



# PHYSIOLOGY MCQS

## Done by

Emad Nofel

Omar Debas

Sulaiman Madani

Baraa Safi

Eman Otoom

Malak Qasem

**Checked by: Johainah Taha**

---

1. What is the calculated osmolarity of a solution containing 12 millimolar NaCl, 4 millimolar KCl, and 2 millimolar CaCl<sub>2</sub> (in mOsm/L)?

- A) 16
- B) 26
- C) 29
- D) 32
- E) 38
- F) 42

Ans: E

2. Simple diffusion and facilitated diffusion share which of the following characteristics?

- A) Can be blocked by specific inhibitors
- B) Do not require adenosine triphosphate (ATP)
- C) Require transport protein
- D) Saturation kinetics
- E) Transport solute against concentration gradient

Ans: B

3. The resting potential of a myelinated nerve fiber is primarily dependent on the concentration gradient of which of the following ions?

- A) Ca<sup>++</sup>
- B) Cl<sup>-</sup>
- C) HCO<sub>3</sub><sup>-</sup>
- D) K<sup>+</sup>
- E) Na<sup>+</sup>

Ans: D

4. Which of the following is a consequence of myelination in large nerve fibers?

- A) Decreased velocity of nerve impulses
- B) Generation of action potentials only at the nodes of Ranvier
- C) Increased energy requirement to maintain ion gradients
- D) Increased membrane capacitance
- E) Increased nonselective diffusion of ions across the axon membrane

Ans: B

---

---

5. Tetanic contraction of a skeletal muscle fiber results from a cumulative increase in the intracellular concentration of which of the following?

- A) ATP
- B)  $\text{Ca}^{++}$
- C)  $\text{K}^+$
- D)  $\text{Na}^+$
- E) Troponin

Ans: B

6. Which of the following transport mechanisms is not rate limited by an intrinsic  $V_{\text{max}}$ ?

- A) Facilitated diffusion via carrier proteins
- B) Primary active transport via carrier proteins
- C) Secondary co-transport
- D) Secondary counter-transport
- E) Simple diffusion through protein channels

Ans: E

7. Assuming complete dissociation of all solutes, which of the following solutions would be hyperosmotic relative to 1 millimolar  $\text{NaCl}$ ?

- A) 1 millimolar  $\text{CaCl}_2$
- B) 1 millimolar glucose
- C) 1 millimolar  $\text{KCl}$
- D) 1 millimolar sucrose
- E) 1.5 millimolar glucose

Ans: A

8. ATP is used directly for each of the following processes EXCEPT one. Which one is this EXCEPTION?

- A) Accumulation of  $\text{Ca}^{++}$  by the sarcoplasmic reticulum
- B) Transport of glucose into muscle cells
- C) Transport of  $\text{H}^+$  from the parietal cells into the lumen of the stomach
- D) Transport of  $\text{K}^+$  from the extracellular to intracellular fluid
- E) Transport of  $\text{Na}^+$  from the intracellular to extracellular fluid

Ans: B

---

---

Intracellular (mM)	Extracellular (mM)
140 K <sup>+</sup>	14 K <sup>+</sup>
10 Na <sup>+</sup>	100 Na <sup>+</sup>
11 Cl <sup>-</sup>	110 Cl <sup>-</sup>
10 <sup>-4</sup> Ca <sup>++</sup>	2 Ca <sup>++</sup>

The table shows the concentrations of four ions across the plasma membrane of a model cell. Refer to the table when answering the following four questions.

9. What is the equilibrium potential for Cl<sup>-</sup> across the plasma membrane of this cell?

- A) 0 millivolts
- B) 122 millivolts
- C) -122 millivolts
- D) 61 millivolts
- E) -61 millivolts

Ans: E

10. What is the equilibrium potential for K<sup>+</sup> across the plasma membrane of this cell?

- A) 0 millivolts
- B) 122 millivolts
- C) -122 millivolts
- D) 61 millivolts
- E) -61 millivolts

Ans: E

11. If the membrane potential of this cell is -80 millivolts, the driving force is greatest for which ion?

- A) Ca<sup>+2</sup>
- B) Cl<sup>-</sup>
- C) K<sup>+</sup>
- D) Na<sup>+</sup>

Ans: A

---

---

12. If this cell were permeable only to  $K^+$ , what would be the effect of reducing the extracellular  $K^+$  concentration from 14 to 1.4 millimolar?

