasing the ion concentration ratio increased the initial current through the open channels. The team concluded that an ion responds to the combined electrochemical gradient. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

37. Which observation from the study most directly supports the proposed relationship involving electrochemical gradients?
- A. ATP is required for every form of membrane movement.
 - B. Membrane composition cannot affect solute flux.
 - C. Net ion movement reflects both concentration and electrical gradients across the membrane.
 - D. Passive transport moves solute against its electrochemical gradient without energy input.
38. If the concentration gradient of an ion increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Membrane composition cannot affect solute flux.
 - B. Net ion movement initially increases in the direction favored by the larger concentration gradient.
 - C. Passive transport moves solute against its electrochemical gradient without energy input.
 - D. ATP is required for every form of membrane movement.
39. Which comparison would most directly test whether the observed result is caused by the concentration gradient of an ion rather than by a competing variable?

- A. Passive transport moves solute against its electrochemical gradient without energy input.
 - B. ATP is required for every form of membrane movement.
 - C. Keep membrane voltage and channel number fixed while varying the ion concentration ratio.
 - D. The reversal potential shifts when the concentration ratio changes.
40. In a related system, the concentration gradient of an ion increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Net ion movement initially increases in the direction favored by the larger concentration gradient.
 - B. ATP is required for every form of membrane movement.
 - C. Passive transport moves solute against its electrochemical gradient without energy input.
 - D. Keep membrane voltage and channel number fixed while varying the ion concentration ratio.

Passage 10: Nuclear chemistry

A research team investigated radioactive decay using a controlled comparison. The investigators varied the elapsed time after a sample is prepared and kept the other stated conditions as constant as possible. Their working model was that radioactive decay follows a characteristic half-life that is independent of the initial amount. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Samples of different starting activity lost the same fraction, rather than the same number of nuclei, during one half-life. The team concluded that each half-life removes half of the nuclei present at its beginning. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

41. Which observation from the study most directly supports the proposed relationship involving radioactive decay?
- A. Radioactive decay follows a characteristic half-life that is independent of the initial amount.
 - B. The same absolute number of nuclei disappears during every equal time interval.
 - C. Half-life changes when the amount of sample changes.
 - D. Radioactive decay requires a catalyst to proceed.
42. If the elapsed time after a sample is prepared increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Half-life changes when the amount of sample changes.
 - B. Radioactive decay requires a catalyst to proceed.
 - C. After one half-life, approximately half of the original radioactive nuclei remain.
 - D. The same absolute number of nuclei disappears during every equal time interval.
43. Which comparison would most directly test whether the observed result is caused by the elapsed time after a sample is prepared rather than by a competing variable?
- A. Half-life changes when the amount of sample changes.
 - B. Measure matched samples of the same isotope at several elapsed times while recording starting activity and keeping temperature constant.
 - C. Samples with different initial activities show the same fractional decrease.

- D. The same absolute number of nuclei disappears during every equal time interval.
44. In a related system, the elapsed time after a sample is prepared increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Half-life changes when the amount of sample changes.
 - B. After one half-life, approximately half of the original radioactive nuclei remain.
 - C. Measure matched samples of the same isotope at several elapsed times while recording starting activity and keeping temperature constant.
 - D. The same absolute number of nuclei disappears during every equal time interval.
45. A 0.50 mol sample occupies 2.0 L. Its molarity is:
- A. 1.0 M
 - B. 2.5 M
 - C. 4.0 M
 - D. 0.25 M
46. If a solution has pH 3, its hydrogen-ion concentration is:
- A. 0.333 M
 - B. 0.001 M
 - C. 3 M
 - D. 1000 M
47. A 2 kg object moving at 3 m/s has kinetic energy:
- A. 18 J
 - B. 3 J
 - C. 6 J
 - D. 9 J
48. A 12 V battery is connected to a 4 ohm resistor. The current is:
- A. 3 A
 - B. 8 A
 - C. 48 A
 - D. 0.33 A
49. Which change increases the rate of a reaction without changing the equilibrium constant?
- A. Removing all reactants
 - B. Lowering every collision energy
 - C. Changing the balanced equation

D. Adding a catalyst

50. A peptide bond forms between the:

A. two sugar molecules only

B. hydrogen atoms of water

C. amino group of one amino acid and carboxyl group of another

D. two phosphate groups

51. At constant temperature, doubling the volume of an ideal gas causes pressure to:

A. remain fixed

B. become negative

C. double

D. halve

52. The net work done by a constant force parallel to displacement is:

A. F divided by d

B. F times d

C. d divided by F

D. zero in every case

53. A reducing agent is oxidized because it:

A. gains electrons

B. loses electrons

C. gains protons only

D. loses neutrons

54. A buffer works best when:

A. all solute has precipitated

B. weak acid and conjugate base are present in comparable amounts

C. only strong acid is present

D. no solvent is present

55. The derivative of position with respect to time represents:

A. acceleration

B. force

C. power

D. velocity

56. A molecule with a polar covalent bond has:
- A. complete electron transfer only
 - B. no electrons
 - C. identical charges at every point
 - D. unequal sharing of electrons
57. If a reaction has a positive entropy change and negative enthalpy change, it is:
- A. unrelated to temperature
 - B. thermodynamically favorable at all temperatures
 - C. never favorable
 - D. favorable only at zero temperature
58. The pKa of an acid is the pH at which:
- A. acid and conjugate base concentrations are equal
 - B. all acid is gone
 - C. water is neutral only
 - D. the acid is fully protonated at every concentration
59. A semipermeable membrane allows water to cross but not a solute. Water moves toward:
- A. neither side under any condition
 - B. the side with greater effective solute concentration
 - C. the side with lower solute concentration
 - D. the side with no membrane

MCAT Critical Analysis and Reasoning Skills

Section timing: 90 minutes

Passage 1: Public memory and monuments

A community debates whether a monument should remain in a central square. One group treats it as a record of an earlier political order; another argues that its prominent location converts memory into present honor. The author does not treat removal as erasure. Relocation to a museum can preserve the object while changing the public meaning attached to it. The dispute therefore concerns not only what a society remembers but also who controls the setting in which remembering occurs. Responsible commemoration should make history visible without requiring the public to accept an inherited hierarchy as its own. The author distinguishes an object's physical survival from the social meaning of its placement. A museum label can make a history available for inspection, whereas a civic square can make an inherited hierarchy seem ordinary. This distinction does not settle every dispute about removal, but it changes the question from whether an object exists to what public arrangement asks viewers to honor. The passage distinguishes physical survival from civic honor. In the case of public memory and monuments, relocation changes the audience's relationship to an object; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering public memory and monuments, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of public memory and monuments then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, relocation changes the audience's relationship to an object. That observation does not settle every case, because visibility can normalize a hierarchy; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: compare preservation with placement, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about public memory and monuments might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking physical survival from civic honor can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about public memory and monuments. The closing claim about public memory and monuments follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should compare preservation with placement when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: setting changes the civic meaning of historical objects, provided the conditions that make that principle meaningful remain visible.

60. The passage is primarily concerned with which of the following?
- A. preservation does not determine what a public setting honors
 - B. a familiar practice should be accepted without qualification
 - C. the issue can be settled by choosing between two absolute positions
 - D. personal response makes public reasoning unnecessary
61. The author's discussion of public memory and monuments most nearly reveals which point?
- A. a historical description that replaces the author's argument
 - B. the relocation example separates keeping an object from endorsing its former civic role
 - C. a background detail that has no effect on the conclusion
 - D. that the practice has no legitimate use
62. Which inference is most strongly supported by the passage?

- A. a monument can remain historically available while its prominent placement still communicates present approval
- B. Any qualification makes a recommendation impossible.
- C. A visible result is always more important than an indirect consequence.
- D. The author believes disagreement cannot be reasoned about.

63. Which of the following would most seriously challenge the author's reasoning?

- A. A preference for a different style of presentation.
- B. the object has the same public meaning wherever it is placed
- C. A case that repeats the opening example without adding evidence.
- D. A statement that the topic is difficult to discuss.

64. The author's method could be applied most appropriately by a reader who would:

- A. evaluate both the record preserved and the hierarchy signaled by the setting
- B. judge the issue only by its most visible result
- C. reject the practice whenever any cost is present
- D. treat a confident description as evidence of its own accuracy

65. A city moves a monument from its civic plaza to a museum with a contextual label. Which judgment best applies the passage's method?

- A. judged the issue only by its most visible result
- B. rejected the practice whenever any cost was present
- C. treated confidence as evidence of accuracy
- D. It preserves access to the record while reconsidering what the civic setting publicly honors.

Passage 2: The value of idleness

Some writers praise idleness as the enemy of productivity, while others defend unoccupied time as a condition for reflection. The author distinguishes passive delay from deliberate unstructured attention. A person who walks without a destination may notice relationships that a schedule would hide. The author does not claim that every idle hour produces insight. Rather, a culture organized entirely around measurable output loses thought that cannot be assigned a predictable duration. Idleness is treated less as a moral virtue than as a practical space where unexpected connections can appear. The author is careful about the difference between unstructured attention and avoidance. A person who refuses every obligation is not thereby more perceptive. The narrower claim concerns intervals in which attention is not assigned an output in advance. Such intervals can expose relationships that a production schedule would treat as irrelevant, although the resulting insight cannot be guaranteed. The passage distinguishes unassigned attention from avoidance. In the case of the value of idleness, a schedule measures output but not every form of noticing; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering the value of idleness, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of the value of idleness then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, a schedule measures output but not every form of noticing. That observation does not settle every case, because insight is possible without being guaranteed; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: judge an interval by its effects rather than by a moral label, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about the value of idleness might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking unassigned attention from avoidance can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about the value of idleness. The closing claim about the value of idleness follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should judge an interval by its effects rather than by a moral label when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: unstructured time can support forms of thought that schedules suppress, provided the conditions that make that principle meaningful remain visible.

66. The passage is primarily concerned with which of the following?
- A. a familiar practice should be accepted without qualification
 - B. the issue can be settled by choosing between two absolute positions
 - C. personal response makes public reasoning unnecessary
 - D. unstructured time can support attention without becoming a universal virtue
67. The author's discussion of the value of idleness most nearly reveals which point?
- A. a historical description that replaces the author's argument
 - B. the walking example distinguishes deliberate openness from refusal of responsibility
 - C. a background detail that has no effect on the conclusion
 - D. that the practice has no legitimate use
68. Which inference is most strongly supported by the passage?
- A. Any qualification makes a recommendation impossible.
 - B. A visible result is always more important than an indirect consequence.

- C. The author believes disagreement cannot be reasoned about.
 - D. a scheduled activity can be productive while still excluding discoveries that have no preset output
69. Which of the following would most seriously challenge the author's reasoning?
- A. all unstructured time produces valuable insight
 - B. A case that repeats the opening example without adding evidence.
 - C. A statement that the topic is difficult to discuss.
 - D. A preference for a different style of presentation.
70. The author's method could be applied most appropriately by a reader who would:
- A. compare the kind of attention an interval permits with the obligations it displaces
 - B. judge the issue only by its most visible result
 - C. reject the practice whenever any cost is present
 - D. treat a confident description as evidence of its own accuracy
71. A school protects a short period for unguided observation and evaluates the reflections rather than counting immediate products. Which judgment best applies the passage's method?
- A. judged the issue only by its most visible result
 - B. rejected the practice whenever any cost was present
 - C. treated confidence as evidence of accuracy
 - D. It tests whether unassigned attention creates useful noticing without treating all unstructured time as valuable.

