Computer Architecture HW1

1

a.

$10 * 2 * 10^9 = 2 * 10^{10}$

b.

$6 = \frac{(clockCycle_B)}{(clockFreq_B)} = \frac{1.2*(clockCycle_A)}{(clockFreq_B)} \Rightarrow clockFreq_B = 0.2 * clockCycle_A = 0.2 * 2 * 10^{10} = 4 * 10^9 = 4GHz$

2

a.

P1: $\frac{1}{\frac{1.5}{3*10^9}} = 2 * 10^9$

P2: $\frac{1}{\frac{1.0}{2.5*10^9}} = 2.5 * 10^9$

P3: $\frac{1}{\frac{2.2}{4*10^9}} = 2/1.1 * 10^9 \approx 1.82 * 10^9$

Ans. P2

b.

$Instruction_{P1} = 2 * 10^9 * 10 = 2 * 10^{10}$

$Cycle_{P1} = 2 * 10^{10} * 1.5 = 3 * 10^{10}$

$Instruction_{P2} = 2.5 * 10^9 * 10 = 2.5 * 10^{10}$

$Cycle_{P2} = 2.5 * 10^{10} * 1.0 = 2.5 * 10^{10}$

$Instruction_{P3} = 2/1.1 * 10^9 * 10 \approx 1.82 * 10^{10}$

$Cycle_{P3} = 4/2.2 * 10^9 * 10 * 2.2 = 4 * 10^{10}$

c.

$0.7 = \frac{1.2}{c} \Rightarrow c \approx 1.71$

So the Frequency should be 1.71 times the origin

$Freq_{P1} = 1.71 * 3 = 5.13GHz$

$Freq_{P2} = 1.71 * 2.5 \approx 4.28GHz$

$Freq_{P3} = 1.71 * 4 = 6.84GHz$

3

2	**50**	**54**	**1.85**	**0.93**
4	25	29	3.45	0.86
8	12.5	16.5	6.06	0.76
16	6.25	10.25	9.76	0.61
32	3.13	7.13	14.03	0.44
64	1.56	5.56	18	0.28
128	0.78	4.78	20.92	0.16