Quiz 2

1. Which is (are) the correct for multithreading? (Multiple Selections)

A. Multithread can be regarded as the Lightweight Process (LWP) in Linux
B. Multithreads can utilize fork-join parallelism
C. Multithreads can be created via clone( ) system call
D. Multithreading models include a two-level model (e.g., a combination of One-to-One and Many-to-Many)

2. Which is (are) the correct for the benefits of multithreading? (Multiple Selections)

A. Reduce response time
B. Improve resource sharing
C. Decrease creation overhead
D. Increase reliability of the whole system
E. Enhance scalability of multicore architecture
F. Save context switch overhead

3. In the CPU scheduling, which are included in the dispatch latency? (Multiple Selections)

A. Load the PCB information of processes
B. Switch between the user mode and the kernel mode
C. Save the PCB information of processes
D. Read the Program Counter (PC) register information

4. Regarding to the Linux Scheduling, which is (are) correct? (Multiple Selections)

A. Real time processes have the highest priorities
B. Higher priority processes have shorter time quantum
C. Starvation can be avoided by adjusting the nice values
D. The priority of a normal process can be 99

5. Which is (are) correct methods for process synchronization? (Multiple Selections)

A. Memory barrier
B. Atomic operations
C. Mutex locks

D. Binary semaphore
E. CPU disabling
F. Read Copy Update (RCU)
G. Spinlocks

6. Regarding to the solution of Critical-Section problem, which is (are) correct? (Multiple Selections)

A. Mutual exclusion is the basic requirement for the Critical-Section problem
B. Peterson's solution is suitable for multiple processes' synchronization
C. In the exit section of critical section, typically there is a progress notification to other processes
D. Circular waiting is required for multiple processes

7. Which is (are) correct for the readers-writers problem? (Multiple Selections)

A. Multiple readers can be executed at the same time
B. Multiple writers can be executed in parallel
C. The "read_count" variable can be regarded as another critical section
D. The second reader need to check the status of the "rw_mutex" lock

8. How many processes and threads in the following code segment? (Single Selection)

```
pid_t pid;
pid = fork();
if (pid == 0) { /* child process */
fork();
thread create( . . .);
}
fork();
```

A. 2 processes, 3 threads
B. 3 processes, 4 threads
C. 4 processes, 6 threads
D. 6 processes, 8 threads

9. In the following scheduling algorithms, which one can avoid starvation? (Single Selection)

A. Round Robin (RR)
B. Priority based scheduling
C. Shortest Job First (SJF)
D. Shortest Remaining Time First (SRTF)

10. Regarding to the bounded buffer problem (producer consumer problem), assume a consumer process must take 10 continuous products from the buffer, and then other consumer processes can get products. Please select the proper codes to fill the blanks for consumer process. (Multiple Selections in order)

```
semaphore mutex=1;    /*original mutex lock in the textbook*/
semaphore mutex_consumer=1; /*mutex lock for 10 continuous products*/
semaphore empty=n;
semaphore full=0;

Consumer Process
    while (true) {
        _____
        for (int i = 0; i < = 10; i ++){
        _____
        _____
        /* remove an item from buffer to next_consumed */
        _____
        _____
        }
        _____
    }
```

A. wait (mutex_consumer);
B. wait (mutex);
C. wait (empty);
D. wait (full);
E. signal (mutex_consumer);
F. signal (mutex);
G. signal (empty);
H. signal (full);