- A) 10 millivolts depolarization
- B) 10 millivolts hyperpolarization
- C) 122 millivolts depolarization
- D) 122 millivolts hyperpolarization
- E) 61 millivolts depolarization
- F) 61 millivolts hyperpolarization

Ans: F



الننادي الطبي

---

---

Match each of the processes described below with the correct type of transport listed (each answer may be used more than once.)

- A) Simple diffusion
- B) Facilitated diffusion
- C) Primary active transport
- D) Co-transport
- E) Counter-transport

13. Ouabain-sensitive transport of  $\text{Na}^+$  ions from the cytosol to the extracellular fluid

Ans: C

14. Glucose uptake into skeletal muscle

Ans: B

15.  $\text{Na}^+$ -dependent transport of  $\text{Ca}^{+2}$  from the cytosol to the extracellular fluid

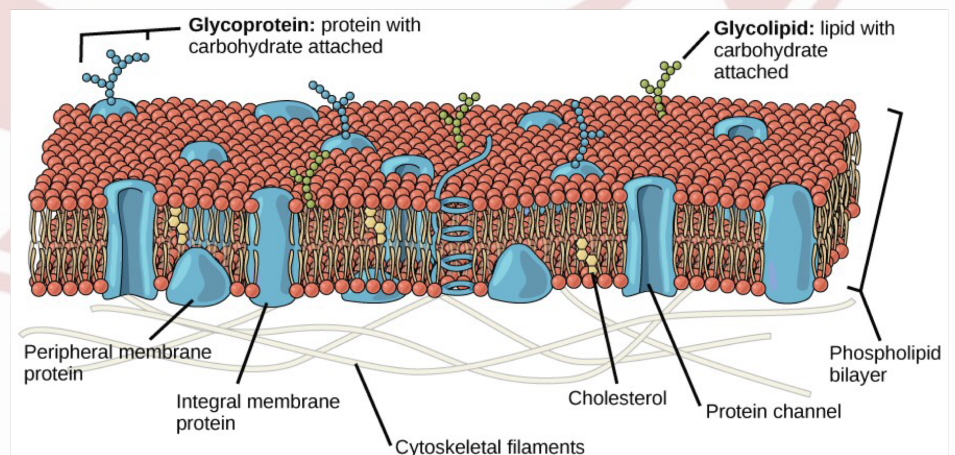
Ans: E

16. Transport of glucose from the intestinal lumen into an intestinal epithelial cell

Ans: D

17. Movement of  $\text{Na}^+$  ions into a nerve cell during the upstroke of an action potential

Ans: A



---

18. A typical mammalian motor neurone: (More than one answer might be correct)

- a) Innervates only one skeletal muscle cell
- b) Is myelinated
- c) Is unmyelinated
- d) Has its cell body in the ventral (anterior) horn of the spinal cord
- e) Has its cell body in the dorsal (posterior) horn of the spinal cord

T,T,T,F,F

19. A reflex action: (More than one answer might be correct)

- a) May be carried out by skeletal, smooth or cardiac muscle or by glands
- b) Is not influenced by higher centres in the brain
- c) Results from activity in at least two central nervous synapses in series
- d) May involve simultaneous contraction of some skeletal muscles and relaxation of others
- e) Can be monosynaptic or polysynaptic

T,F,F,T,T

20. Aldosterone: (More than one answer might be correct)

- a) Secretion increases in response to a fall in blood volume
- b) Is a polypeptide
- c) Produces a fall in urine volume
- d) Increases the reabsorption of sodium

T,F,T,T

21. ONE of the following is a precursor of adrenaline:

- a) Tryptophan
- b) Tyrosine
- c) Methionine
- d) Valine
- e) Glutamate

Ans : B

---

---

22. The velocity of conduction of a nerve action potential (More than one answer might be correct)

- a) is inversely related to the cross-sectional area of the axon
- b) is faster in a myelinated fibre than in an unmyelinated one
- d) can exceed 100 m/s in humans
- e) is highest in pre-ganglionic autonomic fibres

F,T,T,F



الننادي الطبي

---



---

23. Which of the following volume changes would most likely be seen in a 38-year-old man who is lost and dehydrated in a desert?

