

QUIZ

Name: _____

Net-ID: _____

Never do this →



Q. 1: Name at least 1 neuromorphic chip (5)

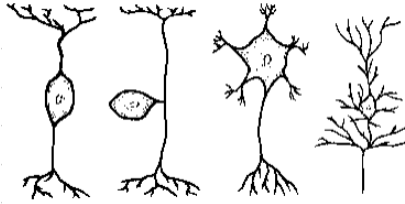
Q. 2: Name some of the advantages and the current limitations of the neuromorphic hardware (10)

Q. 3: Were von Neumann and Alan Turing ever interested on how the brain works? If so, how did they use the –now outdated- knowledge of the brain to construct their “intelligent” machines? (10)

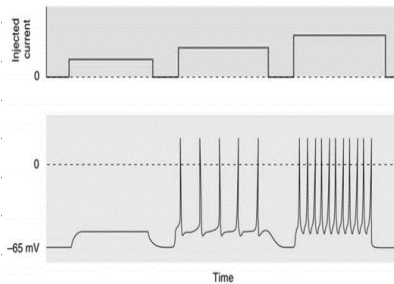
Q. 4: Can you name at least two behavioral characteristics of biological intelligence that have not –yet- been translated to artificial intelligence? (think in terms of “training” a network) (10)

Q. 5: What is the brain’s main computational unit? Name its three different compartments (10)

Q. 6: Can you find a reason for the differences observed across the neurons sketched below? (10)



Q. 7: Can you explain the picture below showing the response of a neuron to an injected current? (15)



Q. 8: Can you explain what does the Hodgkin-Huxley model do? For your convenience, its main equations are found below. (15)

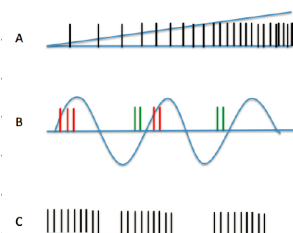
$$C \frac{dv}{dt} = I - g_{Na} m^3 h (V - V_{Na}) - g_K n^4 (V - V_K) - g_L (V - V_L)$$

$$\frac{dm}{dt} = a_m(V)(1 - m) - b_m(V)m$$

$$\frac{dh}{dt} = a_h(V)(1 - h) - b_h(V)h$$

$$\frac{dn}{dt} = a_n(V)(1 - n) - b_n(V)n$$

Q. 9: Briefly describe one of the three main ways that neurons use to encode information. (15)



GOOD LUCK!