Passage 3: Maps and authority

A map appears to offer neutral description, but every map selects some features and omits others. A map designed for taxation emphasizes parcels; one designed for evacuation emphasizes routes and hazards. Neither is simply false, yet each directs attention toward a particular purpose. The appearance of precision can disguise the choices that produced the representation. Readers should ask what a map was made to accomplish before treating it as a complete account of a place. Maps are useful, but their usefulness depends on recognizing their intended function. The choice of scale, boundary, and symbol is therefore part of the map's argument. A road map and a map of flood risk may represent the same place without answering the same question. Precision in measurement does not erase selectivity in design. The reader's task is to connect a representation to the decision it is meant to support. The passage distinguishes selection from neutrality. In the case of maps and authority, scale, boundary, and symbol encode a purpose; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering maps and authority, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of maps and authority then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, scale, boundary, and symbol encode a purpose. That observation does not settle every case, because precision can conceal omission; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: ask which decision the representation is meant to support, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about maps and authority might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking selection from neutrality can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about maps and authority. The closing claim about maps and authority follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should ask which decision the representation is meant to support when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: a representation is shaped by the purpose for which it was made, provided the conditions that make that principle meaningful remain visible.

- 72.** The passage is primarily concerned with which of the following?
- A. a familiar practice should be accepted without qualification
 - B. the issue can be settled by choosing between two absolute positions
 - C. personal response makes public reasoning unnecessary
 - D. a map's purpose shapes what counts as relevant detail
- 73.** The author's discussion of maps and authority most nearly reveals which point?
- A. a historical description that replaces the author's argument
 - B. the tax and evacuation examples show that different selections can be accurate for different decisions
 - C. a background detail that has no effect on the conclusion
 - D. that the practice has no legitimate use
- 74.** Which inference is most strongly supported by the passage?
- A. Any qualification makes a recommendation impossible.
 - B. A visible result is always more important than an indirect consequence.
 - C. The author believes disagreement cannot be reasoned about.

D. precision does not turn a purpose-built representation into a complete account

75. Which of the following would most seriously challenge the author's reasoning?

- A. a map includes every feature of the place equally
- B. A case that repeats the opening example without adding evidence.
- C. A statement that the topic is difficult to discuss.
- D. A preference for a different style of presentation.

76. The author's method could be applied most appropriately by a reader who would:

- A. judge the issue only by its most visible result
- B. reject the practice whenever any cost is present
- C. treat a confident description as evidence of its own accuracy
- D. ask what decision the map's omissions and symbols are designed to support

77. An emergency map emphasizes flood depth and evacuation routes but omits businesses that are irrelevant to the evacuation decision. Which judgment best applies the passage's method?

- A. It evaluates the map by the decision it supports rather than demanding that it represent every feature equally.
- B. judged the issue only by its most visible result
- C. rejected the practice whenever any cost was present
- D. treated confidence as evidence of accuracy

Passage 4: Comedy and social permission

Comedy can challenge social rules while sometimes reinforcing them. A joke may expose a contradiction by making an audience laugh at authority, but laughter can also release tension without changing authority's position. The author rejects a simple equation between humor and resistance. The effect depends on who tells the joke, who is allowed to laugh, and whether the target can answer back. Comedy may create temporary distance from convention, yet that distance can close when the audience returns to ordinary habits. Political evaluation therefore requires attention to consequences, not merely rebellious tone. The author therefore asks readers to examine the social distribution of laughter. A joke that lets an audience imagine dissent may still leave the institution untouched if the audience receives release without changing practice. Conversely, a comic form can create a vocabulary for criticism when its targets can no longer control the interpretation. The effect is conditional, not automatic. The passage distinguishes temporary release from durable resistance. In the case of comedy and social permission, the distribution of laughter determines who can answer back; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering comedy and social permission, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of comedy and social permission then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, the distribution of laughter determines who can answer back. That observation does not settle every case, because distance from convention may close without changed practice; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: trace consequences rather than rewarding rebellious tone, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about comedy and social permission might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking temporary release from durable resistance can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about comedy and social permission. The closing claim about comedy and social permission follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should trace consequences rather than rewarding rebellious tone when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: humor may interrupt authority without necessarily transforming it, provided the conditions that make that principle meaningful remain visible.

78. The passage is primarily concerned with which of the following?
- A. a familiar practice should be accepted without qualification
 - B. the issue can be settled by choosing between two absolute positions
 - C. personal response makes public reasoning unnecessary
 - D. humor's political effect depends on social consequences rather than rebellious appearance
79. The author's discussion of comedy and social permission most nearly reveals which point?
- A. that the practice has no legitimate use
 - B. a historical description that replaces the author's argument
 - C. the audience and target determine whether laughter opens or closes room for criticism
 - D. a background detail that has no effect on the conclusion
80. Which inference is most strongly supported by the passage?
- A. The author believes disagreement cannot be reasoned about.
 - B. a joke can expose contradiction while leaving the institution's practice unchanged

- C. Any qualification makes a recommendation impossible.
- D. A visible result is always more important than an indirect consequence.

81. Which of the following would most seriously challenge the author's reasoning?

- A. laughter necessarily transfers power to the target of a joke
- B. A case that repeats the opening example without adding evidence.
- C. A statement that the topic is difficult to discuss.
- D. A preference for a different style of presentation.

82. The author's method could be applied most appropriately by a reader who would:

- A. treat a confident description as evidence of its own accuracy
- B. trace who can answer, what changes afterward, and whether release substitutes for action
- C. judge the issue only by its most visible result
- D. reject the practice whenever any cost is present

83. A satirical performance criticizes a public agency, but the audience's laughter is followed by no change in the agency's practice. Which judgment best applies the passage's method?

- A. treated confidence as evidence of accuracy
- B. It distinguishes the release produced by the joke from evidence that the institution's power actually changed.
- C. judged the issue only by its most visible result
- D. rejected the practice whenever any cost was present

Passage 5: Craft and authenticity

A novelist claims that natural writing should arrive without visible labor. The author disputes this by comparing literary craft to skilled translation. A finished sentence may seem inevitable precisely because revision removed the alternatives that would reveal its construction. Hidden labor does not make a result artificial; it makes the writer responsible for the effects of form. Excessive polish can flatten a voice, but spontaneity is an insufficient standard. Authenticity is not the absence of technique but the fit between technique and the experience a work seeks to communicate. Revision is presented as a form of fidelity rather than concealment. The writer tests whether the rhythm, omission, and emphasis suit the experience being represented. The visible smoothness of the final sentence may be evidence that alternatives were considered and rejected. What matters is not whether labor can be seen but whether the form remains answerable to the work's subject. The passage distinguishes visible spontaneity from faithful construction. In the case of craft and authenticity, revision removes alternatives that would distract from the experience; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering craft and authenticity, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of craft and authenticity then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, revision removes alternatives that would distract from the experience. That observation does not settle every case, because polish can flatten a voice without making technique suspect; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: test the fit between form and the subject represented, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about craft and authenticity might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking visible spontaneity from faithful construction can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about craft and authenticity. The closing claim about craft and authenticity follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should test the fit between form and the subject represented when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: authenticity can be produced through disciplined craft, provided the conditions that make that principle meaningful remain visible.

84. The passage is primarily concerned with which of the following?
- A. technique can make a work feel faithful rather than artificial
 - B. a familiar practice should be accepted without qualification
 - C. the issue can be settled by choosing between two absolute positions
 - D. personal response makes public reasoning unnecessary
85. The author's discussion of craft and authenticity most nearly reveals which point?
- A. a historical description that replaces the author's argument
 - B. revision shows how hidden choices can produce an apparently inevitable sentence
 - C. a background detail that has no effect on the conclusion
 - D. that the practice has no legitimate use
86. Which inference is most strongly supported by the passage?
- A. Any qualification makes a recommendation impossible.
 - B. A visible result is always more important than an indirect consequence.

- C. The author believes disagreement cannot be reasoned about.
 - D. spontaneous wording is not a sufficient test of authenticity
87. Which of the following would most seriously challenge the author's reasoning?
- A. A case that repeats the opening example without adding evidence.
 - B. A statement that the topic is difficult to discuss.
 - C. A preference for a different style of presentation.
 - D. visible labor always makes a voice less genuine
88. The author's method could be applied most appropriately by a reader who would:
- A. judge whether formal choices remain answerable to the experience represented
 - B. judge the issue only by its most visible result
 - C. reject the practice whenever any cost is present
 - D. treat a confident description as evidence of its own accuracy
89. A writer revises sentence rhythm and removes familiar phrases so that a character's experience is represented more precisely. Which judgment best applies the passage's method?
- A. treated confidence as evidence of accuracy
 - B. It treats revision as potentially faithful when the formal choices remain answerable to the experience represented.
 - C. judged the issue only by its most visible result
 - D. rejected the practice whenever any cost was present

Passage 6: Public health and trust

A public health campaign may assume that accurate information produces compliance. The author argues that accuracy is necessary but not sufficient. People judge the messenger, the fairness of the request, and whether institutions have previously acknowledged uncertainty. A campaign that treats hesitation as ignorance may intensify distrust even when its facts are correct. The better approach explains what is known, what is not, and how decisions may be revised. Trust is not a substitute for evidence; it is a condition that helps evidence become actionable. The author also rejects the idea that transparency means listing every uncertainty without judgment. Institutions must identify which uncertainties matter for the decision and what evidence would change the recommendation. Trust grows when revision is explained rather than hidden. Accuracy remains indispensable, but it becomes useful through a relationship in which people can evaluate the messenger's conduct. The passage distinguishes accurate information from actionable communication. In the case of public health and trust, fairness and transparent revision affect whether evidence can be used; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering public health and trust, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of public health and trust then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, fairness and transparent revision affect whether evidence can be used. That observation does not settle every case, because uncertainty can increase trust when its limits are specific; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: evaluate the relationship between messenger and audience, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about public health and trust might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking accurate information from actionable communication can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about public health and trust. The closing claim about public health and trust follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should evaluate the relationship between messenger and audience when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: trust depends on transparent relationships as well as accurate facts, provided the conditions that make that principle meaningful remain visible.

90. The passage is primarily concerned with which of the following?
- A. the issue can be settled by choosing between two absolute positions
 - B. personal response makes public reasoning unnecessary
 - C. accurate information becomes actionable through a fair and transparent relationship
 - D. a familiar practice should be accepted without qualification
91. The author's discussion of public health and trust most nearly reveals which point?
- A. the campaign example shows why acknowledging revision can matter as much as stating facts
 - B. a background detail that has no effect on the conclusion
 - C. that the practice has no legitimate use
 - D. a historical description that replaces the author's argument
92. Which inference is most strongly supported by the passage?
- A. A visible result is always more important than an indirect consequence.
 - B. The author believes disagreement cannot be reasoned about.

- C. a correct recommendation may fail when the audience cannot evaluate the messenger's conduct
- D. Any qualification makes a recommendation impossible.

93. Which of the following would most seriously challenge the author's reasoning?

- A. A statement that the topic is difficult to discuss.
- B. A preference for a different style of presentation.
- C. transparency requires listing every uncertainty without prioritizing any
- D. A case that repeats the opening example without adding evidence.

94. The author's method could be applied most appropriately by a reader who would:

- A. reject the practice whenever any cost is present
- B. treat a confident description as evidence of its own accuracy
- C. consider evidence, fairness, and the conditions under which people can act on it
- D. judge the issue only by its most visible result

95. A health agency explains why its recommendation changed, identifies the uncertainty that mattered, and states what evidence would change it again. Which judgment best applies the passage's method?

- A. judged the issue only by its most visible result
- B. rejected the practice whenever any cost was present
- C. treated confidence as evidence of accuracy
- D. It treats transparency as actionable explanation rather than an undifferentiated list of every uncertainty.

Passage 7: The politics of queues

Queues are often described as impersonal mechanisms that give everyone an equal chance. The author notes that a queue can be fair in one sense while imposing unequal costs on people with different time, mobility, or information. A first-come rule ignores that arriving early may be easier for one group than another. Queues remain useful, but should be evaluated by the burdens they distribute as well as the order they produce. Efficiency and fairness may converge, but they cannot be assumed to do so. The queue's apparent neutrality can therefore conceal a theory of whose time counts. A rule may distribute places evenly while distributing waiting unequally. The author favors comparison among procedures rather than a universal rejection of order. The proper question is which arrangement meets the purpose with the least unjustified burden. The passage distinguishes equal order from equal burden. In the case of the politics of queues, time, mobility, and information affect the cost of waiting; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering the politics of queues, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of the politics of queues then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, time, mobility, and information affect the cost of waiting. That observation does not settle every case, because a first-come rule can distribute places evenly while distributing sacrifice unevenly; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: compare procedures by purpose and burden, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about the politics of queues might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking equal order from equal burden can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about the politics of queues. The closing claim about the politics of queues follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should compare procedures by purpose and burden when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: procedural equality does not guarantee equal burden, provided the conditions that make that principle meaningful remain visible.

