Biology Grade 12 — Chapter 8

Thermoregulation and Homeostasis

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Independent practice MCQs from the supplied Class 12 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. Thermoregulation is the maintenance of internal temperature within a range that allows:

(A) Cells to function efficiently
(B) Cells to stop working
(C) Enzymes to denature
(D) Blood pressure to rise

Correct Answer: A

Explanation: Thermoregulation is defined as the maintenance of internal temperature within a range that allows cells to function efficiently.

2. The core temperature of the human body remains reasonably constant at:

(A) 30°C
(B) 37°C
(C) 40°C
(D) 25°C

Correct Answer: B

Explanation: The core temperature of the human body remains reasonably constant at 37°C.

3. Animals that are unable to maintain their body temperature within narrow limits using physiological mechanisms are called:

(A) Homeotherms
(B) Endotherms
(C) Poikilotherms
(D) Osmoregulators

Correct Answer: C

Explanation: Poikilotherms are unable to maintain their body temperature within the narrow limits using physiological mechanisms.

4. Animals that can maintain a fairly constant body temperature by using physiological mechanisms are called:

(A) Poikilotherms
(B) Ectotherms
(C) Osmoconformers
(D) Homeotherms

Correct Answer: D

Explanation: Homeotherms are birds and mammals which are able to maintain a fairly constant body temperature by using physiological mechanisms.

5. Animals that rely more on heat derived from the environment to raise their body temperature are called:

(A) Ectotherms
(B) Endotherms
(C) Homeotherms
(D) Osmoregulators

Correct Answer: A

Explanation: Ectotherms rely more on heat derived from the environment to raise their body temperature.

6. Animals that produce their own body heat through metabolism are called:

(A) Ectotherms
(B) Endotherms
(C) Poikilotherms
(D) Osmoconformers

Correct Answer: B

Explanation: Endotherms produce their own body heat through heat production as byproduct during metabolism.

7. The thermoregulatory center in the human body is located in the:

(A) Cerebrum
(B) Cerebellum
(C) Hypothalamus
(D) Medulla

Correct Answer: C

Explanation: Thermoregulatory center in human body is located in the hypothalamus which acts as a thermostat.

8. Homeostasis means:

(A) Keeping things out of balance
(B) Increasing body temperature
(C) Decreasing body temperature
(D) Keeping things in balance

Correct Answer: D

Explanation: Homeostasis means keeping things in balance.

9. The process by which organisms keep internal conditions relatively constant is called:

(A) Homeostasis
(B) Thermoregulation
(C) Osmoregulation
(D) Excretion

Correct Answer: A

Explanation: Homeostasis is the process by which organisms keep internal conditions relatively constant despite changes in external environment.

10. The three components of homeostatic mechanisms are:

(A) Receptor, effector, hormone
(B) Receptor, control center, effector
(C) Control center, hormone, effector
(D) Receptor, control center, hormone

Correct Answer: B

Explanation: The three components of homeostatic mechanisms are Receptor, control center, effector.

11. The maintenance of constant osmotic conditions in the body is called:

(A) Thermoregulation
(B) Homeostasis
(C) Osmoregulation
(D) Excretion

Correct Answer: C

Explanation: The maintenance of constant osmotic conditions (water and solute concentration) in the body is called osmoregulation.

12. Animals that change the osmotic concentrations of the body fluids according to the surrounding medium are called:

(A) Osmoregulators
(B) Homeotherms
(C) Endotherms

(D) Osmoconformers

Correct Answer: D

Explanation: Those animals that change the osmotic concentrations of the body fluids according to that of surrounding medium are called osmo-conformers.

13. Animals that maintain internal osmotic concentrations different from the surrounding medium are called:

(A) Osmoregulators
(B) Osmoconformers
(C) Poikilotherms
(D) Ectotherms

Correct Answer: A

Explanation: Those animals that can maintain internal osmotic concentrations different from the surrounding medium are called osmoregulators.

14. Freshwater animals are generally:

(A) Hypotonic to their environment
(B) Hypertonic to their environment
(C) Isotonic to their environment
(D) Independent of their environment

Correct Answer: B

Explanation: Almost all of the freshwater animals are osmoregulators and are generally hypertonic to their outer environment.

15. Marine teleosts are:

(A) Hypertonic to their environment
(B) Isotonic to their environment
(C) Hypotonic to their environment
(D) Independent of their environment

Correct Answer: C

Explanation: Most of the marine teleosts (bony fishes) are hypotonic to sea water.

16. What is the function of vasodilation during heat exposure?

(A) Decreases heat loss
(B) Increases heat production
(C) Decreases heat production
(D) Increases heat loss

Correct Answer: D

Explanation: One way to increase heat loss is to supply the capillaries in the skin with a greater volume of blood, which then loses heat to the environment via radiation.

