

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
RETEST

Subject Code/ Name: CSPC34/ Computer Organization

Date: 23/ 11/ 2023

Marks: 20

Time: 12:00 PM–1:00 PM

Answer all the questions

1. Calculate 1.666015625×10^0 ($1.9760 \times 10^4 + - 1.9744 \times 10^4$) by hand, assuming each of the values are stored in the 16-bit half precision format. Assume 1 guard, 1 round bit, and 1 sticky bit, and round to the nearest even. Show all the steps, and write your answer in both the 16-bit floating point format and in decimal. (4)
2. Discuss in detail the steps in translating and starting a computer program. (4)
3. Draw neatly the data path diagram for the MIPS jump instruction. Use a pencil and ruler. (4)
4. Write short notes on Control hazards with an example. (3)
5. Consider the following sequence of instructions: (3)
 or r1,r2,r3
 or r2,r1,r4
 or r1,r1,r2

Also, assume the following cycle times for each of the options related to forwarding:

Without Forwarding	With Full Forwarding	With ALU-ALU Forwarding Only
250ps	300ps	290ps

What is the total execution time of this instruction sequence without forwarding and with full forwarding? What is the speedup achieved by adding full forwarding to a pipeline that had no forwarding? Explain

6. Using a table, calculate 37 divided by 5. You should show the contents of each register on each step. Assume both inputs are unsigned 5-bit integers. (3)