96. The passage is primarily concerned with which of the following?
- A. equal sequence does not by itself create equal burden
 - B. a familiar practice should be accepted without qualification
 - C. the issue can be settled by choosing between two absolute positions
 - D. personal response makes public reasoning unnecessary
97. The author's discussion of the politics of queues most nearly reveals which point?
- A. that the practice has no legitimate use
 - B. a historical description that replaces the author's argument
 - C. the first-come rule exposes how time and mobility alter the cost of the same procedure
 - D. a background detail that has no effect on the conclusion
98. Which inference is most strongly supported by the passage?
- A. The author believes disagreement cannot be reasoned about.
 - B. a queue can be procedurally even while imposing unequal waiting costs
 - C. Any qualification makes a recommendation impossible.

D. A visible result is always more important than an indirect consequence.

99. Which of the following would most seriously challenge the author's reasoning?

A. A preference for a different style of presentation.

B. a first-come rule gives every person the same practical opportunity to arrive early

C. A case that repeats the opening example without adding evidence.

D. A statement that the topic is difficult to discuss.

100. The author's method could be applied most appropriately by a reader who would:

A. reject the practice whenever any cost is present

B. treat a confident description as evidence of its own accuracy

C. compare procedures by the burdens they distribute, not only by the order they produce

D. judge the issue only by its most visible result

101. A clinic replaces first-come service with scheduled access and accommodations for people who cannot wait for hours. Which judgment best applies the passage's method?

A. rejected the practice whenever any cost was present

B. treated confidence as evidence of accuracy

C. It compares procedures by the burdens they distribute instead of assuming equal sequence creates equal opportunity.

D. judged the issue only by its most visible result

Passage 8: Scientific metaphors

Metaphors make unfamiliar processes thinkable, but they also import associations that may not fit. Calling the brain a computer can emphasize information processing while obscuring embodiment and emotion. The author recommends using metaphors provisionally, asking what each reveals and hides. The goal is not literal accuracy in every detail, which a metaphor cannot provide, but disciplined comparison. A metaphor earns its keep when it generates questions rather than ending inquiry with a familiar image. A metaphor is most productive when its mismatch becomes visible. The computer analogy may invite questions about coding and storage, but the questions change once emotion, bodily regulation, or social context enters the picture. The author treats this friction as a resource for inquiry, provided that readers do not mistake a useful comparison for an identity. The passage distinguishes a revealing comparison from a complete identity. In the case of scientific metaphors, the computer analogy foregrounds processing while hiding embodiment; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering scientific metaphors, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of scientific metaphors then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, the computer analogy foregrounds processing while hiding embodiment. That observation does not settle every case, because a mismatch can generate a better question; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: use a metaphor provisionally and test its limits, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about scientific metaphors might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking a revealing comparison from a complete identity can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about scientific metaphors. The closing claim about scientific metaphors follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should use a metaphor provisionally and test its limits when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: a useful metaphor should guide inquiry while revealing its limits, provided the conditions that make that principle meaningful remain visible.

102. The passage is primarily concerned with which of the following?
- A. personal response makes public reasoning unnecessary
 - B. a metaphor is useful when its limits remain available for inspection
 - C. a familiar practice should be accepted without qualification
 - D. the issue can be settled by choosing between two absolute positions
103. The author's discussion of scientific metaphors most nearly reveals which point?
- A. the computer analogy makes one feature visible while inviting questions about what it leaves out
 - B. a background detail that has no effect on the conclusion
 - C. that the practice has no legitimate use
 - D. a historical description that replaces the author's argument
104. Which inference is most strongly supported by the passage?
- A. a mismatch between metaphor and subject can generate rather than end inquiry
 - B. Any qualification makes a recommendation impossible.
 - C. A visible result is always more important than an indirect consequence.

D. The author believes disagreement cannot be reasoned about.

105. Which of the following would most seriously challenge the author's reasoning?

- A. a familiar metaphor supplies a complete literal model
- B. A case that repeats the opening example without adding evidence.
- C. A statement that the topic is difficult to discuss.
- D. A preference for a different style of presentation.

106. The author's method could be applied most appropriately by a reader who would:

- A. reject the practice whenever any cost is present
- B. treat a confident description as evidence of its own accuracy
- C. use the comparison to form a question, then test where the comparison breaks
- D. judge the issue only by its most visible result

107. A teacher uses a computer metaphor for memory, then asks students where bodily and social context make the comparison fail. Which judgment best applies the passage's method?

- A. judged the issue only by its most visible result
- B. rejected the practice whenever any cost was present
- C. treated confidence as evidence of accuracy
- D. It uses the metaphor to generate a testable question without treating the comparison as a complete identity.

Passage 9: Education and uncertainty

A school that rewards only correct answers may teach students to hide uncertainty rather than investigate it. The author argues that intellectual confidence should mean willingness to revise a belief when evidence changes, not certainty before evidence is available. Students can rank explanations while acknowledging what would change their minds. The author favors classrooms where reasons are examined publicly and revision is treated as progress. The concern is not indecision but the confusion of confidence with infallibility. The classroom described by the author does not reward indecision for its own sake. It rewards reasons that identify what is known, what is uncertain, and what evidence would discriminate among explanations. A student can therefore be confident in a method while provisional about a conclusion. Revision becomes a sign that reasoning has responded to evidence. The passage distinguishes methodological confidence from premature certainty. In the case of education and uncertainty, students can rank explanations and state what would change their minds; this is why the author resists treating the first appearance of the issue as its complete meaning. For readers considering education and uncertainty, the point is not that the familiar description is false, but that it leaves out the condition that makes the description reliable or unreliable. The analysis of education and uncertainty then turns that distinction into a method. A reader must identify the purpose at stake, inspect the process by which the claimed effect occurs, and ask who or what bears the consequence. Here, students can rank explanations and state what would change their minds. That observation does not settle every case, because revision can be progress rather than failure; it tells the reader what additional evidence or comparison is needed. The author therefore preserves a limited benefit while rejecting an unqualified generalization. The passage's standard is practical: separate confidence in a method from confidence in a conclusion, then revise the judgment if the relevant conditions differ. A reader who wants a simple rule about education and uncertainty might therefore find the conclusion unsatisfying. The author accepts that cost because overlooking methodological confidence from premature certainty can mistake a visible result for a complete evaluation. A stronger objection would have to show not merely that the practice sometimes works, but that the omitted condition does not alter the outcome in the cases under discussion. Conversely, a qualification is not a command to reject the practice. It is a request to compare concrete arrangements, identify their effects, and keep the argument answerable to evidence about education and uncertainty. The closing claim about education and uncertainty follows from that discipline of comparison. The author does not deny the initial observation; the author denies that it is sufficient by itself. For this topic, the decision-maker should separate confidence in a method from confidence in a conclusion when the audience, setting, timing, and distribution of burdens change. A conclusion that preserves these limits may sound less dramatic than a universal rule, but it travels better across new examples. The reader is left with a qualified principle: intellectual confidence includes disciplined willingness to revise, provided the conditions that make that principle meaningful remain visible.

108. The passage is primarily concerned with which of the following?
- A. a familiar practice should be accepted without qualification
 - B. the issue can be settled by choosing between two absolute positions
 - C. personal response makes public reasoning unnecessary
 - D. intellectual confidence includes disciplined revision
109. The author's discussion of education and uncertainty most nearly reveals which point?
- A. that the practice has no legitimate use
 - B. a historical description that replaces the author's argument
 - C. the classroom example turns uncertainty into a reasoned comparison of explanations
 - D. a background detail that has no effect on the conclusion
110. Which inference is most strongly supported by the passage?
- A. A visible result is always more important than an indirect consequence.
 - B. The author believes disagreement cannot be reasoned about.

- C. a student can be confident in a method while provisional about a conclusion
- D. Any qualification makes a recommendation impossible.

111. Which of the following would most seriously challenge the author's reasoning?

- A. A statement that the topic is difficult to discuss.
- B. A preference for a different style of presentation.
- C. the best classroom rewards only immediate correctness
- D. A case that repeats the opening example without adding evidence.

112. The author's method could be applied most appropriately by a reader who would:

- A. reject the practice whenever any cost is present
- B. treat a confident description as evidence of its own accuracy
- C. ask what evidence would change the student's ranking of explanations
- D. judge the issue only by its most visible result

MCAT Biological and Biochemical Foundations of Living Systems

Section timing: 95 minutes

Passage 1: Enzyme kinetics

A research team investigated enzyme activity using a controlled comparison. The investigators varied substrate concentration and kept the other stated conditions as constant as possible. Their working model was that an enzyme-catalyzed reaction approaches a maximum rate as active sites become saturated. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Velocity rose rapidly at low substrate concentration and approached a plateau at high concentration. The team concluded that finite active-site availability produces saturation behavior. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

113. Which observation from the study most directly supports the proposed relationship involving enzyme activity?
- A. Velocity continues to rise linearly without approaching a plateau.
 - B. An enzyme-catalyzed reaction approaches a maximum rate as active sites become saturated.
 - C. Velocity decreases immediately as substrate rises for every enzyme.
 - D. Enzyme concentration alone determines velocity regardless of substrate concentration.
114. If substrate concentration increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Velocity rises at first and then approaches a plateau.
 - B. Velocity decreases immediately as substrate rises for every enzyme.
 - C. Enzyme concentration alone determines velocity regardless of substrate concentration.
 - D. Velocity continues to rise linearly without approaching a plateau.
115. Which comparison would most directly test whether the observed result is caused by substrate concentration rather than by a competing variable?
- A. Measure the same enzyme with substrate varied and enzyme concentration fixed.
 - B. A velocity-versus-substrate plot rises and approaches a plateau, while a double-reciprocal plot of $1/v$ against $1/[S]$ is linear.
 - C. Velocity decreases immediately as substrate rises for every enzyme.
 - D. Enzyme concentration alone determines velocity regardless of substrate concentration.
116. In a related system, substrate concentration increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Velocity rises at first and then approaches a plateau.
 - B. Enzyme concentration alone determines velocity regardless of substrate concentration.
 - C. Velocity decreases immediately as substrate rises for every enzyme.
 - D. Measure the same enzyme with substrate varied and enzyme concentration fixed.

117. Which additional result would most strengthen the claim about enzyme activity?
- A. Velocity continues to rise linearly without approaching a plateau.
 - B. A velocity-versus-substrate plot rises and approaches a plateau, while a double-reciprocal plot of $1/v$ against $1/[S]$ is linear.
 - C. Velocity decreases immediately as substrate rises for every enzyme.
 - D. Enzyme concentration alone determines velocity regardless of substrate concentration.

Passage 2: Gene expression

A research team investigated transcription using a controlled comparison. The investigators varied the availability of an activating transcription factor and kept the other stated conditions as constant as possible. Their working model was that a transcription factor can change rna production by binding a regulatory dna sequence. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Target-gene RNA increased in cells receiving the activating factor before the encoded protein increased. The team concluded that regulatory proteins influence whether RNA polymerase initiates transcription efficiently. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

118. Which observation from the study most directly supports the proposed relationship involving transcription?
- A. Translation occurs before transcription in a eukaryotic cell.
 - B. Every change in gene expression requires a change in DNA sequence.
 - C. Ribosomes bind regulatory DNA to initiate transcription.
 - D. A transcription factor can change RNA production by binding a regulatory DNA sequence.
119. If the availability of an activating transcription factor increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Ribosomes bind regulatory DNA to initiate transcription.
 - B. Messenger RNA for the target gene increases when an activating factor is available.
 - C. Translation occurs before transcription in a eukaryotic cell.
 - D. Every change in gene expression requires a change in DNA sequence.
120. Which comparison would most directly test whether the observed result is caused by the availability of an activating transcription factor rather than by a competing variable?
- A. Target-gene RNA rises before the encoded protein increases.
 - B. Translation occurs before transcription in a eukaryotic cell.
 - C. Every change in gene expression requires a change in DNA sequence.
 - D. Compare cells with and without the factor while keeping promoter sequence identical.
121. In a related system, the availability of an activating transcription factor increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Every change in gene expression requires a change in DNA sequence.
 - B. Messenger RNA for the target gene increases when an activating factor is available.

