- [ ] B

Which of the following is false about deadlocks? *

- [x] Deadlocks cannot happen if resources are always requested in a specific sequence.
- [ ] Deadlocks can be avoided if resources can be preemptively taken away from other processes.
- [ ] The Linux kernel by default has a module that observes the resources requested, and avoids deadlocks based on it.
- [ ] Deadlocks occur due to circular requests of resources by processes.

Which of the following is a disadvantage of an inverted page table? *

- [ ] Size of page table is too large
- [ ] Not all page entries are present in the page table
- [x] Its hardware is much more complex to implement
- [ ] It is vulnerable to more page faults

Suppose a designer of a memory system finds that the size of page table is too large. Which of the following options are possible? *

- [ ] Increase the size of page frames
- [ ] Use multi-level page table
- [ ] Use inverted page table
- [x] All the other options are possible
- [ ] None of the other options are possible

Suppose you have a two-level page table of the form 12|12|8. What is the size of the first-level page table, assuming no other bits are kept apart from the virtual addresses? *

- [ ] 512 bytes
- [x] 2 KB
- [ ] 1 KB
- [ ] 256 bytes

Suppose you want to execute a shell script? Which of the permissions is NOT necessary for it to execute? *

- [ ] All the options are necessary
- [ ] Read
- [x] Write
- [ ] Execute

Which of the following permissions of a directory allows a user to make it the current working directory? *

- [ ] Read
- [ ] Write
- [x] Execute
- [ ] Sticky

Which of the following is NOT true about a character device? *

- [x] A character device allows read, write and seek operations
- [ ] A character device has a file in /dev directory
- [ ] Operating on a character device goes through Virtual File System
- [ ] All of the other options are true

Which of the following latencies is NOT relevant to access data from a hard disk? *

- ○ Rotational latency
- ○ Seek latency
- ○ Data transfer latency
- ◉ Data translation latency

Which of the following does not slow down file reads? *

- ○ Slower movement of mechanical head
- ○ Fragmentation of files
- ◉ Disk caches
- ○ Random requests to access data from disk

Which of the following disk scheduling algorithms may lead to starvation? *

- ○ Deadline, assuming every request has a deadline
- ○ FIFO
- ◉ Shortest Seek Time Fast
- ○ LOOK

Suppose you write a single C program that prints integers from 1 to 100, and then computes their sum. Now, you run this program simultaneously from two different shells. How many processes (ignoring the shell processes) and how many additional threads (excluding the main thread) were created to run this C program? *

- ○ 1, 1
- ○ 2, 2
- ○ 1, 0

- [x] 2, 0

Which of the following events are NOT handled by the interrupt handler? *

- [ ] Divide by zero
- [x] Overflow of a number
- [ ] Page fault
- [ ] Access to memory outside the process address space

Which of the following is true about the current Linux process scheduler? *

- [x] It has a time complexity of O(log n)
- [ ] It gives more stress on throughput than on equitable access to resources
- [ ] It is much better suited for servers than for desktops
- [ ] It can easily handle hard deadlines

Suppose a file has multiple hard links. What happens if one of the hard links is deleted? *

- [ ] The file is actually removed from the hard disk, along with the other links
- [ ] The file is removed from the hard disk, but the other links are not removed
- [x] The link is removed, but the file remains on the disk
- [ ] You get an error message and nothing gets removed

The memory ranges visible to Linux Modules are: *

- [ ] a. Virtual address ranges.
- [ ] b. Corresponding to kernel address spaces.

c. Use the same virtual memory management system (such as demand paging system) like the rest of the system does.

d. The real addresses and not the virtual address, as the latter is only for application programs.

e. A&B

f. A&C

g. None of the above

The following is true about the ``dirty" bit in page descriptors: *

It is used to keep track of pages that may be replaced by data corresponding to any other process (that may have page faulted).

It is used to keep track of pages that may be exchanged with pages in the swap memory.

It is used to keep track of pages for a corresponding frame is allocated in the RAM.

None of the other given options

Which of the following operations is comparatively rare for disk accesses? *

Front merging

Back merging

Sorting

All of them happen frequently

The advantage of using semaphores and mutexes over spin locks is as follows: *

Semaphores (and mutexes) are designed to yield the CPU to other processes whenever the caller attempts to enter the critical section but cannot.

Semaphores (and mutexes) cannot be used within the kernel as they can go to sleep with the lock, leading to kernel deadlock state.

One cannot disable the interrupts when semaphores (and mutexes) are used, while it may be

done for spin locks.

- ○ None of the other given options

Which of the following operations is well suited to be handled using DMA operations: *

- ○ Handling several quick keystrokes and mouse pointer movements in applications like computer games.
- ◉ Reading or writing data from the network card device -- e.g. while web browsing that involves exchanging millions of bits per second.
- ○ Reading or writing to the sound card say when making audio calls over the Internet.
- ○ Writing to a printer connected via USB (Universal Serial Bus).

Consider the following demand-paging system with the following time-measurement utilizations: CPU Utilization: 10% Swap space: 88% I/O operations: 2% i.e., 10% of the time the CPU is utilized, 88% of the time the swap space is being used and only 2% of the times the I/O operations are executing.Which of the following do you think can optimize CPU utilization: *

- ○ Install a faster CPU.
- ○ Increase swap space.
- ◉ Increase main memory.
- ○ Install a faster disk.