- A. Loss of isotonic fluid with ECF volume contraction, no change in total body osmolarity, no change in ICF volume
- B. Loss of hypotonic fluid with ECF volume contraction, increase in total body osmolarity, ICF volume contraction
- C. Loss of hypotonic fluid with ECF volume contraction, no change in total body osmolarity, no change in ICF volume
- D. Loss of hypertonic fluid with ECF volume contraction, decrease in total body osmolarity, increase in ICF volume
- E. Loss of hypertonic fluid with ECF volume expansion, decrease in total body osmolarity, decrease in ICF volume

Answer: B

24. Which of the following is the mechanism of action behind heart arrhythmias caused by hyperkalemia?

- A. Increased potassium hyperpolarizes the cell
- B. Increased potassium prolongs action potential duration
- C. Increased potassium increases heart rate via funny current channels
- D. Increased potassium depolarizes the cell bringing excitable nerves closer to action potential
- E. Increased potassium increases intracellular calcium concentration

Answer: D

25. Which of the following corresponds to phase 2 of the non-nodal action potential?

- A. Upstroke of the action potential creating the QRS complex of the EKG
- B. Sodium channels transition to the inactivated state
- C. Resting membrane potential
- D. Repolarization phase creating the T wave of the EKG
- E. Inward  $\text{Ca}^{2+}$  current offset by the outward  $\text{K}^{+}$  current resulting in little change in membrane potential

Answer: E

---

---

26. A 48-year-old woman undergoes surgical removal of her pituitary macroadenoma when the pituitary stalk is accidentally cauterized. An increase in which of the following is most likely to be noted on labs?

- A. Thyroid stimulating hormone
- B. Prolactin
- C. Cortisol
- D. Dopamine
- E. Follicle stimulating hormone

Answer: B

27. ADH secretion is most sensitive to changes in which of the following?

- A. Plasma osmolarity
- B. Plasma volume
- C. Cardiac output
- D. Ejection fraction
- E. Peripheral vascular resistance

Answer: A

28. Which of the following is correct about the control of growth hormone (GH) secretion?

- A. Continuous and slow
- B. Occurs in the early stages of sleep during stage 1 and 2
- C. Depends on thyroid hormone plasma levels
- D. Accelerates during decade 6 of life
- E. Depends on plasma insulin levels

Answer: C

---

---

29. Choose one answer below that completes the sentence so that it makes a true statement: Positive feedback

- A. is the way the body maintains homeostasis
- B. is a response that opposes a stimulus
- C. is a response that maintains a dynamic state equilibrium
- D. is a response that enhances a stimulus

State of couilhrin

Answer is D

30. The hypothalamus and core thermoreceptors notice if body temp too low. The hypothalamus signals smooth muscle in blood vessels to vasoconstrict and skeletal muscle in blood vessels to vasoconstrict and skeletal muscle to shiver. This activity causes body temp to rise, which is again noticed by hypothalamus & core thermoreceptors, so the hypothalamus turn off these heat gain mechanisms. In this scenario, which of the following statements is correct?

- A. The scenario describes positive feedback in action.
- B. The core thermoreceptors are the effector organs.
- C. The hypothalamus is the control centre.
- D. Skeletal muscle is the efferent pathway to the effector organ.

Answer is C: The hypothalamus interprets the sensory input and determines the response. Choice A is wrong as this is negative feedback. The effector organs are the skeletal muscles (which are not a "pathway").

31. The human body's ability to maintain a relatively constant internal temperature is an example of what?

- A. Respiratory heat loss
- B. Homeostasis
- C. Vasodilation and evaporative heat loss
- D. Positive feedback

Answer is B: Homeostasis is derived from words that mean remaining similar and standing still and refers to physiological conditions remaining more or less the same.