- C. Compare cells with and without the factor while keeping promoter sequence identical.
- D. Translation occurs before transcription in a eukaryotic cell.

122. Which additional result would most strengthen the claim about transcription?

- A. Ribosomes bind regulatory DNA to initiate transcription.
- B. Target-gene RNA rises before the encoded protein increases.
- C. Translation occurs before transcription in a eukaryotic cell.
- D. Every change in gene expression requires a change in DNA sequence.

Passage 3: Membrane transport

A research team investigated solute movement using a controlled comparison. The investigators varied the concentration gradient and kept the other stated conditions as constant as possible. Their working model was that passive transport moves solute down its electrochemical gradient without direct ATP use. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: With voltage fixed, increasing the ion concentration ratio increased the initial current through the open channels. The team concluded that net passive flux depends on the gradient, while a finite transporter population can become occupied. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

123. Which observation from the study most directly supports the proposed relationship involving solute movement?

- A. ATP is required for every form of membrane movement.
- B. Membrane composition cannot affect solute flux.
- C. Passive transport moves solute down its electrochemical gradient without direct ATP use.
- D. Passive transport moves solute against its electrochemical gradient without energy input.

124. If the concentration gradient increases while the other stated conditions remain fixed, which result best follows from the passage's model?

- A. Passive transport moves solute against its electrochemical gradient without energy input.
- B. ATP is required for every form of membrane movement.
- C. Membrane composition cannot affect solute flux.
- D. Net movement increases as the concentration gradient becomes larger, until another transport limit is reached.

125. Which comparison would most directly test whether the observed result is caused by the concentration gradient rather than by a competing variable?

- A. ATP is required for every form of membrane movement.
- B. Use identical membranes and vary only the starting concentration difference.
- C. Blocking the transporter reduces flux without changing the gradient.
- D. Passive transport moves solute against its electrochemical gradient without energy input.

126. In a related system, the concentration gradient increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Use identical membranes and vary only the starting concentration difference.
 - B. ATP is required for every form of membrane movement.
 - C. Net movement increases as the concentration gradient becomes larger, until another transport limit is reached.
 - D. Passive transport moves solute against its electrochemical gradient without energy input.
127. Which additional result would most strengthen the claim about solute movement?
- A. Blocking the transporter reduces flux without changing the gradient.
 - B. Passive transport moves solute against its electrochemical gradient without energy input.
 - C. ATP is required for every form of membrane movement.
 - D. Membrane composition cannot affect solute flux.

Passage 4: Cardiovascular physiology

A research team investigated cardiac output using a controlled comparison. The investigators varied heart rate at fixed stroke volume and kept the other stated conditions as constant as possible. Their working model was that measured cardiac output rises in the same proportion as heart rate across fixed-stroke-volume trials. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Direct flow measurements matched the product of heart rate and stroke volume during the transient interval studied. The team concluded that the product of rate and volume determines output. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

128. Which observation from the study most directly supports the proposed relationship involving cardiac output?
- A. Measured cardiac output rises in the same proportion as heart rate across fixed-stroke-volume trials.
 - B. Cardiac output equals blood pressure divided by oxygen concentration.
 - C. Heart rate and stroke volume cannot influence the same output.
 - D. Cardiac output is independent of volume ejected per beat.
129. If heart rate at fixed stroke volume increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Cardiac output equals blood pressure divided by oxygen concentration.
 - B. Heart rate and stroke volume cannot influence the same output.
 - C. Cardiac output is independent of volume ejected per beat.
 - D. Cardiac output increases when heart rate rises if stroke volume is unchanged.
130. Which comparison would most directly test whether the observed result is caused by heart rate at fixed stroke volume rather than by a competing variable?
- A. Heart rate and stroke volume cannot influence the same output.

- B. Measure output while keeping stroke volume and venous return constant.
 - C. Direct flow measurement matches the predicted product.
 - D. Cardiac output equals blood pressure divided by oxygen concentration.
131. In a related system, heart rate at fixed stroke volume increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Cardiac output increases when heart rate rises if stroke volume is unchanged.
 - B. Heart rate and stroke volume cannot influence the same output.
 - C. Cardiac output equals blood pressure divided by oxygen concentration.
 - D. Measure output while keeping stroke volume and venous return constant.
132. Which additional result would most strengthen the claim about cardiac output?
- A. Direct flow measurement matches the predicted product.
 - B. Cardiac output equals blood pressure divided by oxygen concentration.
 - C. Heart rate and stroke volume cannot influence the same output.
 - D. Cardiac output is independent of volume ejected per beat.

Passage 5: Respiratory physiology

A research team investigated oxygen binding using a controlled comparison. The investigators varied blood oxygen partial pressure and kept the other stated conditions as constant as possible. Their working model was that hemoglobin saturation changes with oxygen partial pressure according to a sigmoidal binding curve. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: At matched temperature and pH, hemoglobin saturation increased with oxygen partial pressure, with the steepest change in the middle of the binding curve. The team concluded that cooperative binding creates a curve with plateau and steep regions. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

133. Which observation from the study most directly supports the proposed relationship involving oxygen binding?
- A. pH cannot alter hemoglobin's oxygen affinity.
 - B. Hemoglobin saturation changes with oxygen partial pressure according to a sigmoidal binding curve.
 - C. Hemoglobin saturation changes linearly with oxygen pressure at every range.
 - D. Hemoglobin binds oxygen irreversibly under physiological conditions.
134. If blood oxygen partial pressure increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Hemoglobin binds oxygen irreversibly under physiological conditions.
 - B. pH cannot alter hemoglobin's oxygen affinity.
 - C. At high partial pressure, a moderate increase produces a smaller saturation increase than it would in the steep region.
 - D. Hemoglobin saturation changes linearly with oxygen pressure at every range.

135. Which comparison would most directly test whether the observed result is caused by blood oxygen partial pressure rather than by a competing variable?
- A. Measure saturation with temperature and pH fixed.
 - B. The curve shifts when pH changes at constant oxygen pressure.
 - C. Hemoglobin saturation changes linearly with oxygen pressure at every range.
 - D. Hemoglobin binds oxygen irreversibly under physiological conditions.
136. In a related system, blood oxygen partial pressure increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Hemoglobin saturation changes linearly with oxygen pressure at every range.
 - B. Hemoglobin binds oxygen irreversibly under physiological conditions.
 - C. At high partial pressure, a moderate increase produces a smaller saturation increase than it would in the steep region.
 - D. Measure saturation with temperature and pH fixed.

Passage 6: Genetics

A research team investigated linkage using a controlled comparison. The investigators varied the distance between loci and kept the other stated conditions as constant as possible. Their working model was that recombination frequency generally increases as the distance between linked loci increases. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The recombinant fraction was larger for the more distant pair of loci in the three-point cross. The team concluded that crossing over is more likely between loci that are farther apart. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

137. Which observation from the study most directly supports the proposed relationship involving linkage?
- A. Recombination frequency is unrelated to the distance between loci.
 - B. Every offspring produced by a linked cross is recombinant.
 - C. Recombination frequency generally increases as the distance between linked loci increases.
 - D. Linked loci always segregate together without recombination.
138. If the distance between loci increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Linked loci always segregate together without recombination.
 - B. Recombination frequency is unrelated to the distance between loci.
 - C. Every offspring produced by a linked cross is recombinant.
 - D. More distant loci produce a larger fraction of recombinant gametes.
139. Which comparison would most directly test whether the observed result is caused by the distance between loci rather than by a competing variable?
- A. Use the same heterozygous parent and score many offspring.
 - B. A three-point cross places the loci in the predicted order.

- C. Linked loci always segregate together without recombination.
- D. Recombination frequency is unrelated to the distance between loci.

140. In a related system, the distance between loci increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Recombination frequency is unrelated to the distance between loci.
 - B. More distant loci produce a larger fraction of recombinant gametes.
 - C. Linked loci always segregate together without recombination.
 - D. Use the same heterozygous parent and score many offspring.

Passage 7: Metabolism

A research team investigated oxidative phosphorylation using a controlled comparison. The investigators varied the proton gradient across the inner mitochondrial membrane and kept the other stated conditions as constant as possible. Their working model was that atp synthase uses the proton gradient to drive phosphorylation of adp. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Increasing the usable proton gradient increased ATP output until oxygen delivery became limiting. The team concluded that the gradient stores electrochemical energy used by ATP synthase. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

141. Which observation from the study most directly supports the proposed relationship involving oxidative phosphorylation?
- A. The proton gradient exists only in the nucleus.
 - B. ATP synthase uses the proton gradient to drive phosphorylation of ADP.
 - C. ATP synthase can produce ATP without the proton gradient in this model.
 - D. The inner mitochondrial membrane generates oxygen as its primary product.
142. If the proton gradient across the inner mitochondrial membrane increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. The inner mitochondrial membrane generates oxygen as its primary product.
 - B. The proton gradient exists only in the nucleus.
 - C. Increasing the proton gradient increases ATP production until another component becomes limiting.
 - D. ATP synthase can produce ATP without the proton gradient in this model.
143. Which comparison would most directly test whether the observed result is caused by the proton gradient across the inner mitochondrial membrane rather than by a competing variable?
- A. Maintain oxygen and substrate while varying the gradient within the system's operating range.
 - B. A protonophore lowers ATP output while oxygen consumption initially changes.
 - C. ATP synthase can produce ATP without the proton gradient in this model.
 - D. The inner mitochondrial membrane generates oxygen as its primary product.

144. In a related system, the proton gradient across the inner mitochondrial membrane increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. The inner mitochondrial membrane generates oxygen as its primary product.
 - B. Increasing the proton gradient increases ATP production until another component becomes limiting.
 - C. Maintain oxygen and substrate while varying the gradient within the system's operating range.
 - D. ATP synthase can produce ATP without the proton gradient in this model.

Passage 8: Immune response

A research team investigated clonal selection using a controlled comparison. The investigators varied exposure to a specific antigen and kept the other stated conditions as constant as possible. Their working model was that antigen exposure selects and expands lymphocytes with receptors that bind that antigen. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The second antigen exposure produced a faster response and a larger concentration of antigen-specific antibody. The team concluded that selection and proliferation amplify cells with matching receptors. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

145. Which observation from the study most directly supports the proposed relationship involving clonal selection?
- A. Antigen exposure selects and expands lymphocytes with receptors that bind that antigen.
 - B. Every lymphocyte responds identically to every antigen.
 - C. Red blood cells are the primary source of antibodies.
 - D. Memory formation requires destruction of all antigen receptors.
146. If exposure to a specific antigen increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Every lymphocyte responds identically to every antigen.
 - B. Red blood cells are the primary source of antibodies.
 - C. Memory formation requires destruction of all antigen receptors.
 - D. The frequency of antigen-specific clones increases after exposure.
147. Which comparison would most directly test whether the observed result is caused by exposure to a specific antigen rather than by a competing variable?
- A. Every lymphocyte responds identically to every antigen.
 - B. Red blood cells are the primary source of antibodies.
 - C. Compare antigen-specific and unrelated lymphocyte populations.
 - D. A second exposure produces a faster and larger response.
148. In a related system, exposure to a specific antigen increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Red blood cells are the primary source of antibodies.

- B. Every lymphocyte responds identically to every antigen.
- C. Compare antigen-specific and unrelated lymphocyte populations.
- D. The frequency of antigen-specific clones increases after exposure.

