



# Physiology Test Bank

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*Past Questions+ BOOK Questions*

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1. In which phase of the ventricular muscle action potential is the potassium permeability the highest?

- A) 0
- B) 1
- C) 2
- D) 3
- E) 4

ANSWER: D

2. Which of the following structures will have the slowest rate of conduction of the cardiac action potential?

- A) Atrial muscle
- B) Anterior internodal pathway
- C) A-V bundle fibers
- D) Purkinje fibers
- E) Ventricular muscle

ANSWER: C

3. Sympathetic stimulation of the heart does which of the following?

- A) Releases acetylcholine at the sympathetic endings
- B) Decreases sinus nodal discharge rate
- C) Decreases excitability of the heart
- D) Releases norepinephrine at the sympathetic endings

ANSWER: D

4. Which condition at the A-V node will cause a decrease in heart rate?

- A) Increased sodium permeability
- B) Decreased acetylcholine levels
- C) Increased norepinephrine levels
- D) Increased potassium permeability
- E) Increased calcium permeability

ANSWER:D

5. Which statement best explains how sympathetic stimulation affects the heart?

- A) The permeability of the S-A node to sodium decreases
- B) The permeability of the A-V node to sodium decreases
- C) The permeability of the S-A node to potassium increases
- D) There is an increased rate of upward drift of the resting membrane potential of the S-A node
- E) The permeability of the cardiac muscle to calcium decreases

ANSWER:D

6. Which condition at the S-A node will cause heart rate to decrease?

- A) Increased norepinephrine level
- B) Increased sodium permeability
- C) Increased calcium permeability
- D) Increased potassium permeability
- E) Decreased acetylcholine level

ANSWER: D

7. In which phase of the ventricular muscle action potential is the sodium permeability the highest?

- A) 0
- B) 1
- C) 2
- D) 3
- E) 4

ANSWER:A

8. If the Purkinje fibers, situated distal to the A-V junction, become the pacemaker of the heart, what is the expected heart rate?

- A) 30/min
- B) 50/min
- C) 60/min
- D) 70/min
- E) 80/min

ANSWER: A

9. A patient had an ECG at the local emergency department.

The attending physician stated that the patient had an A-V nodal rhythm. What is the likely heart rate?

- A) 30/min
- B) 50/min
- C) 65/min
- D) 75/min
- E) 85/min

ANSWER: B

10. Which condition at the A-V node will cause a decrease in heart rate?

- A) Increased sodium permeability
- B) Decreased acetylcholine level
- C) Increased norepinephrine level
- D) Increased potassium permeability
- E) Increased calcium permeability

ANSWER: D

11. Sympathetic stimulation of the heart normally causes which condition?

- A) Acetylcholine release at the sympathetic endings
- B) Decreased heart rate

- C) Decreased rate of conduction of the cardiac impulse
- D) Decreased force of contraction of the atria
- E) Increased force of contraction of the ventricles

ANSWER: E

12. About the absolute refractory (A.R.P) period in the heart, all the following is true

EXCEPT:

- a. It is longer than the A.R.P of neurons.
- b. It lasts approximately as long as the cardiac contraction.
- c. It is due mainly to phase 2 (plateau) of the contractile cardiac muscle action potential.
- d. During it, the heart cannot be stimulated.
- e. It corresponds in time with the whole duration of the action potential.

Answer : E

13. Sinoatrial node cells are characterized by one of the following:

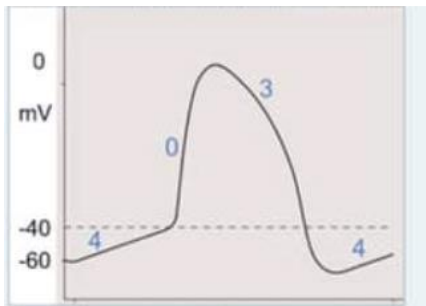
- a. Able to generate intrinsic and rhythmic impulses because their membrane potential is unstable.
- b. Unable to generate impulses when completely denervated.
- c. Innervated by the vagus (parasympathetic) only.
- d. Connected to the AV node by fine bundles of Purkinje tissue.
- e. Found in both atria.

