উঃ ৩:

1. $\text{Performance}_x = \frac{1}{\text{Execution time}_x}$

2. Let, $\text{Performance}_x > \text{performance}_y$

$$\therefore \frac{1}{\text{Execution time}_x} > \frac{1}{\text{Execution time}_y}$$

$$\text{Execution time}_y > \text{Execution time}_x$$

$$\therefore \frac{\text{performance}_x}{\text{performance}_y} = \frac{\text{Execution time}_y}{\text{Execution time}_x}$$

3. Sequence of cycles

$$\frac{\text{seconds}}{\text{program}} = \frac{\text{cycles}}{\text{program}} \times \frac{\text{seconds}}{\text{cycle}}$$

একটা প্রোগ্রাম = $\frac{1}{\text{প্রোগ্রাম}}$

$\frac{\text{cycles}}{\text{program}}$ ↓ clock rate (Hz, MHz, GHz), cycles per sec

$\frac{\text{seconds}}{\text{cycle}}$ ↓ clock cycle time / cycle time (seconds per cycle)

$1\,MHz = 10^6\,Hz$ | $1\,Hz = 10^{-6}\,MHz$

$1\,GHz = 10^9\,Hz$ | $1\,Hz = 10^{-9}\,GHz$

1 second = 10^9 nanoseconds | 1 sec = 10^3 Millisecond

$200\,MHz = \frac{1}{200 \times 10^6}$ seconds per cycle

clock rate cycle time

4. Performance Equation 1:

CPU execution time for a program = CPU clock cycles for a program × clock cycle time

CPU clock cycles for a program → clock cycles

clock cycle time → cycle time

CPU time / execution time

$$= \frac{\text{CPU clock cycles}}{\text{clock rate}}$$

5. CPU clock cycles = Instructions for a program × Average clock cycles per Instruction

Instructions for a program → Total number of instruction

Average clock cycles per Instruction → CPI

6. Performance Eq 2:

Instruction performance

Mix of 4, 5 টি

$$\text{CPU time} = \underbrace{\text{Instruction count} \times \text{CPI}}_{\text{clock cycles}} \times \text{clock cycle Time}$$

$$= \frac{\text{Instruction count} \times \text{CPI}}{\text{clock rate}}$$

7. $\text{CPI} = \frac{\text{CPU clock cycles}}{\text{Instruction count}}$