BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination: Surprise Test - 1 | Semester: Fall 2024
Duration: 10 minutes | Full Marks: 05

CSE 340: Computer Architecture

Name: Solution	ID:	Section: 0

1. Computer A has a **2GHz clock**, Computer B has a **3GHz clock**. Suppose we run the following code in both the computers. 1+1

```
def calculate (num1, num2, sign):
    if (sign == '+'):
        return num1 + num2
    elif (sign == '-'):
        return num1 - num2
    else:
        return num1% num2
```

For Computer A the instruction count is 25. What would be the instruction count for Computer B assuming both computers follow the same ISA? Justify your answer.

Answer: 25.

Same code running on Both PCs & ISA same.

Hence, instruction count is also same; Clock rate has no role here.

2. Consider a processor P that has a 4GHz clock rate and a CPI of 2. If the processor executes a program within 10s then **find** the number of instructions and the duration of a clock cycle. 1.5 + 1.5

Answer:

Clock Rate = 4 GHz = 4×10^9 Hz

CPI = 2

CPU Time = 10s

$$\text{CPU Time} = \frac{\text{Instruction count} \times \text{CPI}}{\text{Clock Rate}}$$

$$\Rightarrow \text{Instruction count} = \frac{\text{CPU Time} \times \text{Clock Rate}}{\text{CPI}}$$

$$= \frac{10 \times 4 \times 10^9}{2}$$

$$= 20 \times 10^9$$

$$\text{Clock Duration} = \frac{1}{\text{Clock Rate}}$$

$$= \frac{1}{4 \times 10^9}$$

$$= 0.25 \times 10^{-9}$$

$$= 2.5 \times 10^{-10} \text{ s}$$