Computer Organization - December 2012

TOTAL MARKS: 100
TOTAL TIME: 3 HOURS

(1) Question 1 is compulsory.
(2) Attempt any **four** from the remaining questions.
(3) Assume data wherever required.
(4) Figures to the right indicate full marks.

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1 (a) Explain the different functional units of a digital computer. (5 marks)

1 (b) Draw and explain the connection between memory and processor with the representative registers. (5 marks)

1 (c) Explain clearly SPEC rating and its significance. Assuming that the reference computer is ultra SPARCIO work station with 300 MHz ultra SPARC processor. A company has to purchase 100 new computer hence ordered testing of new computer with SPEC 2000. Following observation were made. (10 marks)

Programs	Runtime on reference computer	Runtime in new computer
1	50 minutes	5 minutes
2	75 minutes	4 minutes
3	60 minutes	6 minutes
4	30 minutes	3 minutes

The company system manager will place the order for purchasing new computers only if the overall SPEC rating is at least 12. After the said test will the system manager place order for purchase of new computer.

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2 (a) What is little endian and big endian memory? Representation the number 64243848H in 32 bits big endian and little endian memory. (6 marks)

2 (b) What is addressing mode? Explain immediate, direct and indirect addressing mode by an example. (6 marks)

2 (c) Explain logical shift and rotate instructions, with examples. (8 marks)

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3 (a) Define memory mapped I/O and IO mapped I/O, with examples. (5 marks)

3 (b) Explain how interrupt request from several IO devices can be communicated to a processor through a single INTR line. (10 marks)

3 (c) What are the different methods of DMA? Explain them in brief. (5 marks)

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4 (a) With a block diagram, explain how the keyboard is connected to processor. (6 marks)

4 (b) Explain the serial port and serial interface. (6 marks)

4 (c) Explain architecture and protocols, with respect to USB. (8 marks)

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5 (a) Draw a diagram and explain the working of 16 Mega bits DRAM chip configured as 2M × 8. Also explain as at how it can be made to work in fast page mode. (10 marks)

5 (b) Briefly explain any four non-volatile memory concepts. (5 marks)

5 (c) With figure analyze the memory hierarchy in terms of speed cost and size. (5 marks)

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6 (a) Explain the design of a four bits carry-look ahead adder circuit. (10 marks)

6 (b) Give Booth's algorithm to multiply two binary numbers. Explain the working of algorithm by taking an example. (10 marks)

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7 (a) Write and explain the control sequence for execution of an unconditional branch instruction. (10 marks)

7 (b) Draw and explain multiple bus organization. Explain its advantages. (10 marks)

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8 (a) Write short note on power wall. (6 marks)

8 (b) What you mean by shared memory multiprocessors. (6 marks)

8 (c) Explain the different approaches used in multithreading. (8 marks)