Answer : A

14. The curve below represents the slow response action potential of the sinoatrial node

of the conduction system. Which of the above phases is due to leakiness of the cells to

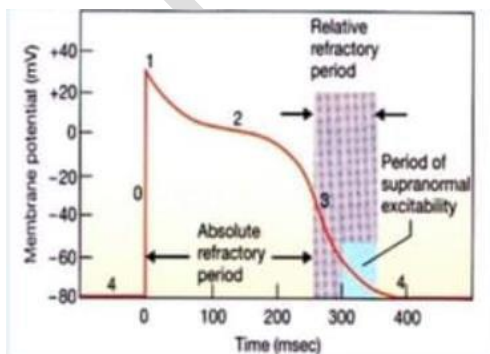
Na<sup>+</sup> ions :



- a. Phase 4
- b. Phase 0
- c. Phase 3
- d. Phase 4 and 0
- e. None of the above

Answer : A

15. In which phase of the ventricular muscle action potential is the potassium permeability the lowest ?



- a. 4
- b. 1
- c. 0
- d. 3
- e. 2

Answer : E

16. Which of the following conditions at the sinoatrial node will cause heart rate to decrease?

- a. Increased norepinephrine levels
- b. Increased calcium permeability
- c. Increased calcium sodium permeability
- d. Increased potassium permeability
- e. Decreased acetylcholine levels.

Answer : D

17. About the cardiac conductivity, all the following are true EXCEPT:

- a. It is increased by sympathetic stimulation.
- b. It is slowest in the A-V node.
- c. It is slowest in the ventricular muscle.
- d. It is decreased by vagal stimulation.
- e. It is maximal in the Purkinje fibres.

Answer : C

18. Sympathetic stimulation cause all of the following in the heart EXCEPT:



- a. It has a positive inotropic action on the heart.
- b. It decreases the conduction time in the atrioventricular (AV) node.
- c. It decreases the permeability of sinoatrial (SA) node to  $K^+$
- d. It decreases the slope of phase 4 of the slow response potential of the SA node.
- e. It increases the heart rate.

Answer : D

19. Sympathetic stimulation of the heart normally causes which of the following conditions?

- a. Decreased force of contraction (negative inotropic) of the atria.
- b. Decreased rate of conduction (negative dromotropic effect) of the cardiac impulse.
- c. Acetylcholine release at the sympathetic endings
- d. Negative chronotropic effect on the heart rate
- e. Increased force of contraction (positive inotropic) of the ventricles

Answer : E

20. The SA node is the pacemaker of the heart because.

- a. Leakier to  $K^+$  than other cells
- b. It is the only cells leaky to  $Na^+$  in the heart.
- c. Its membrane property (reach threshold faster than any other cell)
- d. Its location in the right atrium between the venae cava
- e. It is connected to autonomic nervous system.

Answer : C

21. About SA node:

Answer>> its cell are naturally permeable to Na<sup>+</sup> ions.

22. sympathetic effect on heart:

Answer>>> increases the slope of depolarization.

23. sympathetic effect on heart:

Answer>> epinephrine increase permeability to Na<sup>+</sup>

24. Na voltage gated channel is (close and not capable to open) in:

- A) resting state
- B) hyperpolarization
- C) absolute refractory period
- D) relative refractory period

ANSWER: C

25. If the ventricular Purkinje fibers become the pacemaker of the heart, what is the expected heart rate?

- A) 30/min
- B) 65/min
- C) 75/min
- D) 50/min
- E) 85/min

ANSWER A

26. At phase (2) of an action potential in a ventricular muscle cell which of the following is true?

- A) The chemical gradient for  $\text{Ca}^{++}$  tends to move this ion inside
- B) The electrochemical gradient for  $\text{K}^+$  tends to move this ion inside
- C)  $\text{Na}^+$  permeability greatly increases
- D) This phase is responsible for the short refractory period of cardiac action potential
- E) The chemical gradient for  $\text{K}^+$  tends to move this ion inside

ANSWER A

27. Which of the following structures will have the slowest rate of conduction of the cardiac action potential?

- A) Atrial muscle
- B) Ventricular muscle
- C) Purkinje fibers
- D) Atrioventricular node
- E) Sinoatrial node

ANSWER D

28.. Intracellular calcium homeostasis in cardiac muscle cell is characterized by:

- A)  $\text{Na}^+/\text{Ca}^{++}$  exchanger is found in cardiac as well as in skeletal muscle
- B) Mitochondrial  $\text{Na}^+/\text{Ca}^{++}$  exchanger works in pathological states
- C)  $\text{Na}^+/\text{Ca}^{++}$  exchanger exchanges one sodium for one calcium ions
- D)  $\text{Ca}^{++}$  pump in the cardiac muscle sarcolemma is low affinity but high capacity pump

E) Ca<sup>++</sup> pump of the sarcoplasmic reticulum is not found in the cardiac muscle Cells

ANSWER B

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