Passage 9: Cell cycle

A research team investigated checkpoint control using a controlled comparison. The investigators varied DNA damage before division and kept the other stated conditions as constant as possible. Their working model was that checkpoint pathways can pause the cell cycle when dna damage is detected. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: A DNA-damage signal increased checkpoint-protein activity before cells entered the next division phase. The team concluded that checkpoints protect genome integrity by delaying division or triggering repair or death. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

149. Which observation from the study most directly supports the proposed relationship involving checkpoint control?
- A. DNA damage always accelerates cell division.
 - B. The cell cycle has no checkpoints that can delay progression.
 - C. DNA damage changes only the cell membrane and not nuclear control.
 - D. Checkpoint pathways can pause the cell cycle when DNA damage is detected.
150. If DNA damage before division increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. DNA damage changes only the cell membrane and not nuclear control.
 - B. Cells with damage spend longer before entering the next phase.
 - C. DNA damage always accelerates cell division.
 - D. The cell cycle has no checkpoints that can delay progression.
151. Which comparison would most directly test whether the observed result is caused by DNA damage before division rather than by a competing variable?
- A. The cell cycle has no checkpoints that can delay progression.
 - B. Compare damaged and undamaged cells with the same growth factors.
 - C. A checkpoint protein becomes active before division is delayed.
 - D. DNA damage always accelerates cell division.
152. In a related system, DNA damage before division increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Compare damaged and undamaged cells with the same growth factors.
 - B. DNA damage always accelerates cell division.
 - C. The cell cycle has no checkpoints that can delay progression.
 - D. Cells with damage spend longer before entering the next phase.

Passage 10: Evolution

A research team investigated selection using a controlled comparison. The investigators varied the frequency of a heritable trait under an environmental pressure and kept the other stated conditions as constant as possible. Their working model was that a heritable trait that improves reproductive success can become more common over generations. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The heritable phenotype became more common only in populations exposed to the stated selective pressure. The team concluded that differential reproductive success shifts the distribution of heritable variants. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

153. Which observation from the study most directly supports the proposed relationship involving selection?
- A. All genetic variation is harmful to a population.
 - B. A heritable trait that improves reproductive success can become more common over generations.
 - C. Individuals acquire directed mutations because they need them.
 - D. Natural selection changes only an individual during its lifetime.
154. If the frequency of a heritable trait under an environmental pressure increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. The advantageous phenotype increases in frequency when the pressure persists.
 - B. Individuals acquire directed mutations because they need them.
 - C. Natural selection changes only an individual during its lifetime.
 - D. All genetic variation is harmful to a population.
155. Which comparison would most directly test whether the observed result is caused by the frequency of a heritable trait under an environmental pressure rather than by a competing variable?
- A. The trait is heritable and correlated with offspring number.
 - B. Individuals acquire directed mutations because they need them.
 - C. Natural selection changes only an individual during its lifetime.
 - D. Compare with a population lacking the selective pressure.
156. In a related system, the frequency of a heritable trait under an environmental pressure increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Individuals acquire directed mutations because they need them.
 - B. Compare with a population lacking the selective pressure.
 - C. Natural selection changes only an individual during its lifetime.
 - D. The advantageous phenotype increases in frequency when the pressure persists.
157. A competitive inhibitor generally causes:
- A. a decrease in K_m and V_{max}
 - B. an increase in V_{max} only
 - C. complete loss of substrate binding

D. an increase in apparent K_m with no change in V_{max}

158. The organelle most directly responsible for ATP production by oxidative phosphorylation is the:

- A. nucleolus
- B. mitochondrion
- C. lysosome
- D. Golgi apparatus

159. During translation, the ribosome reads:

- A. DNA introns only
- B. lipid tails
- C. antibody sugars
- D. mRNA codons

160. A heterozygous individual for a dominant trait has genotype:

- A. Aa
- B. AA only
- C. aa only
- D. A only

161. The nephron segment that normally reabsorbs the greatest fraction of filtered sodium and water is the:

- A. proximal convoluted tubule
- B. collecting duct only
- C. Bowman capsule
- D. glomerular basement membrane

162. A hormone that binds an intracellular receptor is most likely:

- A. a cell-wall polymer
- B. lipid-soluble
- C. strongly charged and membrane-impermeable
- D. a ribosomal RNA

163. The immediate result of depolarization of a typical neuron is:

- A. the membrane potential becomes infinitely negative
- B. all ion gradients disappear
- C. ATP synthesis stops
- D. the membrane potential becomes less negative

164. A mutation that inserts one nucleotide into a coding sequence is most likely to cause:

- A. a silent substitution only
- B. no possible effect
- C. a whole-genome duplication
- D. a frameshift

165. A steroid hormone commonly changes gene expression by:

- A. destroying all mRNA
- B. opening every ion channel
- C. binding an intracellular receptor that regulates transcription
- D. binding a ribosome and changing codons

166. During mitosis, sister chromatids separate during:

- A. anaphase
- B. prophase
- C. metaphase
- D. telophase only

167. The primary structure of a protein is its:

- A. amino acid sequence
- B. three-dimensional fold
- C. association of subunits
- D. pattern of membrane insertion

168. If a cell is placed in a hypertonic solution, it generally:

- A. keeps all water because membranes are rigid
- B. divides immediately
- C. loses water and shrinks
- D. gains water and swells

169. A study with random assignment primarily improves:

- A. the accuracy of every measurement
- B. the sample size automatically
- C. internal validity for causal comparisons
- D. representativeness of the sample

170. The antibody-producing descendants of activated B cells are:

- A. osteoclasts
- B. motor neurons
- C. plasma cells
- D. platelets

171. A population bottleneck can reduce:

- A. genetic variation
- B. the need for DNA
- C. the number of chromosomes in every organism
- D. all natural selection

MCAT Psychological, Social, and Biological Foundations of Behavior

Section timing: 95 minutes

Passage 1: Sensation and perception

A research team investigated sensory processing using a controlled comparison. The investigators varied stimulus intensity and kept the other stated conditions as constant as possible. Their working model was that perception reflects both the physical stimulus and the way sensory systems organize and interpret it. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Detection improved as intensity increased, even though the instructions and environment were unchanged. The team concluded that sensation begins with detection, while perception includes interpretation shaped by context. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

172. Which observation from the study most directly supports the proposed relationship involving sensory processing?
- A. Expectations cannot influence interpretation of ambiguous input.
 - B. Perception reflects both the physical stimulus and the way sensory systems organize and interpret it.
 - C. Perception is independent of neural processing.
 - D. Every stimulus is detected with certainty once it is present.
173. If stimulus intensity increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Every stimulus is detected with certainty once it is present.
 - B. Expectations cannot influence interpretation of ambiguous input.
 - C. A stimulus near threshold is detected less consistently than a clearly stronger stimulus.
 - D. Perception is independent of neural processing.
174. Which comparison would most directly test whether the observed result is caused by stimulus intensity rather than by a competing variable?
- A. Detection improves as intensity rises while instructions remain constant.
 - B. Perception is independent of neural processing.
 - C. Every stimulus is detected with certainty once it is present.
 - D. Use the same participant and environment while varying only intensity.
175. In a related system, stimulus intensity increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. A stimulus near threshold is detected less consistently than a clearly stronger stimulus.
 - B. Use the same participant and environment while varying only intensity.
 - C. Perception is independent of neural processing.
 - D. Every stimulus is detected with certainty once it is present.

176. Which additional result would most strengthen the claim about sensory processing?

- A. Every stimulus is detected with certainty once it is present.
- B. Expectations cannot influence interpretation of ambiguous input.
- C. Detection improves as intensity rises while instructions remain constant.
- D. Perception is independent of neural processing.

Passage 2: Learning

A research team investigated reinforcement using a controlled comparison. The investigators varied the consequence following a behavior and kept the other stated conditions as constant as possible. Their working model was that a behavior followed by a reinforcing consequence becomes more likely under similar conditions. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The target response became more frequent only when the reinforcing consequence followed that response. The team concluded that operant learning changes behavior according to its consequences. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

177. Which observation from the study most directly supports the proposed relationship involving reinforcement?

- A. Reinforcement always decreases the behavior it follows.
- B. Consequences cannot affect the probability of a future behavior.
- C. Classical and operant conditioning use identical learning procedures.
- D. A behavior followed by a reinforcing consequence becomes more likely under similar conditions.

178. If a behavior is followed reliably by a reinforcing consequence while the other stated conditions remain fixed, which result best follows from the passage's model?

- A. The behavior increases when the reinforcing consequence is reliably delivered.
- B. Reinforcement always decreases the behavior it follows.
- C. Consequences cannot affect the probability of a future behavior.
- D. Classical and operant conditioning use identical learning procedures.

179. Which comparison would most directly test whether the observed result is caused by the consequence following a behavior rather than by a competing variable?

- A. Consequences cannot affect the probability of a future behavior.
- B. Compare with a group receiving the same exposure but no contingent consequence.
- C. Behavior changes only when the consequence follows the target response.
- D. Reinforcement always decreases the behavior it follows.

180. In a related system, a behavior is followed reliably by a reinforcing consequence while the other stated conditions remain fixed. Which prediction best transfers the mechanism?

- A. Reinforcement always decreases the behavior it follows.
- B. Consequences cannot affect the probability of a future behavior.

- C. The behavior increases when the reinforcing consequence is reliably delivered.
- D. Compare with a group receiving the same exposure but no contingent consequence.

181. Which additional result would most strengthen the claim about reinforcement?

- A. Reinforcement always decreases the behavior it follows.
- B. Consequences cannot affect the probability of a future behavior.
- C. Classical and operant conditioning use identical learning procedures.
- D. Behavior changes only when the consequence follows the target response.

Passage 3: Memory

A research team investigated encoding using a controlled comparison. The investigators varied meaningful organization of information and kept the other stated conditions as constant as possible. Their working model was that organizing information into meaningful units can improve later recall. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Participants who organized the list recalled more items than participants given the same study time without organization instructions. The team concluded that elaboration and organization create more routes for later retrieval. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

182. Which observation from the study most directly supports the proposed relationship involving encoding?

- A. Memory is a perfect recording of every experience.
- B. Organizing information always prevents later recall.
- C. Retrieval is unrelated to the way information was encoded.
- D. Organizing information into meaningful units can improve later recall.

183. If meaningful organization of information increases while the other stated conditions remain fixed, which result best follows from the passage's model?

- A. Retrieval is unrelated to the way information was encoded.
- B. Participants who group related items recall more than participants who study the same items randomly.
- C. Memory is a perfect recording of every experience.
- D. Organizing information always prevents later recall.

184. Which comparison would most directly test whether the observed result is caused by meaningful organization of information rather than by a competing variable?

- A. Memory is a perfect recording of every experience.
- B. Organizing information always prevents later recall.
- C. Keep study time and list length constant while changing organization instructions.
- D. Performance improves when the test provides matching organizational cues.

185. In a related system, meaningful organization of information increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?

- A. Keep study time and list length constant while changing organization instructions.
- B. Memory is a perfect recording of every experience.
- C. Organizing information always prevents later recall.
- D. Participants who group related items recall more than participants who study the same items randomly.

186. Which additional result would most strengthen the claim about encoding?

- A. Memory is a perfect recording of every experience.
- B. Organizing information always prevents later recall.
- C. Retrieval is unrelated to the way information was encoded.
- D. Performance improves when the test provides matching organizational cues.

Passage 4: Stress physiology

A research team investigated stress response using a controlled comparison. The investigators varied perceived threat and kept the other stated conditions as constant as possible. Their working model was that perceived threat can activate sympathetic and endocrine responses that mobilize energy. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Heart rate and stress-hormone concentration rose during the acute threat but returned toward baseline after the task ended. The team concluded that the stress response prepares the organism for action but has costs when prolonged. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

187. Which observation from the study most directly supports the proposed relationship involving stress response?

- A. Perceived threat can activate sympathetic and endocrine responses that mobilize energy.
- B. Stress responses require no physiological change.
- C. The sympathetic system only reduces arousal.
- D. All stress is beneficial regardless of duration or intensity.

188. If perceived threat increases while the other stated conditions remain fixed, which result best follows from the passage's model?

- A. Stress responses require no physiological change.
- B. The sympathetic system only reduces arousal.
- C. All stress is beneficial regardless of duration or intensity.
- D. Heart rate and circulating stress hormones rise during an acute threat.

