Quiz1 Solution
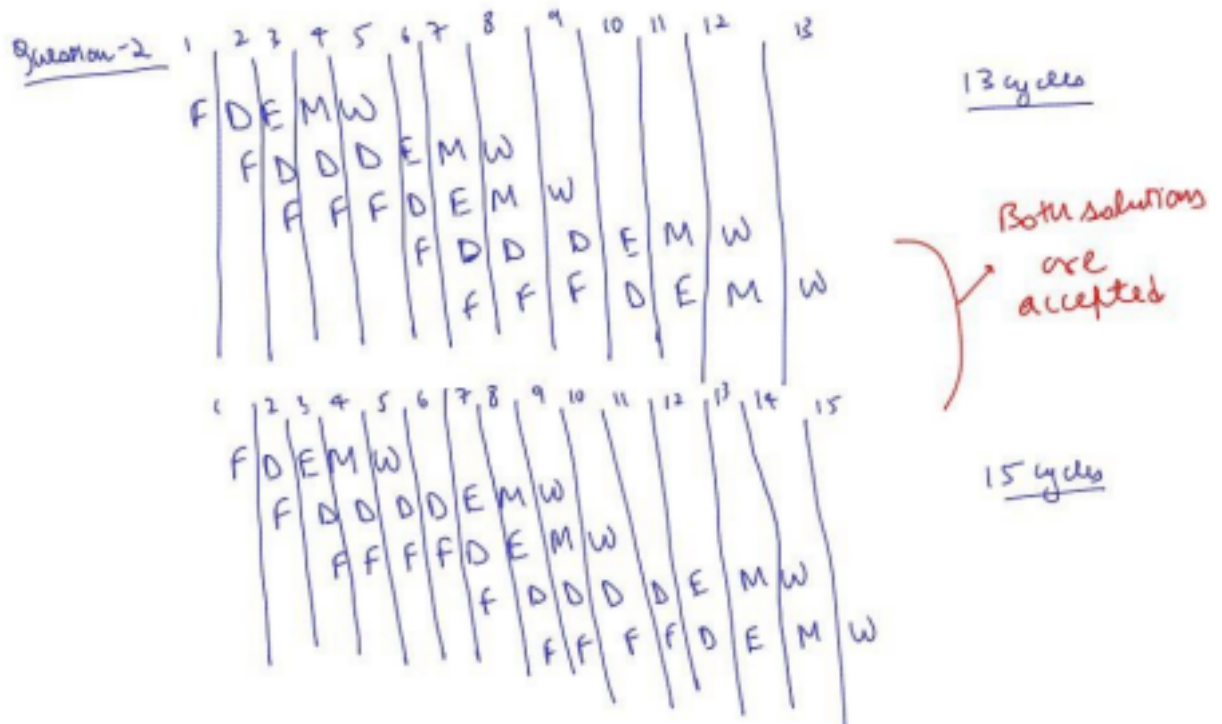## CSE/ECE 511 Computer Architecture

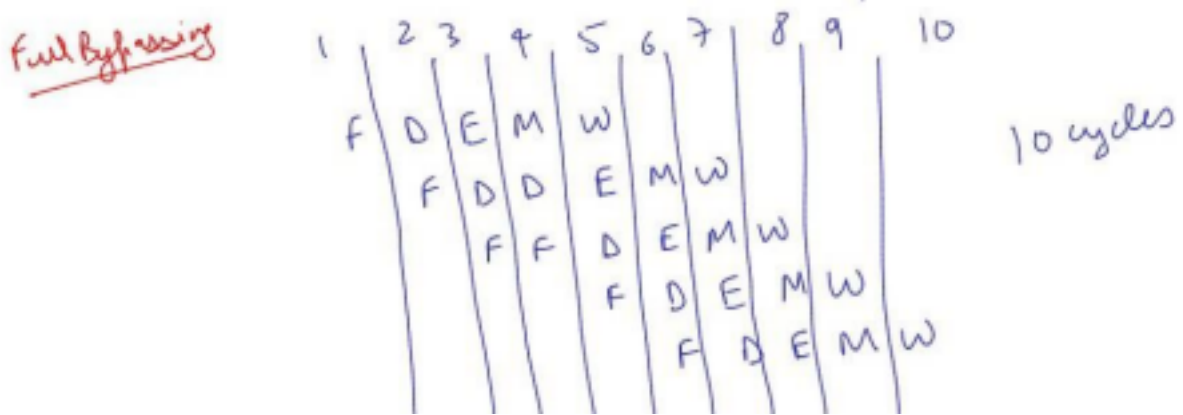**Q1**

a) ISA A: 5 instructions/cycle * 500,000,000 cycle/second = 2500 MIPS [1 marks for correct answer]

ISA B: 4 instructions/cycle * 300,000,000 cycle/second = 1200 MIPS [1 marks for correct answer]

b) Run time = Number of instructions * Time taken to execute one instruction

For ISA A, Time taken to execute 1 instruction = $1/2500 \times 10^{-6}$ second

For ISA B, Time taken to execute 1 instruction = $1/1200 \times 10^{-6}$ second

Therefore:

$1/2500 \times 10^{-6} \times 1000 = 1/1200 \times 10^{-6} \times$ Instructions for ISA B

=> Instructions for ISA B = 480 [1 mark for correct answer and 2 mark for correct explanation]

Q2.

(a) Without Bypass: [4 marks for correctly writing from instruction 2 to instruction 5; 1 mark for the correct number of cycles**]**

(b) With Bypass: [4 marks for correctly writing from instruction 2 to instruction 5; 1 mark for the correct number of cycles]

Full Bypassing

	1	2	3	4	5	6	7	8	9	10
	F	D	E	M	W					
		F	D	D	E	M	W			
			F	F	D	E	M	W		
					F	D	E	M	W	
						F	D	E	M	W

10 cycles

Pipeline Diagram	Cycle Number Marks
Correct	Correct 1
Incorrect	In accordance with the pipeline diagram 0.5 (Partial marks for counting)

Q3 [Binary Marking]
  a. 22 **[1 mark]**
  b. 22 **[1 mark]**
  c. 5 **[1 mark]**
  d. $2^5 = 32$ **[1 mark]**
  e. $2^5 = 32$ **[1 mark]**