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## **CS501 Advance Computer Architecture**

**Final Term Examination – Spring 2005**

**Time Allowed: 150 Minutes**

**Please read the following instructions carefully before attempting any of the questions:**

1. Attempt all questions. Marks are written adjacent to each question.
2. Do not ask any questions about the contents of this examination from anyone.
  - a. If you think that there is something wrong with any of the questions, attempt it to the best of your understanding.
  - b. If you believe that some essential piece of information is missing, make an appropriate assumption and use it to solve the problem.
  - c. Write all steps, missing steps may lead to deduction of marks.
3. Exam is Closed Book. No handouts or extra material is allowed in exam hall other than rough sheet which will be provided by the examiner.

**\*\*WARNING: Please note that Virtual University takes serious note of unfair means. Anyone found involved in cheating will get an 'F' grade in this course.**

**Total Marks: 100**

**Total Questions: 07**

**Question No. 1**

**Marks : 15**

Given a 16-bit parallel output port attached with the FALCON-A CPU as shown in the figure below. The port is mapped onto address DEh of the FALCON-A's I/O space.

Sixteen LED branches are used to display the data being received from the FALCON-A's data bus. Every LED branch is wired in such a way that when a 1 appears on a particular data bus bit, it turns the LED on; a 0 turns it off.

(a) Which LEDs will be ON when the instruction

**out r1, 123**

Executes on the CPU? Assume r1 contains A2C9h. Briefly explain your answer.

(b) Identify the changes needed to map the above output port at address D0h and DFh to the FALCON-A's I/O space (instead of DEh and DFh )

**Question No. 2**

**Marks : 15**

Find the bandwidth of a memory system that has a latency of 30ns, a pre charge time of 10ns and transfers 3 bytes of data per access.

**Question No. 3**

**Marks : 15**

Write the code to implement the following expressions on 3, 2, 1, and 0 addresses.

$$A = B + C \times D$$

**Question No. 4**

**Marks : 15**

Define an I/O port. Which functions are performed by it?

**Question No. 5**

**Marks : 15**

Write a note on complications related to pipelining.

**Question No. 6**

**Marks : 15**

Convert the following decimal numbers to IEEE single precision floating- point  
Report the results as hexadecimal values. You need not extend the calculations of  
the significant value beyond its most significant 8 bit.

+0.875

**Question No. 7**

**Marks : 10**

A magnetic disk has an average seek time of 8 ms. The transfer rate is 50 MB/sec. The  
disk rotates at 10,000 rpm and the controller overhead is 0.3 msec. Find the average  
time to read or write 1024 bytes.

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