17. What is the function of sweating?

(A) Cools the body
(B) Warms the body
(C) Increases heat production
(D) Decreases heat loss

Correct Answer: A

Explanation: Evaporation of sweat from the skin's surface leads to cooling.

18. What is the function of shivering?

(A) Decreases heat production
(B) Increases heat production
(C) Increases heat loss
(D) Decreases heat loss

Correct Answer: B

Explanation: We shiver when muscles contract and relax rapidly; shivering muscles give out four or five times as much heat as resting muscles.

19. What is the function of vasoconstriction during cold exposure?

(A) Increases heat loss
(B) Increases heat production
(C) Decreases heat loss
(D) Decreases heat production

Correct Answer: C

Explanation: One way to decrease heat loss is to supply the capillaries in the skin with a smaller volume of blood, minimizing the loss of heat to the environment via radiation.

20. What is the function of piloerection?

(A) Increases heat loss
(B) Decreases heat production
(C) Increases sweating
(D) Traps air for insulation

Correct Answer: D

Explanation: In most mammals, piloerection makes the fur 'thicker', so that it traps more air to provide extra insulation.

21. What is the function of increased metabolic rate during cold exposure?

(A) Increases heat production
(B) Decreases heat production
(C) Increases heat loss
(D) Decreases heat loss

Correct Answer: A

Explanation: The body secretes the hormone adrenaline in response to cold; this raises metabolic rate and therefore increases heat production.

22. What is the function of the receptor in homeostatic mechanisms?

(A) Processes information
(B) Receives information about changes
(C) Responds to commands
(D) Produces hormones

Correct Answer: B

Explanation: The receptor receives information that something in the environment is changing.

23. What is the function of the control center in homeostatic mechanisms?

(A) Receives information
(B) Responds to commands
(C) Processes information
(D) Produces hormones

Correct Answer: C

Explanation: The control center receives and processes information from the receptor.

24. What is the function of the effector in homeostatic mechanisms?

(A) Receives information
(B) Processes information
(C) Produces hormones
(D) Responds to commands

Correct Answer: D

Explanation: Responds to commands — this correctly answers the question.

25. What is the function of negative feedback?

(A) Maintains homeostasis

(B) Amplifies change
(C) Increases temperature
(D) Decreases temperature

Correct Answer: A

Explanation: Homeostasis is maintained by negative feedback loops within the organism.

B. Less Important / Secondary Topics

26. What is the function of positive feedback?

(A) Amplifies change
(B) Maintains homeostasis
(C) Reverses change
(D) Decreases temperature

Correct Answer: A

Explanation: Amplifies change — this correctly answers the question.

27. What is the function of osmoregulation in freshwater animals?

(A) Produces small volume of concentrated urine
(B) Produces large volume of diluted urine
(C) Increases salt loss
(D) Decreases water intake

Correct Answer: B

Explanation: Freshwater animals deal with their problems by producing large volume of diluted urine.

28. What is the function of ionocytes in freshwater animals?

(A) Produce urine
(B) Produce hormones
(C) Actively transport salts
(D) Digest food

Correct Answer: C

Explanation: Freshwater animals actively transport salts from the external dilute medium with the help of special salt cells called ionocytes.

29. What is the function of rectal glands in some marine fishes?

(A) Produce urine
(B) Produce hormones
(C) Digest food
(D) Remove salts into the digestive tract

Correct Answer: D

Explanation: Some fishes have special salt secreting glands in the wall of rectum called rectal glands that remove salts into the digestive tract.

30. What is anhydrobiosis?

(A) Ability to tolerate dehydration
(B) Ability to tolerate excess water
(C) Ability to produce hormones
(D) Ability to digest food

Correct Answer: A

Explanation: Desert mammals can tolerate against strong degree of dehydration by special metabolic and behavioural adaptation; this characteristic is called anhydrobiosis.

31. What is the function of the kangaroo rat's metabolic water?

(A) Provides food
(B) Provides water for survival
(C) Provides hormones
(D) Provides oxygen

Correct Answer: B

Explanation: Ninety percent of the water that kangaroo rat uses is metabolic water derived from cellular oxidation.

32. What is the function of the renin-angiotensin system?

(A) Regulates temperature
(B) Regulates digestion
(C) Regulates blood pressure and fluid balance
(D) Regulates reproduction

Correct Answer: C

Explanation: Regulates blood pressure and fluid balance — this correctly answers the question.

33. What is the function of ADH in osmoregulation?

(A) Promotes water loss
(B) Promotes salt loss
(C) Promotes heat loss
(D) Promotes water retention

Correct Answer: D

Explanation: ADH causes water retention in the kidney, which increases blood volume.

34. What is the function of aldosterone in osmoregulation?

(A) Promotes sodium reabsorption
(B) Promotes sodium loss
(C) Promotes water loss
(D) Promotes heat loss

Correct Answer: A

Explanation: Promotes sodium reabsorption — this correctly answers the question.

