



Sheet 03 Answers

References
Shefaa Sections

Computer Architecture

**No Excellence
Just Pass**

CASheet 3كيرلس عادل نجيب
Sec: 2

$$\boxed{1} \quad S = \frac{1}{(1-F) + \left(\frac{F}{K}\right)} \Rightarrow F = 0.65 \quad K = 1.5$$

$$S = \frac{1}{(1-0.65) + \left(\frac{0.65}{1.5}\right)} = 1.2766$$

$$\boxed{2} \quad S = \frac{1}{(1-F) + \left(\frac{F}{K}\right)} = \frac{1}{(1-0.4) + \left(\frac{0.4}{2}\right)} = 1.25$$

$$\boxed{3} \quad S = 1.25 \quad K = ??$$

$$\textcircled{a} \quad S = \frac{1}{(1-F) + \left(\frac{F}{K}\right)} \Rightarrow 1.25 = \frac{1}{(1-0.6) + \left(\frac{0.6}{K}\right)}$$

$K = 1.5$ CPU needs to be 50% Faster.

$$\textcircled{b} \quad 1.25 = \frac{1}{(1-0.4) + \left(\frac{0.4}{K}\right)} \Rightarrow K = 2$$

disk needs to be 100% Faster

$$\boxed{4} \quad S = 1.3 \quad K = ??$$

$$\textcircled{a} \quad 1.3 = \frac{1}{(1-0.7) + \left(\frac{0.7}{K}\right)} \Rightarrow K = 1.49$$

CPU needs to be 49% Faster

$$(b) 1.3 = \frac{1}{(1-0.3) + \left(\frac{0.3}{K}\right)} \Rightarrow \boxed{K=4.33}$$

disk needs to be $\boxed{333\%}$ Faster

$$\boxed{5} \quad S=1.5 \quad F=0.75 \quad K=??$$

$$S = \frac{1}{(1-F) + \left(\frac{F}{K}\right)} \Rightarrow 1.5 = \frac{1}{(1-0.75) + \left(\frac{0.75}{K}\right)}$$

$\boxed{K=1.8}$ the speedup of new I/O card should be at least $\boxed{18\text{KHz}}$

$$\boxed{6} \quad S=1.12 \quad F=0.25 \quad K=??$$

$$1.12 = \frac{1}{(1-0.25) + \left(\frac{0.25}{K}\right)} \Rightarrow \boxed{K=1.75}$$

the new Processore speedup should be at least $\boxed{75\%}$ Faster than the old one.

$$\boxed{7} \quad \text{new system} \Rightarrow 1\text{GHz} = 1000\text{MHz}$$

$$\text{old system} \Rightarrow 300\text{MHz}$$

$$\text{the speedup difference} = 1000 - 300 = 700\text{MHz}$$

the system need $\boxed{700\text{MHz}}$ to be Faster 3 times.

$$\boxed{8} \quad S_{CPU} = \frac{1}{(1-0.6) + \left(\frac{0.6}{1.4}\right)} = 1.207$$

$$S_{disk} = \frac{1}{(1-0.4) + \left(\frac{0.4}{2.5}\right)} = 1.316$$

(a) $CPU = \frac{5000}{20.7} = 241.55 \$$ Per 1% increase

disk = $\frac{8000}{31.6} = 253.16 \$$ Per 1% increase

Choose CPU upgrade For least amount of money.

(b) Choose disk upgrade For best Performance

(c) $\frac{X}{20.7} = 253.16 \Rightarrow \boxed{X = 5241 \$}$

$$\boxed{9} \quad S_{CPU} = \frac{1}{(1-0.55) + \left(\frac{0.55}{1.4}\right)} = 1.186$$

$$S_{disk} = \frac{1}{(1-0.45) + \left(\frac{0.45}{2.5}\right)} = 1.37$$

(a) $CPU = \frac{5000}{18.6} = 268.82 \$$ Per 1% increase

disk = $\frac{8000}{37} = 216.216 \$$ Per 1% increase

Choose disk upgrade For least amount of money

(b) Choose CPU upgrade For best Performance

$$(c) \frac{X}{37} = 268.82 \Rightarrow \boxed{X = 9947 \$}$$

10 (a) $F = 0.9$ $K = 10$

$$S = \frac{1}{(1-0.9) + \left(\frac{0.9}{10}\right)} = \boxed{5.263}$$

(b) $F = 0.8$ $K = 1.2$

$$S = \frac{1}{(1-0.8) + \left(\frac{0.8}{1.2}\right)} = \boxed{1.154}$$
