Branch : CSE & IT   Batch : Hinglish

Operating Systems
Intro & Background

[MSQ]

1. Which of the following are allowed in kernel mode only?
(a) Enabling / Disabling interrupts.
(b) Reading the system's time.
(c) Context switching.
(d) Clear the memory.

[MSQ]

2. Which of the following is/are correct?
(a) To switch from kernel mode to user mode, the mode bit should be changed to 1.
(b) To switch from kernel mode to user mode, the mode bit should be changed to 0.
(c) To switch from user mode to kernel mode, the mode bit should be changed to 1.
(d) To switch from user mode to kernel mode, the mode bit should be changed to 0.

[MCQ]

3. Match the following:
(i) User mode   1) Atomic
(ii) Kernel mode   2) Mode bit 0
                      3) Privileged
                      4) Preemptive
(a) (i) – 2, 3; (ii) – 1, 4
(b) (i) – 2, 1; (ii) – 3, 4
(c) (i) – 2, 1, 4; (ii) – 3
(d) (i) – 4; (ii) – 1, 2, 3

[MCQ]

4. System call is used to access_____.
(a) Application functionality.
(b) I/O functionality.
(c) Operating system functionality.
(d) None of these.

[MCQ]

5. Consider the following statements:
(i) Pre-defined functions start executing in kernel mode.
(ii) User-defined functions start executing in user mode.
Which of the following is correct?
(a) Only (i) is correct.
(b) Only (ii) is correct.
(c) Both (i) and (ii) are correct.
(d) Both (i) and (ii) are incorrect.

[NAT]

6. Consider the following program:
```
main()
{
    fork()
    fork()
    fork()
    printf("GATE "2023");
    return 0;
}
```
How many times GATE 2023 will get printed?

[MCQ]

7. Mode bit is present in _____.
(a) Main Memory
(b) Disk
(c) Cache
(d) Register

[MCQ]

8. At system boot time, the hardware starts in _____.
(a) Kernel mode
(b) User mode
(c) Operating mode
(d) Disk mode

Answer Key

1. (a, c, d)
2. (a, d)
3. (d)
4. (c)

5. (b)
6. (8)
7. (d)
8. (a)

Hints & Solutions

1. **(a, c, d)**

The instructions that run in kernel mode are known as privileged instructions.

Privileged instructions include:

Enabling/ disabling of interrupts,

Context switching

Clear the memory or remove any process from memory.

Whereas, reading the system's time is a non-privileged instruction and can be performed in user-mode.

∴ (a), (c) and (d) are correct.

2. **(a, d)**

To switch from kernel mode to user mode, the mode bit should be 1, and

To switch from user mode to kernel mode, the mode bit should be 0.

Therefore, option (a) and (d) are correct.

3. **(d)**

User mode is non-atomic, preemptive and non-privileged mode with mode bit set to 1.

Kernel mode is atomic non-preemptive and privileged mode with mode bit set to 0.
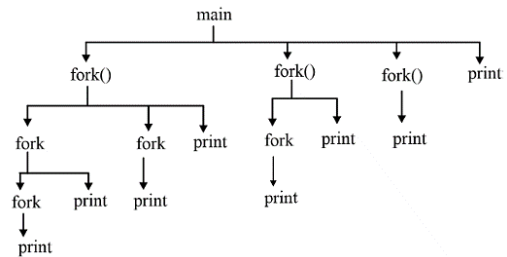
∴ option (d) is correct

4. **(c)**

System call is used to access operating system's functionality.

5. **(b)**

All user-defined and pre-defined function start executing in user-mode.

6. **(8)**

Total 8 times printf is executed and "GATE2023" is printed.

7. **(d)**

Mode bit is stored in program status word (PSW) register.

8. **(a)**

During booting, hardware starts in kernel mode.