35. What is the function of the loop of Henle in osmoregulation?

(A) Produces hormones
(B) Creates a concentration gradient
(C) Digests food
(D) Produces red blood cells

Correct Answer: B

Explanation: The loop of Henle creates a concentration gradient in the medulla that allows water reabsorption and urine concentration.

36. A patient has a condition that causes excessive sweating. Which of the following would be the most likely consequence?

(A) Overhydration
(B) Increased blood volume
(C) Dehydration
(D) Decreased body temperature

Correct Answer: C

Explanation: Dehydration — this correctly answers the question.

37. A patient has a condition that causes decreased ADH secretion. Which of the following would be the most likely consequence?

(A) Decreased urine volume
(B) Increased blood volume
(C) Decreased blood pressure
(D) Increased urine volume

Correct Answer: D

Explanation: Increased urine volume — this correctly answers the question.

38. A patient has a condition that causes decreased aldosterone secretion. Which of the following would be the most likely consequence?

(A) Increased sodium loss
(B) Decreased sodium loss
(C) Increased water retention
(D) Decreased urine volume

Correct Answer: A

Explanation: Increased sodium loss — this correctly answers the question.

39. Which of the following correctly describes the role of negative feedback in thermoregulation?

(A) It amplifies the change in temperature
(B) It reverses the change in temperature
(C) It has no effect on temperature
(D) It increases body temperature

Correct Answer: B

Explanation: It reverses the change in temperature — this correctly answers the question.

40. A patient has a condition that causes increased body temperature. Which of the following would most likely occur?

(A) Vasoconstriction and shivering
(B) Piloerection and increased metabolic rate
(C) Vasodilation and sweating
(D) Decreased heart rate

Correct Answer: C

Explanation: Vasodilation and sweating — this correctly answers the question.

41. A patient has a condition that causes decreased body temperature. Which of the following would most likely occur?

(A) Vasodilation and sweating
(B) Increased sweating
(C) Decreased metabolic rate
(D) Vasoconstriction and shivering

Correct Answer: D

Explanation: Vasoconstriction and shivering — this correctly answers the question.

42. Which of the following correctly describes the role of the hypothalamus in osmoregulation?

(A) It detects changes in blood osmolarity and regulates ADH release
(B) It produces urine
(C) It produces red blood cells
(D) It digests food

Correct Answer: A

Explanation: The hypothalamus detects changes in blood osmolarity and regulates ADH release from the posterior pituitary.

43. Which of the following correctly describes the role of the kidneys in homeostasis?

(A) They produce red blood cells
(B) They regulate water and electrolyte balance
(C) They digest food
(D) They produce hormones

Correct Answer: B

Explanation: They regulate water and electrolyte balance — this correctly answers the question.

44. A patient has a condition that causes increased blood osmolarity. Which of the following would most likely occur?

(A) Decreased ADH secretion
(B) Increased urine volume
(C) Increased ADH secretion

(D) Decreased water reabsorption

Correct Answer: C

Explanation: Increased blood osmolarity stimulates ADH secretion, which promotes water retention.

45. A patient has a condition that causes decreased blood osmolarity. Which of the following would most likely occur?

(A) Increased ADH secretion
(B) Decreased urine volume
(C) Increased water reabsorption
(D) Decreased ADH secretion

Correct Answer: D

Explanation: Decreased ADH secretion — this correctly answers the question.

46. Which of the following correctly describes the role of the countercurrent multiplier mechanism?

(A) It creates a concentration gradient in the medulla
(B) It produces hormones
(C) It digests food
(D) It produces red blood cells

Correct Answer: A

Explanation: The countercurrent multiplier mechanism creates a concentration gradient in the medulla that allows water reabsorption and urine concentration.

47. Which of the following correctly describes the role of the vasa recta?

(A) It produces hormones
(B) It maintains the concentration gradient
(C) It digests food
(D) It produces red blood cells

Correct Answer: B

Explanation: The vasa recta are specialized capillaries that maintain the concentration gradient in the medulla.

48. A patient has a condition that causes increased sodium reabsorption. Which of the following would be the most likely consequence?

(A) Decreased blood pressure
(B) Increased urine volume
(C) Increased blood pressure
(D) Decreased blood volume

Correct Answer: C

Explanation: Increased sodium reabsorption leads to increased water retention and increased blood volume, which increases blood pressure.

49. Which of the following correctly describes the role of the renin-angiotensin-aldosterone system (RAAS)?

(A) It regulates temperature
(B) It regulates digestion
(C) It regulates reproduction
(D) It regulates blood pressure and fluid balance

Correct Answer: D

Explanation: The RAAS is a critical hormonal system that regulates blood pressure and fluid balance.

50. A patient has a condition that causes excessive water loss. Which of the following would be the most likely consequence?

(A) Dehydration
(B) Overhydration
(C) Increased blood volume
(D) Decreased blood pressure

Correct Answer: A

Explanation: Dehydration — this correctly answers the question.