Operating Systems, First Term Exam, chap 1 to Memory Management, (except synchronization)

I. Please write down the full names of the following abbreviations. Please do **not** make any explanations.

(1) FCFS:_____
(2) FIFO:_____
(3) LIFO:_____
(4) SaaS(for cloud):_____
(5) SMP (for multiprocessing):_____
(6) NUMA (for memory access):_____
(7) PAN (for network):_____
(8) PaaS (for cloud):_____
(9) GUI (for interface):_____
(10) API (for interface):_____
(11) BIOS:_____
(12) SYSGEN:_____
(13) PCB:_____
(14) IPC:_____
(15) PCS (in thread scheduling):_____

II. Consider (i)FCFS, (ii)shortest job first, (iii)RR, (iv) priority, (v)multilevel feedback queue.

(1) ( )Which of the above scheduling algorithm could result in starvation?
(2) ( )Which of the above scheduling algorithm is(are) in favor or short processes?

III. Please explain the following terminology briefly.

(1) Kernel:
(2) firmware
(3) blade server
(4) system call
(5) trap
(6) daemon
(7) Privileged instructions
(8) mode bit
(9) heap:
(10) context switch:

(11) socket:

(12) pipe:

(13) thread library:

(14) Load balancing:

(15) Hard real time systems:

IV. Describe what is a shared memory model and what is a message passing model.

V. Define what is a policy and what is a mechanism and show an example for each of them.

VI. Most recently, the part of the operating system that resides in memory has been limited to a few essential modules while other functions are provided by special modules which are treated as regular applications. Please show at least two examples of those parts that (1) must reside in memory, (2) can be treated as applications.

VII. Draw a process state (transition) diagram. The states are new, ready, running, terminated, and waiting. Note that you should identify the events that trigger each state transition.

V. (What are the items of a PCB? Please list at least five items.

VIII. Assume the following processes are to be scheduled using a ***preemptive, round-robin*** scheduling algorithm. Each process is assigned a priority (value). A higher value indicates a higher priority. In addition, assume that the system has an idle process. The idle process has priority value 0 and it is scheduled when there is no available process to run. The length of a time quantum is 10 units. If a process is preempted by a higher priority process, the preempted process is placed at the end of the queue.

thread	priority	burst	arrival
P1	40	20	0
P2	30	25	25
P3	30	25	30
P4	35	15	60
P5	5	10	100
P6	10	10	105

(1) Show the scheduling order of the processes using a Gantt chart.

(2) What is turnaround time for each process?

(3) What is the waiting time for each process?

(4) What is the CPU utilization rate?