189. Which comparison would most directly test whether the observed result is caused by perceived threat rather than by a competing variable?

- A. Physiological measures rise even when movement is matched.
- B. Stress responses require no physiological change.
- C. The sympathetic system only reduces arousal.

D. Compare with a neutral task matched for movement and duration.

190. In a related system, perceived threat increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?

- A. The sympathetic system only reduces arousal.
- B. Heart rate and circulating stress hormones rise during an acute threat.
- C. Stress responses require no physiological change.
- D. Compare with a neutral task matched for movement and duration.

191. Which additional result would most strengthen the claim about stress response?

- A. The sympathetic system only reduces arousal.
- B. All stress is beneficial regardless of duration or intensity.
- C. Physiological measures rise even when movement is matched.
- D. Stress responses require no physiological change.

Passage 5: Social identity

A research team investigated group membership using a controlled comparison. The investigators varied the salience of a group category and kept the other stated conditions as constant as possible. Their working model was that people may use group membership as part of self-concept and interpret social feedback through that identity. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The same feedback produced a larger response when the relevant group category was made salient. The team concluded that identity links individual self-understanding to social groups and expectations. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

192. Which observation from the study most directly supports the proposed relationship involving group membership?

- A. Stereotypes can affect only physical traits and not performance or judgment.
- B. People may use group membership as part of self-concept and interpret social feedback through that identity.
- C. Identity is unrelated to social context.
- D. Groups never influence self-concept.

193. If the salience of a group category increases while the other stated conditions remain fixed, which result best follows from the passage's model?

- A. Identity is unrelated to social context.
- B. Groups never influence self-concept.
- C. Stereotypes can affect only physical traits and not performance or judgment.
- D. Identity-relevant feedback has a larger effect when the category is salient.

194. Which comparison would most directly test whether the observed result is caused by the salience of a group category rather than by a competing variable?

- A. Identity is unrelated to social context.
- B. Groups never influence self-concept.
- C. Compare feedback with the same content but different category cues.
- D. The same feedback produces different effects after category cues change.

195. In a related system, the salience of a group category increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?

- A. Identity is unrelated to social context.
- B. Compare feedback with the same content but different category cues.
- C. Groups never influence self-concept.
- D. Identity-relevant feedback has a larger effect when the category is salient.

Passage 6: Social stratification

A research team investigated resource access using a controlled comparison. The investigators varied access to health-supporting resources and kept the other stated conditions as constant as possible. Their working model was that unequal access to housing, education, income, and care can produce patterned differences in health. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Outcome differences narrowed after transportation and clinic-access barriers were reduced. The team concluded that social position shapes exposure, opportunity, and ability to use resources. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

196. Which observation from the study most directly supports the proposed relationship involving resource access?

- A. Unequal access to housing, education, income, and care can produce patterned differences in health.
- B. Health differences among groups are always random.
- C. Access to resources has no relation to health outcomes.
- D. Structural conditions cannot affect individual behavior or health.

197. If access to health-supporting resources increases while the other stated conditions remain fixed, which result best follows from the passage's model?

- A. Reducing access barriers can improve outcomes without changing individual motivation.
- B. Health differences among groups are always random.
- C. Access to resources has no relation to health outcomes.
- D. Structural conditions cannot affect individual behavior or health.

198. Which comparison would most directly test whether the observed result is caused by access to health-supporting resources rather than by a competing variable?

- A. Health differences among groups are always random.
- B. Access to resources has no relation to health outcomes.
- C. Compare otherwise similar neighborhoods with different transportation or clinic access.

D. Outcome differences shrink after access barriers are reduced.

199. In a related system, access to health-supporting resources increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?

- A. Health differences among groups are always random.
- B. Access to resources has no relation to health outcomes.
- C. Reducing access barriers can improve outcomes without changing individual motivation.
- D. Compare otherwise similar neighborhoods with different transportation or clinic access.

Passage 7: Research methods

A research team investigated causal inference using a controlled comparison. The investigators varied the proportion of participants assigned by lottery and kept the other stated conditions as constant as possible. Their working model was that lottery assignment helps balance preexisting participant differences between experimental groups. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Baseline characteristics were more similar across treatment groups before the intervention. The team concluded that chance assignment reduces systematic baseline differences between conditions. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

200. Which observation from the study most directly supports the proposed relationship involving causal inference?

- A. Random assignment guarantees that a sample represents the target population.
- B. Random assignment removes every source of measurement error.
- C. Random assignment makes a comparison group unnecessary.
- D. Lottery assignment helps balance preexisting participant differences between experimental groups.

201. If a larger share of participants is assigned by lottery while the other stated conditions remain fixed, which result best follows from the passage's model?

- A. Random assignment makes a comparison group unnecessary.
- B. As the lottery-assigned share increases, treatment groups become more comparable at baseline on average.
- C. Random assignment guarantees that a sample represents the target population.
- D. Random assignment removes every source of measurement error.

202. Which comparison would most directly test whether the observed result is caused by the proportion of participants assigned by lottery rather than by a competing variable?

- A. Compare lottery-assigned and investigator-assigned groups while keeping recruitment, treatment, and measurement procedures constant.
- B. Baseline characteristics are more similar across lottery-assigned treatment groups before treatment.
- C. Random assignment guarantees that a sample represents the target population.
- D. Random assignment removes every source of measurement error.

- 203.** In a related system, a larger share of participants is assigned by lottery while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A.** As the lottery-assigned share increases, treatment groups become more comparable at baseline on average.
 - B.** Compare lottery-assigned and investigator-assigned groups while keeping recruitment, treatment, and measurement procedures constant.
 - C.** Random assignment guarantees that a sample represents the target population.
 - D.** Random assignment removes every source of measurement error.

Passage 8: Development

A research team investigated cognitive change using a controlled comparison. The investigators varied the child's ability to use abstract rules and kept the other stated conditions as constant as possible. Their working model was that cognitive development can involve changes in how information is represented and reasoned about. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: The child generalized the same reasoning operation across tasks with different surface content. The team concluded that developmental interpretations must distinguish the underlying reasoning ability from task familiarity. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

- 204.** Which observation from the study most directly supports the proposed relationship involving cognitive change?
- A.** Task demands never affect observed performance.
 - B.** Cognitive development can involve changes in how information is represented and reasoned about.
 - C.** Development stops after infancy.
 - D.** Every child reaches developmental milestones at exactly the same age.
- 205.** If the child's ability to use abstract rules increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A.** A child who can reason systematically about hypothetical situations shows more advanced abstract thinking.
 - B.** Development stops after infancy.
 - C.** Every child reaches developmental milestones at exactly the same age.
 - D.** Task demands never affect observed performance.
- 206.** Which comparison would most directly test whether the observed result is caused by the child's ability to use abstract rules rather than by a competing variable?
- A.** Development stops after infancy.
 - B.** Every child reaches developmental milestones at exactly the same age.
 - C.** Use tasks matched for vocabulary and working-memory demands.
 - D.** The child succeeds across several tasks requiring the same reasoning operation.
- 207.** In a related system, the child's ability to use abstract rules increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?

- A. Use tasks matched for vocabulary and working-memory demands.
- B. Every child reaches developmental milestones at exactly the same age.
- C. A child who can reason systematically about hypothetical situations shows more advanced abstract thinking.
- D. Development stops after infancy.

Passage 9: Attitudes and behavior

A research team investigated cognitive dissonance using a controlled comparison. The investigators varied inconsistency between belief and action and kept the other stated conditions as constant as possible. Their working model was that people may experience discomfort when behavior conflicts with a valued belief and may change an attitude to reduce the inconsistency. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Attitude change was greatest when participants freely chose the difficult action and received little external justification. The team concluded that insufficient external justification can make internal attitude adjustment more likely. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

208. Which observation from the study most directly supports the proposed relationship involving cognitive dissonance?
- A. Inconsistency always strengthens the original attitude.
 - B. People never change attitudes after acting.
 - C. External rewards have identical psychological effects at every size.
 - D. People may experience discomfort when behavior conflicts with a valued belief and may change an attitude to reduce the inconsistency.
209. If inconsistency between belief and action increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. A person may report a more favorable attitude after freely choosing a difficult action.
 - B. Inconsistency always strengthens the original attitude.
 - C. People never change attitudes after acting.
 - D. External rewards have identical psychological effects at every size.
210. Which comparison would most directly test whether the observed result is caused by inconsistency between belief and action rather than by a competing variable?
- A. Inconsistency always strengthens the original attitude.
 - B. People never change attitudes after acting.
 - C. Compare with a person who was strongly rewarded or forced to perform the same action.
 - D. Attitude change is greatest when external justification is modest.
211. In a related system, inconsistency between belief and action increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Compare with a person who was strongly rewarded or forced to perform the same action.

- B. Inconsistency always strengthens the original attitude.
- C. People never change attitudes after acting.
- D. A person may report a more favorable attitude after freely choosing a difficult action.

Passage 10: Group processes

A research team investigated norms using a controlled comparison. The investigators varied the clarity of group expectations and kept the other stated conditions as constant as possible. Their working model was that group norms guide behavior by communicating what members are expected to do or avoid. The pilot results were not interpreted from a single observation. Replicate samples were measured, the outcome was recorded before and after the manipulation, and a comparison condition was included. Data summary: Behavior became more similar when expectations were clear and approval and disapproval were consistently communicated. The team concluded that norms operate through shared expectations and social consequences. The conclusion is limited to the variables measured; it does not establish that every related system behaves identically.

- 212.** Which observation from the study most directly supports the proposed relationship involving norms?
- A. Norms affect only isolated individuals.
 - B. Groups cannot enforce expectations through approval or sanctions.
 - C. Private disagreement automatically ends a group norm.
 - D. Group norms guide behavior by communicating what members are expected to do or avoid.
- 213.** If the clarity of group expectations increases while the other stated conditions remain fixed, which result best follows from the passage's model?
- A. Private disagreement automatically ends a group norm.
 - B. Behavior becomes more similar across members when norms are clear and consistently enforced.
 - C. Norms affect only isolated individuals.
 - D. Groups cannot enforce expectations through approval or sanctions.
- 214.** Which comparison would most directly test whether the observed result is caused by the clarity of group expectations rather than by a competing variable?
- A. Compare groups with the same task but different clarity of expectations.
 - B. Members change behavior after learning the group's approval and disapproval patterns.
 - C. Norms affect only isolated individuals.
 - D. Groups cannot enforce expectations through approval or sanctions.
- 215.** In a related system, the clarity of group expectations increases while the other stated conditions remain fixed. Which prediction best transfers the mechanism?
- A. Compare groups with the same task but different clarity of expectations.
 - B. Norms affect only isolated individuals.
 - C. Groups cannot enforce expectations through approval or sanctions.
 - D. Behavior becomes more similar across members when norms are clear and consistently enforced.
- 216.** Classical conditioning involves:

- A. associating two stimuli
- B. learning only through punishment
- C. randomly assigning participants
- D. changing social class

217. The sympathetic nervous system is most associated with:

- A. decreased heart rate during threat
- B. long-term memory storage only
- C. increased arousal and mobilization
- D. digestion during rest only

218. A measure that gives consistent results but does not measure the intended construct is:

- A. both valid and unreliable
- B. neither consistent nor measurable
- C. reliable but not valid
- D. valid but not reliable

219. A sample recruited from volunteers at one clinic may have limited:

- A. operant conditioning
- B. generalizability
- C. random assignment
- D. internal consistency by definition

220. When people work less hard in a group because individual effort is less identifiable, the process is:

- A. cognitive dissonance
- B. social loafing
- C. group polarization
- D. classical conditioning

221. A person's expected behavior associated with a social position is a:

- A. neuron
- B. reinforcer
- C. schema only
- D. role

222. A negative correlation means that as one variable increases, the other tends to:

- A. decrease

- B. increase at the same rate
- C. become causally determined
- D. become constant

223. The process by which children learn norms and values is:

- A. extinction
- B. socialization
- C. stratification
- D. deindividuation

224. Working memory is best described as:

- A. a reflex arc
- B. a social class
- C. briefly holding and manipulating information
- D. permanent storage of every experience

