PROBLEMA 6.1

a) $CPI = \frac{1}{4} = 0'25$ c/i

b) $20 \cdot 4 = 80$ instrucciones

c) $CPI = 0'25 + 0'2 \cdot 20 = 4'25$ c/i

d) $\frac{4'25}{0'25} = 17$

e) $CPI = 0'25 + 0'05 \cdot 0'2 \cdot 20 = 0'45$ c/i

f) $Speedup = \frac{4'25}{0'45} = 9'44$

PROBLEMA 6.2

a) $IPC = \frac{10^9 \text{ inst}}{10^9 \text{ ciclos}} = 1$ i/c

$OPC = \frac{4 \cdot 10^9}{10^9} = 4$ o/c

b) $\frac{4 \cdot 10^9}{10^9} = 4$ i/c

c) $0'6 \cdot 10^9 + 0'4 \cdot 10^9 \cdot 2 = 1'4 \cdot 10^9$ ciclos

d) $IPC = \frac{10^9}{1'4 \cdot 10^9} = 0'714$ i/c

$OPC = \frac{4 \cdot 10^9}{1'4 \cdot 10^9} = 2'857$ o/c

e) $4/16 = 0'25$

f) $0'6 \cdot 10^9 + 0'25 \cdot 0'4 \cdot 10^9 \cdot 2 + 0'75 \cdot 0'4 \cdot 10^9 = 1'1 \cdot 10^9$ c

g) $IPC = \frac{10^9}{1'1 \cdot 10^9} = 0'909$ i/c

$CPC = \frac{4 \cdot 10^9}{1'1 \cdot 10^9} = 3'63$ c/c

PROBLEMA 6.3

a) $\frac{200}{0'05 \cdot 200 + 0'1 \cdot 200} = 6'67$

b) $t(N) = 30 + \frac{176}{N} + N$

c) $0 = 1 - \frac{170}{N^2}$; $N = \sqrt{170} = 13$ procesadores

d) $\frac{200}{30+126} = 3'51$

e) $\frac{200}{180 + \frac{20}{10}} = 1'1$

f) 5 horas

g) $\frac{200}{10+126+5} = 4'88$

h) $MIPS = \frac{648 \cdot 10^{13}}{10^6 \cdot 200 \cdot 3600} = 9000$ $MFLOPS = \frac{72 \cdot 10^{13}}{10^6 \cdot 200 \cdot 3600} = 1000$

i) $MIPS = \frac{648 \cdot 10^{13} + 13 \cdot 10^{13}}{10^6 \cdot (10+126+5) \cdot 3600} = 44183$

$MFLOPS = \frac{72 \cdot 10^{13}}{10^6 (10+126+5) \cdot 3600} = 4878$