National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Advance Computer Architecture	Course Code:	EE502
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	Exam Type:	Quiz 1	Page(s):	2

Student : Name:_____ Roll No._____
Section:_____

Question 1a [5]

```
load    R5, 100(R3)
and     R3,  R5, R1
add     R2, R5, R3
store   R2, 100(R3)
sub     R14, R3, R2
```

Find all types of hazards in above code. If there is a hazard between two instructions 1 and 2, write 1 &2 in front of that hazard below:
RAW:
WAR:
WAW:

Question 1b [5]

How many stalls will be required for the correct execution of above code? Rewrite the above code after insertion of stalls!

Question 2 [10]

Consider three different processors P1, P2, and P3 with following specifications

Processor	Clock rate	No. of Instructions	Execution Time
P1	2 GHz	20×10^9	7 s
P2	1.5 GHz	30×10^9	10s
P3	3 GHz	90×10^9	9 s

    (a) Find the average CPI for processor P1.

    (b) Find the clock rate for P2 that reduces its execution time to that of P1.

    (c) Find the number of instructions for P3 that reduces its execution time to that of P1.