1. Why the observed (resting) membrane potentials in neurons deviate from the theoretical values for the Nernst potential of K+ derived from the glial cells? (20%)

2. One hypothesis is generated from a very rough pilot study stating that neonatal exposure to substance X may retard the Y performance at day 90 post partum in long-Evans rats. However, "maternal caring" could be a confounding variable. Nonetheless, pups do need a mom to nurse them before weaning. Under these conditions, how would you make up the experimental design to seriously test the above-mentioned hypothesis. Under what circumstances, you may draw a strong conclusion that neonatal exposure to substance X sufficiently and necessarily results in the retarded Y performance in rats when they reach the puberty. (20%)

3. Briefly describe the pathology of Parkinson's disease that you know about from a neurochemical point of view and discuss the potential benefits of amphetamine, L-dapa, deprenyl. (20%)

4. Explain the developmental process of ethanol dependence in terms of the learning theory (conditioning theory). (20%)

5. If amphetamine is used as a dopamine releasor, whereas cocaine acts as a dopamine reuptake blocker, how do you design an in vivo and an in vitro study to explore their differential propensity by utilizing two drugs together? (20%)