225. A behavior followed by removal of an unpleasant stimulus is strengthened by:

- A. extinction by definition
- B. random assignment
- C. negative reinforcement
- D. positive punishment

226. A confounding variable is one that:

- A. offers an alternative explanation related to exposure and outcome
- B. is always the dependent variable
- C. must be randomly assigned
- D. cannot vary

227. The health effect of unemployment may be studied at the intersection of individual behavior and:

- A. social structure
- B. molecular weight only
- C. classical conditioning only
- D. visual acuity only

228. The fundamental attribution error is the tendency to:

- A. remember every detail equally
- B. overemphasize personal factors when explaining others' behavior

- C. ignore all personal factors
- D. assume behavior is never social

229. A placebo-controlled design helps estimate:

- A. whether a measure is a neuron
- B. the exact cause of every outcome
- C. the effect beyond expectation or treatment context
- D. the population mean automatically

230. When a group discussion makes members' initial views more extreme, this is:

- A. group polarization
- B. social facilitation
- C. sensation
- D. negative reinforcement

Answer Key and Explanations

1. **Answer: B.** The supporting observation must address alveolar diffusion and preserve the controls described in the passage.
2. **Answer: B.** The direction follows from the reported mechanism: a larger gradient provides a larger driving force for net diffusion.
3. **Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to alveolar diffusion.
4. **Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: a larger gradient provides a larger driving force for net diffusion.
5. **Answer: D.** The selected measurement directly checks the proposed relationship involving alveolar diffusion rather than recording an unrelated observation.
6. **Answer: C.** The supporting observation must address acid-base buffering and preserve the controls described in the passage.
7. **Answer: C.** The direction follows from the reported mechanism: the conjugate base reacts with added hydrogen ion before free hydrogen ion accumulates.
8. **Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to acid-base buffering.
9. **Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: the conjugate base reacts with added hydrogen ion before free hydrogen ion accumulates.
10. **Answer: D.** The selected measurement directly checks the proposed relationship involving acid-base buffering rather than recording an unrelated observation.
11. **Answer: A.** The supporting observation must address activation energy and preserve the controls described in the passage.
12. **Answer: A.** The direction follows from the reported mechanism: the catalyst changes the pathway and rate but not the energy difference between reactants and products.
13. **Answer: D.** The comparison changes the proposed variable while controlling the alternatives relevant to activation energy.
14. **Answer: C.** The transferred prediction follows the same mechanism without adding an unsupported claim: the catalyst changes the pathway and rate but not the energy difference between reactants and products.
15. **Answer: D.** The selected measurement directly checks the proposed relationship involving activation energy rather than recording an unrelated observation.

16. **Answer: D.** The supporting observation must address vascular flow and preserve the controls described in the passage.
17. **Answer: B.** The direction follows from the reported mechanism: the radius appears with a high power in the flow relationship.
18. **Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to vascular flow.
19. **Answer: C.** The transferred prediction follows the same mechanism without adding an unsupported claim: the radius appears with a high power in the flow relationship.
20. **Answer: C.** The selected measurement directly checks the proposed relationship involving vascular flow rather than recording an unrelated observation.
21. **Answer: D.** The supporting observation must address cell potential and preserve the controls described in the passage.
22. **Answer: D.** The direction follows from the reported mechanism: the Nernst relationship includes the logarithm of the reaction quotient.
23. **Answer: D.** The comparison changes the proposed variable while controlling the alternatives relevant to cell potential.
24. **Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: the Nernst relationship includes the logarithm of the reaction quotient.
25. **Answer: B.** The supporting observation must address lens formation and preserve the controls described in the passage.
26. **Answer: C.** The direction follows from the reported mechanism: focal length is determined by optical power, which depends on curvature and refractive index.
27. **Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to lens formation.
28. **Answer: A.** The transferred prediction follows the same mechanism without adding an unsupported claim: focal length is determined by optical power, which depends on curvature and refractive index.
29. **Answer: B.** The supporting observation must address carbonyl reactivity and preserve the controls described in the passage.
30. **Answer: A.** The direction follows from the reported mechanism: electron withdrawal leaves the carbonyl carbon more electron-poor.
31. **Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to carbonyl reactivity.

- 32. Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: electron withdrawal leaves the carbonyl carbon more electron-poor.
- 33. Answer: B.** The supporting observation must address free-energy change and preserve the controls described in the passage.
- 34. Answer: D.** The direction follows from the reported mechanism: Gibbs free energy combines enthalpy with the temperature-weighted entropy change.
- 35. Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to free-energy change.
- 36. Answer: A.** The transferred prediction follows the same mechanism without adding an unsupported claim: Gibbs free energy combines enthalpy with the temperature-weighted entropy change.
- 37. Answer: C.** The supporting observation must address electrochemical gradients and preserve the controls described in the passage.
- 38. Answer: B.** The direction follows from the reported mechanism: an ion responds to the combined electrochemical gradient.
- 39. Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to electrochemical gradients.
- 40. Answer: A.** The transferred prediction follows the same mechanism without adding an unsupported claim: an ion responds to the combined electrochemical gradient.
- 41. Answer: A.** The supporting observation must address radioactive decay and preserve the controls described in the passage.
- 42. Answer: C.** The direction follows from the reported mechanism: each half-life removes half of the nuclei present at its beginning.
- 43. Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to radioactive decay.
- 44. Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: each half-life removes half of the nuclei present at its beginning.
- 45. Answer: D.** Molarity is moles per liter, so 0.50 divided by 2.0 equals 0.25 M.
- 46. Answer: B.** pH equals negative log of hydrogen-ion concentration, so pH 3 corresponds to 0.001 M.
- 47. Answer: D.** Kinetic energy is one-half mv squared: one-half times 2 times 9 equals 9 J.
- 48. Answer: A.** Ohm law gives I equals V divided by R, or 12 divided by 4 equals 3 A.

- 49. Answer: D.** A catalyst lowers activation energy for the forward and reverse pathways but does not change the equilibrium constant.
- 50. Answer: C.** Peptide bonds join the amino group of one amino acid to the carboxyl group of another with water released.
- 51. Answer: D.** Boyle law gives an inverse relationship between pressure and volume at constant temperature.
- 52. Answer: B.** For a parallel force, work equals force times displacement.
- 53. Answer: B.** A reducing agent donates electrons and is therefore oxidized.
- 54. Answer: B.** Comparable weak-acid and conjugate-base amounts allow the pair to consume added base or acid.
- 55. Answer: D.** Velocity is the time derivative of position; acceleration is the derivative of velocity.
- 56. Answer: D.** A polar covalent bond shares electrons unequally because of an electronegativity difference.
- 57. Answer: B.** Negative enthalpy and positive entropy both favor a negative Gibbs free-energy change.
- 58. Answer: A.** The Henderson-Hasselbalch relationship gives pH equal to pKa when the acid and conjugate-base concentrations match.
- 59. Answer: B.** Osmosis moves water toward the side with higher effective solute concentration.
- 60. Answer: A.** The passage's examples and conclusion develop the qualified claim that preservation does not determine what a public setting honors.
- 61. Answer: B.** The example matters because the relocation example separates keeping an object from endorsing its former civic role.
- 62. Answer: A.** The passage supports this inference: a monument can remain historically available while its prominent placement still communicates present approval.
- 63. Answer: B.** The argument would be weakened by evidence that the object has the same public meaning wherever it is placed.
- 64. Answer: A.** The application preserves the passage's method: evaluate both the record preserved and the hierarchy signaled by the setting.
- 65. Answer: D.** The case applies the passage's method: It preserves access to the record while reconsidering what the civic setting publicly honors.
- 66. Answer: D.** The passage's examples and conclusion develop the qualified claim that unstructured time can support attention without becoming a universal virtue.

- 67. Answer: B.** The example matters because the walking example distinguishes deliberate openness from refusal of responsibility.
- 68. Answer: D.** The passage supports this inference: a scheduled activity can be productive while still excluding discoveries that have no preset output.
- 69. Answer: A.** The argument would be weakened by evidence that all unstructured time produces valuable insight.
- 70. Answer: A.** The application preserves the passage's method: compare the kind of attention an interval permits with the obligations it displaces.
- 71. Answer: D.** The case applies the passage's method: It tests whether unassigned attention creates useful noticing without treating all unstructured time as valuable.
- 72. Answer: D.** The passage's examples and conclusion develop the qualified claim that a map's purpose shapes what counts as relevant detail.
- 73. Answer: B.** The example matters because the tax and evacuation examples show that different selections can be accurate for different decisions.
- 74. Answer: D.** The passage supports this inference: precision does not turn a purpose-built representation into a complete account.
- 75. Answer: A.** The argument would be weakened by evidence that a map includes every feature of the place equally.
- 76. Answer: D.** The application preserves the passage's method: ask what decision the map's omissions and symbols are designed to support.
- 77. Answer: A.** The case applies the passage's method: It evaluates the map by the decision it supports rather than demanding that it represent every feature equally.
- 78. Answer: D.** The passage's examples and conclusion develop the qualified claim that humor's political effect depends on social consequences rather than rebellious appearance.
- 79. Answer: C.** The example matters because the audience and target determine whether laughter opens or closes room for criticism.
- 80. Answer: B.** The passage supports this inference: a joke can expose contradiction while leaving the institution's practice unchanged.
- 81. Answer: A.** The argument would be weakened by evidence that laughter necessarily transfers power to the target of a joke.
- 82. Answer: B.** The application preserves the passage's method: trace who can answer, what changes afterward, and whether release substitutes for action.

83. **Answer: B.** The case applies the passage's method: It distinguishes the release produced by the joke from evidence that the institution's power actually changed.
84. **Answer: A.** The passage's examples and conclusion develop the qualified claim that technique can make a work feel faithful rather than artificial.
85. **Answer: B.** The example matters because revision shows how hidden choices can produce an apparently inevitable sentence.
86. **Answer: D.** The passage supports this inference: spontaneous wording is not a sufficient test of authenticity.
87. **Answer: D.** The argument would be weakened by evidence that visible labor always makes a voice less genuine.
88. **Answer: A.** The application preserves the passage's method: judge whether formal choices remain answerable to the experience represented.
89. **Answer: B.** The case applies the passage's method: It treats revision as potentially faithful when the formal choices remain answerable to the experience represented.
90. **Answer: C.** The passage's examples and conclusion develop the qualified claim that accurate information becomes actionable through a fair and transparent relationship.
91. **Answer: A.** The example matters because the campaign example shows why acknowledging revision can matter as much as stating facts.
92. **Answer: C.** The passage supports this inference: a correct recommendation may fail when the audience cannot evaluate the messenger's conduct.
93. **Answer: C.** The argument would be weakened by evidence that transparency requires listing every uncertainty without prioritizing any.
94. **Answer: C.** The application preserves the passage's method: consider evidence, fairness, and the conditions under which people can act on it.
95. **Answer: D.** The case applies the passage's method: It treats transparency as actionable explanation rather than an undifferentiated list of every uncertainty.
96. **Answer: A.** The passage's examples and conclusion develop the qualified claim that equal sequence does not by itself create equal burden.
97. **Answer: C.** The example matters because the first-come rule exposes how time and mobility alter the cost of the same procedure.
98. **Answer: B.** The passage supports this inference: a queue can be procedurally even while imposing unequal waiting costs.

