**CS 347 : Feedback on Computer Architecture Concepts**

Name _____

Roll No _____

## A. The CPU

1. Name the CPU registers that cannot be used by a program

2. Name the CPU registers whose contents change as the program executes

3. What happens when the CPU encounters an invalid instruction?

4. What happens when a program refers to a non-existing address?

5. What is a trap? Give a few examples.

6. What is an interrupt? Give a few examples.

7. What actions are performed in a hardware manner when an interrupt occurs?

## B. The Cache:

8. An OS services many programs simultaneously by giving some fraction of CPU time to each program in turn. It keeps track of the CPU time used by each program. A program P is run to completion twice. In the first instance, P is run all by itself, that is, no other program exists in the OS. In the second instance, P and some other program are run simultaneously. It is found that it requires a larger amount of CPU time in the second run. Explain why?

9. A CPU has a fully associative cache memory. A program P is run over the CPU all by itself. That is, no other program is serviced while P is run. Then the size of the cache memory is increased, and P is run again. The program finishes earlier in the second run. Identify what specific features the program might be using.

10. Two programs making heavy use of arrays are executed twice each on a computer having a fully associative cache–once before and once after increasing the size of the cache. One program speeds up by 50%, another only by 10%. Give a possible scenario why this might happen.

**C. Memory**

11. Explain how memory protection works. (It is used to ensure that a program does not access memory used by other programs or the OS.)

**D. I/O**

12. Briefly explain how data transfer between a device and memory takes place.

13. How does the I/O subsystem indicate to CPU that an I/O operation is complete? Give all details of this arrangement.

14. Explain whether there is any difference between slow and fast devices in terms of buffering of data?