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MCA206

(Following Paper ID and	Roll No.	to be filled	in your A	Answer	Book)
PAPER ID : 1471	Roll No.				

M.C.A.

(SEM. II) THEORY EXAMINATION 2010-11 COMPUTER ARCHITECTURE AND MICROPROCESSOR

Time : 3 Hours

Total Marks: 100

- Note:— (1) Attempt ALL questions. All questions carry equal marks.
 - . (2) Assume suitable missing data and specify it clearly.
- 1. Attempt any two parts of the following : (10×2=20)
 - (a) Describe parallel computing. Why do we need parallel computers ? Give one analogy to explain your answer.
 - (b) Explain the Feng's classification of computer architectures in detail.
 - (c) (i) Machine A has a clock cycle time of 2 ns and a CPI of 4.0 for a program and Machine B has a clock cycle time of 2 ns and a CPI of 1.2 for the same program. Which machine is faster and by how much ?
 - (ii) Explain the role of data flow graphs in parallel computing.

2. Attempt any two parts of the following : (10×2=20)

(a) Compare the advantages and disadvantages of the S-access and C-access memory organizations for pipelined vector accessing.

1

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[Turn Over

(b) Consider the following phttp://www.aktuonline.com stages. All successor stages after each stage must be used in successive clock periods.



- (i) Write out the reservation table for this pipeline with six columns and four rows.
- (ii) Show the initial collision vector.
- (iii) Draw the state diagram which shows all possible latency cycles.
- (iv) What is the value of the minimal average latency (MAL)?
- (c) (i) Implement the dot-product operation with internal data forwarding between a multiply unit and an add unit.
 - (ii) Write notes on SIMD array processors.
- 3. Attempt any two parts of the following : (10×2=20)
 - (a) Compare the Butterfly networks, hypercube networks and shuffle exchange network in terms of switches elements, diameters, Bisection widths and edges/nodes.
 - (b) Give parallel algorithm of $O(n \log_2 n)$ for matrix multiplication. Show the allocation of the elements of two 4×4 matrices in a 4-cube of 16 PES.

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- (c) Construct a 64-input omega network using 4 × 4 switch modules in multiple stages. How many permutations can be implemented directly in a single pass through the network without blocking ?
- 4. Attempt any two parts of the following : (10×2=20)
 - (a) Explain various multiprocessor scheduling strategies.
 - (b) Draw data flow graphs to represent the following computations :
 - (i) if (a = b) and (c < d)

then $c \leftarrow c - a$

else $c \leftarrow c + a$

(ii) For $i \leftarrow 1$ to m do

 $c[i] \leftarrow 0$

for $j \leftarrow 1$ to n do

 $c[i] \leftarrow c[i] + a[i, h] * b[j].$

(c) Discuss the register set of intel 16 bit microprocessor.

5. Attempt any four parts of the following: (5×4=20)

- (a) Explain the difference among the machine language, assembly language and high level language.
- (b) Explain the functions of ALE and IO/M signals of the 8085 microprocessors.
- (c) Write a assembly language program of 8085 to performs the following :

3

- (i) Load the number 8BH in register D.
- (ii) Load the number 6FH in register C.

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- (iii) Increment the contents of register C by one.
- (iv) Add the contents of registers C and D and display the sum at the outport PORT1.
- (d) What are the control signals necessary in memory-mapped I/O? Explain.
- (e) Explain the functions of the following routine :

LXI SP, STACK PUSH B PUSH D POP B POP D RET

(f) What is the advantage of using assembly language instead of writing a program directly in machine language ?

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