1.8 A DMA module is transferring characters to main memory from an external device transmitting at 9600 bits per second (bps). The processor can fetch instructions at the rate of 1 million instructions per second. By how much will the processor be slowed down due to the DMA activity?

**Question 1**

Consider a machine with a byte addressable main memory of **216** bytes and block size of 8 bytes. Assume that a direct mapped cache consisting of 32 lines is used with this machine.

**For all the following**: **Not only justify, but explain and Box each one of your answers**

1. How is a 16-bit memory address divided into tag, line number, and byte number? **Not only justify, but explain and Box each one of your answers** **[15 points]**
2. Into what line would bytes with each of the following addresses be stored?

**0001 0001 0001 1011 [15 points]**

1. How many total bytes of memory can be stored in the cache? **[15 points]**

**Question 2**

Consider a computer with the following characteristics: total 1Mbyte of main memory, word size of 1 byte; block size of 16 bytes; and cache size of 64 Kbytes.

**For all the following**: **Not only justify, but explain and Box each one of your answers**

1. For the main memory address of F0010, give the corresponding tag and offset values for a fully-associative cache. **[15 Points]**
2. For the main memory address of CABBE, give the corresponding tag, cache set, and offset values (in hex) for a two-way set associative cache. **[15 Points]**

**Question 3**

Type the text and solve problem 1.8 of your textbook **[25 points]**

For each one of the questions you are required to:

1. Add spaces to this document (the 1st page), then print it and solve your questions there. Make sure that you write a full/complete, detailed, step by step, organized and readable solution **(presentation and organization will be worth 10 points)**
2. Show ALL YOUR WORK 🡪 Correct answers without full procedure (magic answers) will be considered invalid and no credit will be given (seriously).

Presentation and readability will be part of your grade.

**Due: Friday February the 2nd Beginning of class.**

**Assignments will be collected on time 🡪 at the very beginning of class.**

Important 🡪 Make sure that you read, review and fully understand all kinds of mappings, as well as the example that was explained in class (slides)