99. **Answer: B.** The argument would be weakened by evidence that a first-come rule gives every person the same practical opportunity to arrive early.
100. **Answer: C.** The application preserves the passage's method: compare procedures by the burdens they distribute, not only by the order they produce.
101. **Answer: C.** The case applies the passage's method: It compares procedures by the burdens they distribute instead of assuming equal sequence creates equal opportunity.
102. **Answer: B.** The passage's examples and conclusion develop the qualified claim that a metaphor is useful when its limits remain available for inspection.
103. **Answer: A.** The example matters because the computer analogy makes one feature visible while inviting questions about what it leaves out.
104. **Answer: A.** The passage supports this inference: a mismatch between metaphor and subject can generate rather than end inquiry.
105. **Answer: A.** The argument would be weakened by evidence that a familiar metaphor supplies a complete literal model.
106. **Answer: C.** The application preserves the passage's method: use the comparison to form a question, then test where the comparison breaks.
107. **Answer: D.** The case applies the passage's method: It uses the metaphor to generate a testable question without treating the comparison as a complete identity.
108. **Answer: D.** The passage's examples and conclusion develop the qualified claim that intellectual confidence includes disciplined revision.
109. **Answer: C.** The example matters because the classroom example turns uncertainty into a reasoned comparison of explanations.
110. **Answer: C.** The passage supports this inference: a student can be confident in a method while provisional about a conclusion.
111. **Answer: C.** The argument would be weakened by evidence that the best classroom rewards only immediate correctness.
112. **Answer: C.** The application preserves the passage's method: ask what evidence would change the student's ranking of explanations.
113. **Answer: B.** The supporting observation must address enzyme activity and preserve the controls described in the passage.
114. **Answer: A.** The direction follows from the reported mechanism: finite active-site availability produces saturation behavior.

115. **Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to enzyme activity.
116. **Answer: A.** The transferred prediction follows the same mechanism without adding an unsupported claim: finite active-site availability produces saturation behavior.
117. **Answer: B.** The selected measurement directly checks the proposed relationship involving enzyme activity rather than recording an unrelated observation.
118. **Answer: D.** The supporting observation must address transcription and preserve the controls described in the passage.
119. **Answer: B.** The direction follows from the reported mechanism: regulatory proteins influence whether RNA polymerase initiates transcription efficiently.
120. **Answer: D.** The comparison changes the proposed variable while controlling the alternatives relevant to transcription.
121. **Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: regulatory proteins influence whether RNA polymerase initiates transcription efficiently.
122. **Answer: B.** The selected measurement directly checks the proposed relationship involving transcription rather than recording an unrelated observation.
123. **Answer: C.** The supporting observation must address solute movement and preserve the controls described in the passage.
124. **Answer: D.** The direction follows from the reported mechanism: net passive flux depends on the gradient, while a finite transporter population can become occupied.
125. **Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to solute movement.
126. **Answer: C.** The transferred prediction follows the same mechanism without adding an unsupported claim: net passive flux depends on the gradient, while a finite transporter population can become occupied.
127. **Answer: A.** The selected measurement directly checks the proposed relationship involving solute movement rather than recording an unrelated observation.
128. **Answer: A.** The supporting observation must address cardiac output and preserve the controls described in the passage.
129. **Answer: D.** The direction follows from the reported mechanism: the product of rate and volume determines output.
130. **Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to cardiac output.

- 131. Answer: A.** The transferred prediction follows the same mechanism without adding an unsupported claim: the product of rate and volume determines output.
- 132. Answer: A.** The selected measurement directly checks the proposed relationship involving cardiac output rather than recording an unrelated observation.
- 133. Answer: B.** The supporting observation must address oxygen binding and preserve the controls described in the passage.
- 134. Answer: C.** The direction follows from the reported mechanism: cooperative binding creates a curve with plateau and steep regions.
- 135. Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to oxygen binding.
- 136. Answer: C.** The transferred prediction follows the same mechanism without adding an unsupported claim: cooperative binding creates a curve with plateau and steep regions.
- 137. Answer: C.** The supporting observation must address linkage and preserve the controls described in the passage.
- 138. Answer: D.** The direction follows from the reported mechanism: crossing over is more likely between loci that are farther apart.
- 139. Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to linkage.
- 140. Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: crossing over is more likely between loci that are farther apart.
- 141. Answer: B.** The supporting observation must address oxidative phosphorylation and preserve the controls described in the passage.
- 142. Answer: C.** The direction follows from the reported mechanism: the gradient stores electrochemical energy used by ATP synthase.
- 143. Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to oxidative phosphorylation.
- 144. Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: the gradient stores electrochemical energy used by ATP synthase.
- 145. Answer: A.** The supporting observation must address clonal selection and preserve the controls described in the passage.
- 146. Answer: D.** The direction follows from the reported mechanism: selection and proliferation amplify cells with matching receptors.

147. **Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to clonal selection.
148. **Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: selection and proliferation amplify cells with matching receptors.
149. **Answer: D.** The supporting observation must address checkpoint control and preserve the controls described in the passage.
150. **Answer: B.** The direction follows from the reported mechanism: checkpoints protect genome integrity by delaying division or triggering repair or death.
151. **Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to checkpoint control.
152. **Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: checkpoints protect genome integrity by delaying division or triggering repair or death.
153. **Answer: B.** The supporting observation must address selection and preserve the controls described in the passage.
154. **Answer: A.** The direction follows from the reported mechanism: differential reproductive success shifts the distribution of heritable variants.
155. **Answer: D.** The comparison changes the proposed variable while controlling the alternatives relevant to selection.
156. **Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: differential reproductive success shifts the distribution of heritable variants.
157. **Answer: D.** Competitive inhibition can be overcome at high substrate, so apparent K_m rises while V_{max} remains unchanged.
158. **Answer: B.** The inner mitochondrial membrane contains the electron transport chain and ATP synthase.
159. **Answer: D.** Ribosomes use mRNA codons to specify the amino acid sequence.
160. **Answer: A.** Heterozygous means two different alleles, here A and a.
161. **Answer: A.** The proximal tubule performs extensive bulk reabsorption of filtered solutes and water.
162. **Answer: B.** Lipid-soluble hormones can cross the phospholipid bilayer and bind intracellular receptors.
163. **Answer: D.** Depolarization means the membrane potential moves toward a less negative value.
164. **Answer: D.** A single-nucleotide insertion can shift the reading frame downstream of the insertion.

- 165. Answer: C.** The hormone-receptor complex can bind regulatory DNA and alter transcription.
- 166. Answer: A.** Sister chromatids are pulled to opposite poles during anaphase.
- 167. Answer: A.** Primary structure is the linear amino acid sequence.
- 168. Answer: C.** Water leaves the cell toward the higher effective solute concentration.
- 169. Answer: C.** Random assignment balances preexisting differences on average, strengthening causal inference.
- 170. Answer: C.** Activated B cells can differentiate into plasma cells that secrete antibodies.
- 171. Answer: A.** A bottleneck randomly removes individuals and can remove alleles from the population.
- 172. Answer: B.** The supporting observation must address sensory processing and preserve the controls described in the passage.
- 173. Answer: C.** The direction follows from the reported mechanism: sensation begins with detection, while perception includes interpretation shaped by context.
- 174. Answer: D.** The comparison changes the proposed variable while controlling the alternatives relevant to sensory processing.
- 175. Answer: A.** The transferred prediction follows the same mechanism without adding an unsupported claim: sensation begins with detection, while perception includes interpretation shaped by context.
- 176. Answer: C.** The selected measurement directly checks the proposed relationship involving sensory processing rather than recording an unrelated observation.
- 177. Answer: D.** The supporting observation must address reinforcement and preserve the controls described in the passage.
- 178. Answer: A.** The direction follows from the reported mechanism: operant learning changes behavior according to its consequences.
- 179. Answer: B.** The comparison changes the proposed variable while controlling the alternatives relevant to reinforcement.
- 180. Answer: C.** The transferred prediction follows the same mechanism without adding an unsupported claim: operant learning changes behavior according to its consequences.
- 181. Answer: D.** The selected measurement directly checks the proposed relationship involving reinforcement rather than recording an unrelated observation.
- 182. Answer: D.** The supporting observation must address encoding and preserve the controls described in the passage.

- 183. Answer: B.** The direction follows from the reported mechanism: elaboration and organization create more routes for later retrieval.
- 184. Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to encoding.
- 185. Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: elaboration and organization create more routes for later retrieval.
- 186. Answer: D.** The selected measurement directly checks the proposed relationship involving encoding rather than recording an unrelated observation.
- 187. Answer: A.** The supporting observation must address stress response and preserve the controls described in the passage.
- 188. Answer: D.** The direction follows from the reported mechanism: the stress response prepares the organism for action but has costs when prolonged.
- 189. Answer: D.** The comparison changes the proposed variable while controlling the alternatives relevant to stress response.
- 190. Answer: B.** The transferred prediction follows the same mechanism without adding an unsupported claim: the stress response prepares the organism for action but has costs when prolonged.
- 191. Answer: C.** The selected measurement directly checks the proposed relationship involving stress response rather than recording an unrelated observation.
- 192. Answer: B.** The supporting observation must address group membership and preserve the controls described in the passage.
- 193. Answer: D.** The direction follows from the reported mechanism: identity links individual self-understanding to social groups and expectations.
- 194. Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to group membership.
- 195. Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: identity links individual self-understanding to social groups and expectations.
- 196. Answer: A.** The supporting observation must address resource access and preserve the controls described in the passage.
- 197. Answer: A.** The direction follows from the reported mechanism: social position shapes exposure, opportunity, and ability to use resources.
- 198. Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to resource access.

- 199. Answer: C.** The transferred prediction follows the same mechanism without adding an unsupported claim: social position shapes exposure, opportunity, and ability to use resources.
- 200. Answer: D.** The supporting observation must address causal inference and preserve the controls described in the passage.
- 201. Answer: B.** The direction follows from the reported mechanism: chance assignment reduces systematic baseline differences between conditions.
- 202. Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to causal inference.
- 203. Answer: A.** The transferred prediction follows the same mechanism without adding an unsupported claim: chance assignment reduces systematic baseline differences between conditions.
- 204. Answer: B.** The supporting observation must address cognitive change and preserve the controls described in the passage.
- 205. Answer: A.** The direction follows from the reported mechanism: developmental interpretations must distinguish the underlying reasoning ability from task familiarity.
- 206. Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to cognitive change.
- 207. Answer: C.** The transferred prediction follows the same mechanism without adding an unsupported claim: developmental interpretations must distinguish the underlying reasoning ability from task familiarity.
- 208. Answer: D.** The supporting observation must address cognitive dissonance and preserve the controls described in the passage.
- 209. Answer: A.** The direction follows from the reported mechanism: insufficient external justification can make internal attitude adjustment more likely.
- 210. Answer: C.** The comparison changes the proposed variable while controlling the alternatives relevant to cognitive dissonance.
- 211. Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: insufficient external justification can make internal attitude adjustment more likely.
- 212. Answer: D.** The supporting observation must address norms and preserve the controls described in the passage.
- 213. Answer: B.** The direction follows from the reported mechanism: norms operate through shared expectations and social consequences.
- 214. Answer: A.** The comparison changes the proposed variable while controlling the alternatives relevant to norms.

- 215. Answer: D.** The transferred prediction follows the same mechanism without adding an unsupported claim: norms operate through shared expectations and social consequences.
- 216. Answer: A.** Classical conditioning pairs stimuli so that one stimulus comes to elicit a response associated with another.
- 217. Answer: C.** Sympathetic activation supports a fight-or-flight response with increased arousal and energy mobilization.
- 218. Answer: C.** Consistency indicates reliability, whereas measuring the intended construct indicates validity.
- 219. Answer: B.** A narrow volunteer sample may not represent the broader population, limiting external validity or generalizability.
- 220. Answer: B.** Social loafing is reduced individual effort when responsibility is diffused in a group.
- 221. Answer: D.** A role is the set of behavioral expectations associated with a status or position.
- 222. Answer: A.** A negative correlation indicates an inverse association, not necessarily causation.
- 223. Answer: B.** Socialization is the lifelong process of learning norms, values, roles, and expectations.
- 224. Answer: C.** Working memory temporarily holds and manipulates information during cognitive tasks.
- 225. Answer: C.** Negative reinforcement increases behavior by removing an aversive stimulus after the behavior.
- 226. Answer: A.** A confounder is related to the presumed cause and outcome, complicating causal interpretation.
- 227. Answer: A.** Unemployment reflects social and economic structure while also affecting individual stress and behavior.
- 228. Answer: B.** People often overattribute others' actions to dispositions while underweighting situational factors.
- 229. Answer: C.** A placebo condition helps separate treatment effects from expectations and context.
- 230. Answer: A.** Group polarization is movement toward a more extreme average position after group discussion.