QUESTION 1

1. What is the need for multi-level queue scheduling?

- (•) Processes with different requirements can be mapped to different queues and each queue can have a different scheduling policy (e.g., RR for interactive processes and FCFS for background).
- ( ) This is necessary to minimize the average waiting time of all processes.
- ( ) Processes with different requirements can be mapped to different queues and each queue can have a different scheduling policy (e.g., FCFS for interactive processes and RR for background).
- ( ) It is only useful for multiprocessing (i.e, CPU with multiple cores).

0.25 points

QUESTION 2

1. Under First-Come First-Served (FCFS) scheduling, what is convoy effect?

- (•) A long process is in the "running" state, while several short processes are waiting in the "ready" state
- ( ) A long process is in the "running" state, while several short processes are waiting in the "waiting" state.
- ( ) A long process is in the "ready" state, while several short processes are waiting in the "ready" state behind this long process.

0.25 points

QUESTION 3

1. What is a CPU burst?

- (•) Time taken by a single instruction executed by a process.
- ( ) Time taken by a set of instructions executed by a process between two successive I/O requests.
- ( ) Time taken by all the instructions executed by a process.

0.25 points

QUESTION 4

1. What is Aging?

- (•) A technique in which the priority of processes that are unable to execute is slowly increased over time to avoid starvation.
- ( ) A technique in which the priority of processes that are unable to execute is slowly decreased over time to avoid starvation.
- ( ) A technique in which the priority of all processes is slowly increased over time to avoid starvation.

0.25 points

QUESTION 5

1. In a nonpreemptive CPU scheduler, when does scheduling happen?

- (•) Upon transitions 1 and 5 and ocassionally upon transition 4 (in the process state transition diagram).

- Upon transitions 2, 3 and 4 (in the process state transition diagram).
- Upon any of the five transitions (in the process state transition diagram).
- Upon any of the five transitions (in the process state transition diagram) and even at other time instants.

0.25 points

QUESTION 6

1. Waiting Time is defined as:
   - (•) Time spent by a process in the "ready" state.
   - ( ) Time spent by a process in the "waiting" state.
   - ( ) Time taken between transition 4 and transition 5 minus the time spent in the "running" state (in the process state transition diagram).
   - ( ) Time spent in the "ready" and "waiting" states combined.

QUESTION 1

1. The difference between non-preemptive Shortest-Job First (SJF) and Shortest Remaining Time First (SRTF) is that
   - (•) SJF is unaffected by newly admitted processes when a process is "running"; In SRTF if the current CPU burst of the newly admitted process is shorter than the remaining CPU burst of the running process, then a context-switch is triggered.
   - ( ) SRTF is unaffected by newly admitted processes when a process is "running"; In SJF if the total CPU duration of the newly admitted process is shorter than the remaining CPU duration of the running process, then a context-switch is triggered.
   - ( ) SJF is unaffected by newly admitted processes when a process is "running"; In SRTF if the total CPU and I/O duration of the newly admitted process is shorter than the remaining total CPU and I/O duration of the running process, then a context-switch is triggered.
   - ( ) SRTF allows random preemption of processes, whereas SJF does not.

0.25 points

QUESTION 2

1. The key challenge under partitioned mutliprocessor scheduling is?
   - ( ) How to schedule processes on individual CPU cores?
   - ( ) How to do time-synchronization across CPU cores?
   - (•) All of the others are key challenges.
   - ( ) How to map and partition the processes to CPU cores?

0.25 points

QUESTION 3

1. Turnaround Time is defined as:
   - (•) Time taken between transition 4 and transition 5 (in the process state transition diagram).
   - ( ) Time taken between transition 2 and transition 5 (in the process state transition diagram).

- Time taken between transition 4 and the first occurrence of the transition from "ready" to "running" (in the process state transition diagram).
- Time taken between transition 2 and the next occurrence of the transition from "ready" to "running" (in the process state transition diagram).

0.25 points

QUESTION 4

1. In First-Come First-Served (FCFS) scheduling, the CPU scheduler is executed whenever a new process is "admitted" in the system.
   - False, it is a nonpreemptive scheduler and hence will only execute when either a "running" process completes or moves to the "waiting" state, or there is no running process when the new process is "admitted".
   - False, it is a nonpreemptive scheduler and hence will only execute when either a "running" process completes or moves to the "waiting" or "ready" states.
   - True, this enables the scheduler to check whether the new process must be given access to the CPU.
   - True, this enables the scheduler to setup the memory region for the new process.

0.25 points

QUESTION 6

1. Shortest-Job-First (SJF) is optimal in the sense that it,
   - Minimizes the average waiting time for all processes.
   - Maximizes the average waiting time for all processes.
   - Minimizes the average response time for all processes.
   - Maximizes CPU utilization.

QUESTION 5

1. Response Time is defined as:
   - Time taken for a process between transition 4 and the first occurrence of transition from "ready" to "running" (in the process state transition diagram)
   - Time taken for a process between transition 2 and the next occurrence of transition from "ready" to "running" (in the process state transition diagram)
   - Time taken for a process between transition 4 and transition 5 (in the process state transition diagram)
   - Time taken for a process between transition 3 and the next occurrence of transition from "ready" to "running" (in the process state transition diagram)