(1) If a necessary condition is satisfied, what conclusion can we draw?

   If a necessary condition is satisfied, there is nothing that can be concluded (since it means “may or may not”).

   Note: the underlined concept should be emphasized, mentioned, or implied for full credit.

(2) What are the two primary roles of operating systems?

   (a) A middleman between you (as a user) and computer hardware (Operating systems as extended machine)

   (b) The government in your computer (Operating systems as resource manager)

(3) What are the typical three structural layers in a computer system?

   (a) Application (user) programs

   (b) Operating system

   (c) Computer hardware
(4) What are the two primary problems in batch system?

Any two of the followings:

(a) Low processor (CPU) utilization (programs are executed one at a time even though multiple programs are loaded to the memory – this means that if the currently executed program stops for I/O inputs, the processor stays idle).

(b) Small (short) programs can never be completed before a large one (smaller ones must wait for a large one to be completed before they get executed, if a large program is submitted before them).

(c) If a program crashes due to a bug, the program need to be removed from the memory and it has to be re-submitted by a human user (the human user can not fix the program while it is in the memory).

(5) Look up the meaning of the following word using your textbook: “degree of multitasking”.

The term, “degree of multitasking”, means the number of programs (processes) that are loaded to the memory in a multi-tasking operating system.