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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Sixth Semester, B.E. - Computer Science and Engineering

Semester End Examination; June/July - 2015

Advanced Computer Architecture

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer any **FIVE** full questions, selecting at least **TWO** full questions from each part.*

PART - A

1 a. With a suitable sketch, explain the elements of modern computers. 5

b. With block diagrams show Flynn's classification of computer systems. 5

c. Explain the three shared memory multi processor models. 10

2 a. Explain the five types of data dependencies. 5

b. Explain five levels of parallelism in program execution on modern computers. 5

c. Compare control flow, data flow and reduction computer architectures. 10

3 a. Compare the main features of RISC and CISC processors. 10

b. List the design requirements set by future bus + standards committee. 5

c. With block diagram, Explain low order and high order m-way interleaving. 5

4 a. With block diagrams, explain asynchronous and synchronous pipeline model. 5

b. What is the effect of number of stages in a pipelined processor on its performance? Derive a formula to find optimal number of stages. 10

c. Write the formula to compute efficiency and throughput of a linear pipelined processor. 5

PART - B

5 a. Explain the pipelined execution of the following instructions:

$X = Y+Z$

$A = B \times C$ 5

b. Explain the three types of prefetch buffers. 5

c. Implement the following dot-product operation without and with internal data forwarding.

$$S = \sum_{i=1}^{n} a_i \times b_i$$ 5

d. Explain the effect of branching on the performance of pipelining. 5

6 a. Briefly explain snoopy bus protocols. 10

b. Explain various flow control strategies to control network traffic flow. 10

7 a. Briefly explain the four steps in parallelization process. 10

b. Explain the simulation of Galaxies evolution using multiple processes. 10

8 a. Briefly discuss various scaling methods. 10

b. Explain synchronous and asynchronous message passing protocols. 10

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