

	FINAL TERM EXAMINATION SPRING 2006 CS501 - ADVANCE COMPUTER ARCHITECTURE (Session - 1)	Marks: 80 Time: 120min
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StudentID/LoginID: _____

Student Name: _____

Center Name/Code: _____

Exam Date: Friday, August 25, 2006

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 question about the contents of this examination from any one.
 - 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.

For Teacher's use only											
Question Marks	1	2	3	4	5	6	7	8	9	10	Total

Question No: 1 (Marks: 3) - Please choose one

2

16k x4 static RAM Chip is arranged in the form of four _____ cells.

- ▶ 16x512
- ▶ 32x512
- ▶ 256x512
- ▶ 64x256

Question No: 2 (Marks: 3) - Please choose one

In a DRAM cell, the storage capacitor will discharge in around _____

- ▶ 4 -15 ms
- ▶ 2 - 10 ms
- ▶ 5-20 ms
- ▶ 10-25 ms

Question No: 3 (Marks: 3) - Please choose one

1-bit sign, 8-bit exponent, 23-bit fraction and a bias of 127 is used for _____ Binary Floating Point Representation

- ▶ Double precision
- ▶ Single Precision
- ▶ All of above
- ▶ Half Precision

Question No: 4 (Marks: 3) - Please choose one

The average rotational latency if the disk rotated at 20,000rpm is _____

- ▶ 0.5 ms
- ▶ 3.5 ms

3

- ▶ 2.5 ms
- ▶ 1.5 ms

Question No: 5 (Marks: 3) - Please choose one

A hard disk with 5 platters has 1024 tracks per platter, 512 sectors per track and 512 bytes/sector. What is the total capacity of the disk?

- ▶ 1.5 GB
- ▶ 1 GB
- ▶ 2 GB
- ▶ 3 GB

Question No: 6 (Marks: 20)

a) Consider two programs having three types of instructions given as follows: [15]

Number of	Program 1	Program 2
Data transfer instructions	4	6
Control instructions	6	9
ALSU instructions	8	7

Instruction Type	CPI
Control	5
ALSU	4
Data Transfer	3

Compare both the programs for the following parameters:

1. Instruction count
2. Speed of execution

b) Give short answers:

[5]

1. When *exceptions* must be disabled?
2. How *machine check exceptions* are generated?

Question No: 7 (Marks: 10)

4

Consider a memory system having the following specifications. Find its total cost and cost per byte of memory.

Memory type	Total bytes	Cost per byte
SRAM	768 KB	40\$ per MB
DRAM	512 MB	4\$ per MB
Disk	4 GB	5\$ per GB

Question No: 8 (Marks: 10)

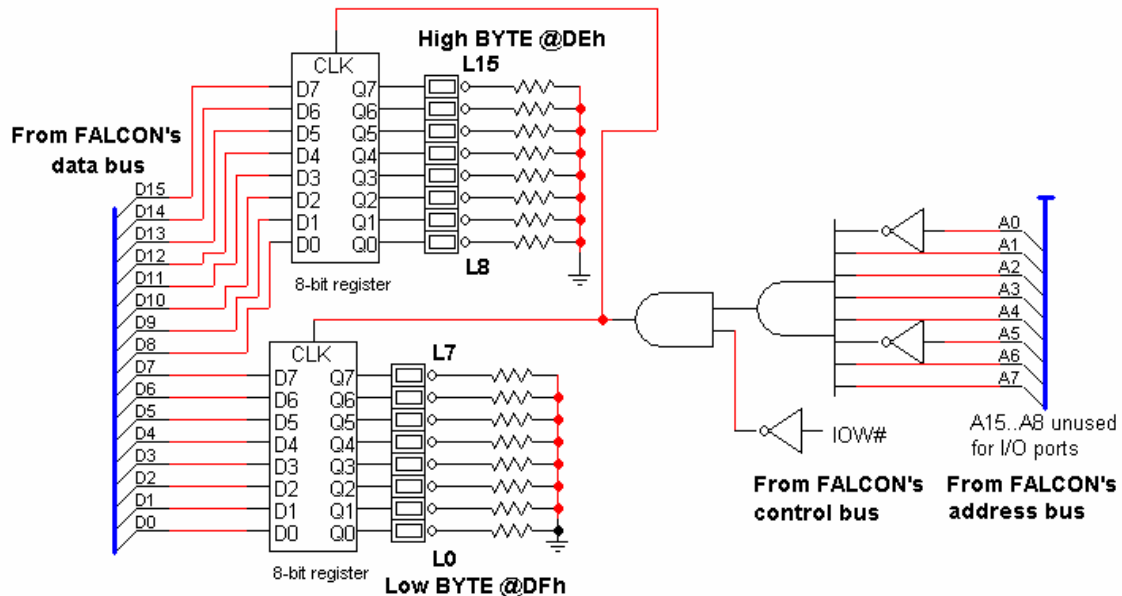
Assume that three I/O devices are connected to a 32-bit, 10 MIPS CPU. The first device is a hard drive with a maximum transfer rate of 1MB/sec. It has a 32-bit bus. The second device is a floppy drive with a transfer rate of 25KB/sec over a 16-bit bus, and the third device is a keyboard that must be polled thirty times per second. Assuming that the polling operation requires 20 instructions for each I/O device, determine the percentage of CPU time required to poll each device.

Question No: 9 (Marks: 10)

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 the particular data bus bit, it turns the LED on, a 0 turns it off.

- (a) Which LEDs will be ON when the instruction
[6]
out r5, 201
executes on the CPU? Assume r5 contains BC69h. Briefly explain your answer.

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A 16-bit parallel output port for the FALCON-A at address DEh and DFh

(b) Identify the changes needed to map the above output port at address C0h and C1h of the FALCON-A's I/O space (instead of DEh and DFh) [4]

Question No: 10 (Marks: 15)

a. Briefly describe the following errors with respect to serial communication.

[9]

- i- Frame error
- ii- Parity
- iii-Overrun

b. List down the advantages of Virtual Memory

[6]