

580.422 System Bioengineering II: Neurosciences (Spring 2015)

Recitation #2 Review Questions

February 05th, 2015

Question 1

What is the “tuning curve (or receptive field)” of an auditory nerve neuron? Sketch it and explain the key features.

Question 2

A sensory neuron is stimulated by a 50 Hz sinusoidal stimulus (100 msec in duration, starting at time=100 msec). Below is a list of the time of occurrences (in msec) of spikes recorded from the neuron in response to 5 repetitions of the same stimulus. Recordings begin at time = 0 msec. and end at time = 200 msec.

Trial-1: [15 114 118 123 134 137 145 151 165 172 184]

Trial-2: [73 112 117 121 133 147 162 165 176 181 198]

Trial-3: [24 115 119 126 129 135 138 158 174 181 190]

Trial-4: [59 113 116 122 132 144 151 158 165 172 184]

Trial-5: [35 111 115 119 131 141 149 157 175 186 197]

a) Calculate mean firing rate.

b) Sketch and label the post-stimulus histogram (PSTH). Use binwidth of 10 msec, x-axis range [0, 200] msec.

c) Is there “phase-locking” in the response of this neuron (please briefly explain your answer)?