

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 – September 2017

M.Tech. 1st Semester / B.Tech. 7th Semester

COURSE CODE: 10M11CI114

MAX. MARKS: 15

COURSE NAME: High Performance Computer Architecture

COURSE CREDITS: 03

MAX. TIME: 1 Hrs

Note: All questions are compulsory. The carrying of mobile phone during examinations will be treated as a case of unfair means.

1. Suppose we have made the following measurements:

Frequency of FP operations = 20%

Average CPI of FP operations = 4.0

Average CPI of other instructions = 1.66

Frequency of FPSQR = 3%

CPI of FPSQR = 20

Assume that the two design alternatives are to reduce the CPI of FPSQR to 3 or to reduce the average CPI of all FP operations to 3. Compare these two design alternatives using the CPU performance equation. [4]

2. Explain foster's design for computer architecture? Discuss disadvantages of flying taxonomy over shared memory architecture? [3]

3. Explain various hazards in pipelining with example? Explain various type of data dependencies in pipelining which may result in stalls? [3]

4. Design a pipeline for given set of instructions? Find CPI, average CPI for set of instruction given below and speedup over sequential processing. [5]

-Assume that forwarding has been implemented.

-We will predict that any branch instruction is not taken.

-Branch or jump are resolved after the EX stage.

-Assume that register \$2 has the value of 1 and \$3 has the value 1

LW \$1, 4(\$9)

SUB \$4, \$1, \$9

ADD \$6, \$4, \$9

BEQ \$2, \$3, Z

ADD \$9, \$6, \$7

AND \$4, \$5, \$5

Z: ADD \$4, \$5, \$9