

1. The occurrence of action potentials in the axons of motor neurons controls the strength of muscular contractions. Given the all-or-none property of action potentials, how can action potential represent information that varies in a continuous fashion (the strength of any given muscular contraction may range from weak to forceful)? 20%
2. Considering trichromatic coding for the cones and opponent-process coding for the ganglion cells of the retina, explain how can we detect "yellow"? 20%
3. Describe two major hypotheses proposed to answer the insistent nature of sleepiness (two lines of experimental evidence should be attached with each hypothesis, respectively). 20%
4. Describe the hormonal control on female reproductive cycles (esp. menstrual cycles) and on sexual behavior in lab rats (including male and female sexual behavior). 10%.
5. What is the passive avoidance paradigm? In conditioned startle paradigm, please depict the neural circuits underlying an auditory startle response and its augmentation by a conditioned loud tone, respectively. (30%)