4.1

a) $t_{trans} = \frac{5000\,sect \cdot 512\,B/sect}{256 \cdot 10^6\,B/s} = 0'01\,s = \boxed{10ms}$

b) $t_{TOTAL}_{5000} = seektime + latencia + t_{TRANS} = 2+8+10 = \boxed{20ms}$

c) $\frac{5000\,sect \cdot 512\,B/sect}{20 \cdot 10^{-3}\,s} = \boxed{128\,MB/s}$

d) $T_{TOTAL} = 8 \cdot t_{TOTAL}_{5000} + 0'4 \cdot T_{TOTAL} + 4 \cdot t_{TOTAL}_{5000}$

$T_{TOTAL} = 8 \cdot 20 + 0'4 \cdot T_{TOTAL} + 4 \cdot 20 \rightarrow T_{TOTAL} = 400ms$

$T_{fase2} = 0'4 \cdot t_{TOTAL} = 0'4 \cdot 400 = \boxed{160ms}$

e) AB_{ef} (8 discos) $= AB_{ef}$ (1 disco) $\cdot 8 = 128 \cdot 8 = \boxed{1024\,MB/s}$

f) AB_{ef} (4 discos) $= AB_{ef}$ (1 disco) $\cdot 4 = 128 \cdot 4 = \boxed{512\,MB/s}$

g) $\frac{1024}{128} = x8 \rightarrow +700\%$

h) $\frac{512}{128} = x4 \rightarrow +300\%$

i) $\frac{240+160}{20+20+160} = \frac{400}{200} = x2 \rightarrow +100\%$

(4.2)

a) · RAID 6 = $300 \cdot (60-2) = 17400$ GB
· RAID 10 = $300 \cdot \left(\frac{60}{2}\right) = 9000$ GB
· RAID 50 = $300 \cdot (60-6) = 16200$ GB
· RAID 51 = $300 \cdot \left(\frac{60}{2} - 1\right) = 8700$ GB

b) $60 \text{ discos} \cdot \frac{100 \text{ MB/s}}{1 \text{ disco}} = 6 \text{ GB/s}$

c) · RAID 6 = $100 \cdot (60-2) = 5800$ MB/s
· RAID 10 = $100 \cdot \left(\frac{60}{2}\right) = 3000$ MB/s
· RAID 50 = $100 \cdot (60-6) = 5400$ MB/s
· RAID 51 = $100 \cdot \left(\frac{60}{2} - 1\right) = 2900$ MB/s

d) $60 \text{ discos} \cdot \frac{100 \text{ MB/s}}{1 \text{ disco}} = 6 \text{ GB/s}$

e) · RAID 6 = $100 \cdot (60-2) = 5800$ MB/s
· RAID 10 = $100 \cdot \left(\frac{60}{2}\right) = 3000$ MB/s
· RAID 50 = $100 \cdot (60-6) = 5400$ MB/s
· RAID 51 = $100 \cdot \left(\frac{60}{2} - 1\right) = 2900$ MB/s

4.3

a) $$\frac{MTTF^2}{N \cdot (N-1) \cdot MTTR}$$

b) $$\frac{MTTF^2}{\left(\frac{N}{2} \cdot G \cdot MTTR\right.}$$

c)

d) $$\frac{MTTF^4}{4 \cdot MTTR} \cdot \left(\frac{1}{2}\right)^2 \cdot \frac{1}{N-1}$$

e) $MTTF_6$

$MTTF_{10}$

$MTTF_{50}$

$MTTF_{51}$