

Abdurrahman BULUT 1901042258 CSE 331-503 Midterm Examination Q11
 I hereby pledge that I will strictly adhere to academic integrity codes and the work done on this examination is solely my own and I will not receive/give my help from/to anybody or source during this examination.

Q11)
 a)

25 min

$$CPI = \sum CPI \times F_{inst}$$

$$\text{Clock cycle} = \text{instruction count} \times CPI$$

$$CPI \text{ time} = \text{clock cycle} \times \text{clock cycle time}$$

$$CPI = 3 \times 0.24 + 5 \times 0.56 + 2 \times 0.2 = 0.72 + 2.80 + 0.4 = 3.92$$

$$\text{Total CPI} = \underline{3.92}$$

b)

$$\begin{array}{l} 1 \text{ class C instruction} = 2 \text{ cycles} \\ 2 \text{ class C } \quad \quad \quad = 4 \text{ cycles} \end{array}$$

$$B \text{ instruction} = 5 \text{ cycle}$$

$$CPI = 3 \times 0.24 + 4 \times 0.56 + 2 \times 0.2 = 0.72 + 2.24 + 0.4 = \underline{3.36}$$

$$\text{New Total CPI} = \underline{3.36}$$

$$\begin{array}{r} 3.36 \times 9 \\ 33 \overline{) 336} \\ \underline{297} \\ 390 \\ \underline{324} \\ 660 \\ \underline{594} \\ 1062 \\ \underline{972} \\ 900 \\ \underline{864} \\ 360 \\ \underline{324} \\ 360 \\ \underline{324} \\ 360 \\ \underline{324} \\ 360 \end{array}$$

c) Average CPI

$$\text{For Part a: } 3.92 / 10 \text{ cycle} = \underline{0.392}$$

$$\text{For Part b: } 3.36 / 9 \text{ cycle} = \underline{0.37}$$

a is faster than b $0.392 / 0.37$ times.

$$\begin{array}{r} 0.392 + 0.8 + 0.4 = \\ 1.2 \\ 1.92 \end{array}$$