

NSCI 401

Final exam questions

(Fall 2018)

1. What are the computational mechanisms underlying spike generation?
2. What's the Receiver Operating Curve (ROC) and why is it a useful concept for neuroscience?
3. Explain one computation for which inhibitory neurons in the brain are crucial.
4. How does causal inference work?
5. Explain how smooth pursuit works (how can it be conceptualized in a model) and why an internal memory loop is needed.
6. What's the role of forward and inverse models in motor control?
7. What mechanism could resolve and implement competition in the brain? How does it work?
8. What is the difference between conspicuity maps, saliency maps and priority maps?
9. Why is it important to balance exploration and exploitation in reinforcement learning? What determines this balance and how is this balance represented mathematically (conceptually)?
10. What is the role of models for scientific discovery? Provide 3 key roles (there are many more).

Note: during the exam, there are *no aids allowed*. Don't forget to bring your Queen's student photo ID to the exam!