

PHYSIOLOGY 451/551
CELLULAR NEUROSCIENCE EXAMINATION
VERSION 1
FRIDAY, SEPTEMBER 23, 2016

INSTRUCTIONS

This examination consists of 25 questions, 6 pages (including this cover page). Please check that your copy has all pages.

Print your name and 8-digit UB person number on the answer sheet.

Mark your answers carefully on the answer sheet with a #2 pencil.
If you erase, do so completely.

You may keep the examination.
Results and answer keys will be posted as soon as possible on UBLearns.

WE DO NOT ANSWER QUESTIONS DURING THE EXAMINATION.

We need to see your UB ID card.

If you have forgotten your card, please bring it to the Department Office (124 Sherman) within 24 hours.

TO PREVENT CHEATING ON EXAMS

Keep your answer sheet covered.

Please inform one of the instructors if you suspect someone is cheating; (your comments will be kept confidential).

Turn off all cell phones.

BE SURE TO FILL IN TEST VERSION NUMBER ON THE SCANTRON

On side two of your answer sheet (Scantron) there is a "Grade or Education" box below the "Identification box" where you add your student person number. In this box, fill in the appropriate version number. If you do not add your exam version you will receive a zero (0) for this exam. If you fill in the WRONG number, you will be scored for the number you fill in. If you fill in the wrong number, it cannot be changed after you turn in your exam.

BE ON TIME.

No one will be allowed to start the exam after 11:20 am.

1. In what phase of the cell cycle is the genomic DNA copied?
 - A. G1 phase
 - B. S phase
 - C. G2 phase
 - D. M phase
 - E. C phase

2. Neurons in your brain and neurons in your spinal cord are derived from cells in which structure?
 - A. Neural tube
 - B. Neural crest
 - C. Neural bend
 - D. Neural arc
 - E. Neural circle

3. When a neuron is held at Nernst equilibrium potential of K^+ , where will Na^+ go?
 - A. There is no net movement of Na^+ .
 - B. There is a huge driving force for Na^+ to enter the cell.
 - C. There is a strong driving force for Na^+ to exit the cell.
 - D. The movement of K^+ balances out the movement of Na^+ .
 - E. The net movement of all ions is zero.

4. For a neuron held at +30 mV, which of the following is true?
 - A. The directions of ΔE and ΔC for K^+ are the opposite.
 - B. The direction of ΔE for K^+ is from outside to inside.
 - C. The direction of ΔC for K^+ is from outside to inside.
 - D. The directions of ΔE and ΔC for Na^+ are the same.
 - E. The directions of ΔE and ΔC for Na^+ are the opposite.

5. When a neuron is held at its RMP, which of the following is true?
 - A. The net movement of K^+ is zero.
 - B. The net movement of Cl^- is zero.
 - C. The net movement of Na^+ is zero.
 - D. Na^+ flows into the cell.
 - E. K^+ flows into the cell.

6. Which of the following inhibits voltage-gated Na^+ channels?

- A. Tetrodotoxin
- B. Saxitoxin
- C. Botulinum toxin
- D. A and B
- E. None of the above

7. In lethal injection, a rapid increase in serum K^+ concentration:

- A. increases Nernst equilibrium potential of K^+
- B. decreases Nernst equilibrium potential of K^+
- C. increases Nernst equilibrium potential of Na^+
- D. decreases Nernst equilibrium potential of Na^+
- E. does not change Nernst equilibrium potential of any ions

8. Na^+ , K^+ -ATPase:

- A. pumps Na^+ out of the cell
- B. pumps 3 Na^+ ions into the cell per cycle
- C. hydrolyzes K^+ ion
- D. is blocked by ATP
- E. is inhibited by TTX

9. The rapid upstroke of an action potential is caused by:

- A. activation of voltage-gated K^+ channels
- B. inactivation of voltage-gated Na^+ channels
- C. activation of voltage-gated Na^+ channels
- D. inactivation of voltage-gated K^+ channels
- E. None of the above

10. The rapid downstroke of an action potential is caused by:

- A. activation of voltage-gated K^+ channels
- B. inactivation of voltage-gated Na^+ channels
- C. inactivation of Na^+ , K^+ -ATPase
- D. A and B
- E. B and C