---

---

**32. Some of the body's homeostatic responses rely on "negative feedback". Which of the following happens in negative feedback?**

- A. The body ignores changes in a physiological variable that are directed towards the set point for that variable.**
- B. The body ignores changes in a physiological variable that are directed away from the set point for that variable**
- C. The body's response acts to oppose the change in the physiological variable.**
- D. The body's response acts to enhance the change in the physiological variable**

**Answer is C: "Negative" refers to the response being in the opposite direction to the stimulus. Thus if a variable is increasing, then the body's response is to produce a change that causes the variable to decrease. The body does not "ignore" stimuli.**

**33. In homeostasis, what is it that produces the response that moves the physiological variable back towards the middle of its healthy range?**

- A. the effector**
- B. the receptor**
- C. the integrating centre**
- D. the efferent pathway**

**Answer is A: The effector produces the effect that it is directed to by the integrating centre. That direction is passed along the efferent (or outgoing) pathway.**

**34. The "afferent pathway" in the description of a feedback loop in homeostasis, refers to the:**

- A. circulating blood.**
- B. pathway from the integrating centre to the effector.**
- C. outgoing signal.**
- D. path taken by the signal produced by a stimulus.**

**Answer is D: The afferent signal is incoming from the receptor to the integrating centre. It may be via the blood, but may be via a nerve.**

---

---

35. Homeostasis usually returns the body to a healthy state after stressful stimuli by

- A. negative feedback
- B. positive feedback
- C. means of the immune system
- D. means of the nervous system

Answer is A: Negative feedback is far more common in maintaining homeostasis than is positive feedback.

36. What does the word "homeostasis" refer to?

- A. the steps leading to repair of a blood vessel and the coagulation of blood
- B. the maintenance of internal body conditions within narrow limits
- C. the controlled response that opposes the influence that caused it.
- D. the production of blood cells in active bone marrow

Answer is B: This is the best definition. Choice C refers to negative feedback only.

37. How does homeostasis return the body to a healthy state after stressful stimuli?

By producing a

- A. responses that oppose the stress
- B. learned behaviour
- C. reflex action
- D. buffering mechanism

Answer is A: Refers to negative feedback. Positive feedback is also possible (but rare), nevertheless choice A is the best answer.

38. What causes the body to maintain a relatively constant internal environment?

- A. positive feedback
- B. homeostasis
- C. reflexes
- D. pH buffers

Answer is B: Homeostasis matches the definition in the question.

---

---

39. Homeostasis relies on feedback to achieve its aims. "Negative" feedback refers to which situation below? The body's response:

- A. travels from the effector to the integrating centre via the afferent pathway.
- B. opposes the stressful stimulus.
- C. is to decrease the set point.
- D. enhances the stressful stimulus.

Answer is B: "Negative" refers to the opposing nature of the response.

40. The term "homeostasis" is described by which one of the following statements?

"The body's ability to:

- A. respond to a stimulus or stress in such a way as to enhance the stress.
- B. maintain a relatively constant internal temperature.
- C. respond to a stimulus or stress in such a way as to reduce the stress.
- D. maintain a relatively constant internal environment.

Answer is D: Choice A refers to positive feedback. Choice C refers to negative feedback. Choice B is an example of homeostasis.

41. Synthesis and release of most hormones is regulated by negative feedback.

Negative feedback means

- A. A rise in hormone levels affects the target organ which acts to inhibit further hormone release
- B. A rise in hormone levels affects the target organ which acts to stimulate further hormone release
- C. The effect of hormones on target cells does not control further release of hormone
- D. Neural stimuli result in the release of oxytocin and antidiuretic hormone from the hypothalamus

Answer is A: When the response opposes a change, it is negative feedback.

---

---

42. Which of the following is a correct definition of "positive feedback"?

- A. The process by which the body maintains homeostasis.
- B. A mechanism in which the body's response to a stimulus, opposes the stimulus.
- C. A mechanism whereby the body responds to a stimulus by acting to enhance the stimulus.
- D. The dynamic equilibrium maintained by an integrating centre which causes an effector to respond to the stimulus received by the receptor.

