# Operating System (Ph.D. Candidacy)

1. (15%) Why caches are useful. What problems do they solve? What problems do they cause? If a cache can be made as large as the device for which it is caching (for instance, a cache as large as a disk), why not make it that large and eliminate the device?

2. (10%) Write the advantage and disadvantage of using virtual-machine architecture.

3. (10%) What are the advantages of Shortest Job First? Disadvantages?

4. (10%) What is a critical section? What three requirements must a solution to the critical-section problem satisfy?

5. (15%) Draw the state transition diagram of a process and write in the diagram the name of a transition. Explain the reasons why a transition occurs and indicate in there each transition occurs.

6. (15%) What is deadlock? Please list and explain the necessary conditions when the deadlock occurs. Please explain how to avoid the deadlock

7. (10%) When do page faults occur? Describe the actions taken by the operating system when a page fault occurs.

8. (15%) Write down the drawback for contiguous, linked, and indexed file a allocation methods respectively.