(1) What is “preemptive process scheduling”?

The preemptive process scheduling is a type of process scheduling algorithms, in which even if a processor is assigned to a process, the processor can be taken away from the process any time.

(2) How can “race condition” happen? Show “how” using an example.

The race condition is the situation where the outputs from processes are never predictable (i.e., each time the process is executed, its outputs can be different), because of unpredictable timing of the process to be preempted by another process.
(3) What is “critical section”?

The term “critical section” means a portion of a process where race condition possibly occurs.

(4) What is “mutual exclusion”?

“Mutual exclusion” is a principle to prevent a race condition to occur, by making sure that at most one process can be active in a critical section at a time (once a process in a critical section, that process should prohibit (exclude) any other process until the current process leaves the critical section).

(5) What “wait” system call to a semaphore exactly performs?

Wait

- If $S > 0$, do $S = S - 1$ then proceed
- If $S = 0$, wait on this semaphore