Answer is C: When the stimulus is enhanced, the feedback is termed "positive".

43. Which of the following is a correct definition of "negative feedback"?

- A. The process by which the body maintains homeostasis.
- B. A mechanism in which the body's response opposes the stimulus.
- C. A mechanism whereby the body responds to a stimulus by acting to enhance the stimulus.
- D. The dynamic equilibrium maintained by an integrating centre which causes an effector to respond to the stimulus received by the receptor.

Answer is B: When an action is taken to cause the stimulus to be reduced, the feedback is termed "negative".

44. Homeostasis refers to maintaining :

- A. a constant internal body environment through negative feedback.
- B. body conditions relatively constant within a narrow range through negative and positive feedback.
- C. adequate concentrations of respiratory gases.
- D. blood glucose level within the healthy range.

Answer is B: The maintenance of body conditions through feedback which is usually negative but is positive in some rare situations.

---

---

45. What does the term "homeostasis" refer to?

- A. the chemical processes that take place in the organelles of the cells.
- B. the body's tendency to maintain a relatively constant internal environment.
- C. the body's use of energy to produce chemical substances and parts for growth.
- D. any body response that opposes the stimulus that initiated the response.

Answer is B: This is the best definition of homeostasis. Choice D refers to negative feedback.

46. The body returns to a healthy state after stressful stimuli thanks to which of the following?

- A. positive feedback
- B. metabolism
- C. anabolism
- D. negative feedback

Answer is D: Negative feedback is more common than positive feedback.

47. Which of the following would be a negative feedback response by the body to hyperthermia?

- A. Shivering
- B. Sweating
- C. Vasoconstriction of blood vessels in the dermis
- D. An increase in metabolic rate

Answer is B: Hyperthermia is an increase on body temperature above 38 °C. Negative feedback would be a response that opposed the temperature rise.

Allowing perspiration to evaporate from the skin would cool the skin and lead

to a decrease in body temperature. The effect of the other choices would be to increase body temperature.

---



---

48. How would the hypothalamus respond if its osmoreceptors noticed an increase in plasma osmotic pressure? It would send a message to:

- A. the posterior pituitary to release more ADH
- B. the posterior pituitary to release less ADH
- C. the adrenal cortex to release less aldosterone
- D. the atria to release more ANP

Answer is A: The hypothalamus would respond in a way that opposed the rise in osmotic pressure. Releasing more ADH would make the distal convoluted tubules of the nephrons to become more permeable to water. This would allow more water to be reclaimed from the filtrate which would act against the osmotic pressure of the plasma from rising further. It would also stimulate

49. During the delivery of a baby the baby's head is pushing against the cervix causing the cervix wall to stretch. This stretching causes nerve impulses to be sent to the hypothalamus which directs the posterior pituitary to release oxytocin in the blood. Oxytocin stimulates the uterus to contract which pushes the baby's head deeper into the cervix, stretching it further. This situation is a description of which of the following?

- A. negative feedback
- B. positive feedback
- C. homeostasis
- D. an afferent pathway to an integrating centre

Answer is B: The stimulus (cervical stretching) causes the integrating centre (the hypothalamus) to respond by enhancing the stimulus - releasing oxytocin so that the uterus contracts. Enhancing the stimulus is an example of positive feedback. The feedback stops when the cervix is no longer being stretched, that is when the baby is delivered.

---

---

50. Which of the following statements about positive feedback and homeostasis is correct?

A. They are regulation mechanisms that control most fluctuations in the internal environment of the body.

B. The response to the stimulus serves to exaggerate the feedback effect.

C. This type of feedback response only involves an effector not a specific stimulus receptor site.

D. This feedback mechanism involves adjustments at the organ level but not at the cellular level.

Answer is B: Positive feedback causes the stimulus to increase in magnitude which in turn elicits a more exaggerated response.

وغداً ستحكي عن حلمك الذي تحقق ، وعن جبرُ الله لك...

#النادي\_الطبي

#معكم\_خطوة\_بخطوة

النادي الطبي