

PROBLEMAS AC:

4.1) Capacidad = 1 TByte seek time medio = 8 ms Latencia media = 2 ms
Transfer Rate = 256 MB/s MTTF = 50.000 h tamaño sector = 512 B

$$a) t = \frac{(5000 \text{ sectores} \cdot 512 \text{ B/sector}) \cdot 10^{-6} \text{ MB}}{256 \text{ MB}} = \frac{2.56 \text{ MB}}{256 \text{ MB}} = 0.01 \text{ s} = \boxed{10 \text{ ms}}$$

$$b) t = t_{\text{búsqueda}} + t_{\text{seek}} + t_{\text{latencia}} = 10 + 8 + 2 = \boxed{20 \text{ ms}}$$

$$c) \text{ Ancho de banda} = \frac{2.56 \text{ MB}}{20 \cdot 10^{-3} \text{ s}} = \boxed{128 \text{ MB/s}}$$

$$d) t_{\text{total}} = \underset{\substack{\text{(8 MB)} \\ \text{datos}}}{t_{\text{sec 1}}} + \underset{\substack{\text{40\%} \\ \text{aplicación}}}{t_{\text{sec 2}}} + \underset{\substack{\text{(4 MB)} \\ \text{datos}}}{t_{\text{sec 3}}} = 8 \cdot 20 + 0.4 \cdot t_{\text{total}} + 4 \cdot 20 \Rightarrow \begin{cases} t_{\text{total}} = 400 \text{ ms} \\ t_{\text{sec 1}} = 160 \text{ ms} \end{cases}$$

$$e) \text{ Ancho de banda} = \frac{2.56 \cdot 8 \text{ MB}}{20 \cdot 10^{-3} \text{ s}} = \boxed{1024 \text{ MB/s}}$$

$$f) \text{ Ancho de banda} = \frac{2.56 \text{ MB}}{20 \cdot 10^{-3} \text{ s}} = \boxed{128 \text{ MB/s}}$$

$$g) \text{ Speed up } t_{\text{sec 1}} = \frac{160}{20} = 8 \Rightarrow 700\%$$

$$h) \text{ Speed up } t_{\text{sec 3}} = \frac{80}{20} = 4 \Rightarrow 300\%$$

$$i) \text{ Speed up aplicación} = \frac{400}{200} = 2 \Rightarrow 100\%$$

4.2) 60 discos / discos de 300 GB, ancho banda: 100 MB/s RAID 6, RAID 10, RAID 50, RAID 51

$$a) \text{ RAID 6: } (60 - 2) \text{ discos} \cdot 300 \text{ GB} = \boxed{17400 \text{ GB}}$$

$$\text{RAID 10: } (60/2) \text{ discos} \cdot 300 \text{ GB} = \boxed{9000 \text{ GB}}$$

$$\text{RAID 50: } (60/2 - 1) \text{ discos} \cdot 300 \text{ GB} = \boxed{8700 \text{ GB}}$$

$$\text{RAID 51: } (9 \cdot 6) \text{ discos} \cdot 300 \text{ GB} = \boxed{16200 \text{ GB}}$$

$$b) 100 \text{ MB/s} \cdot 60 \text{ discos} = 6000 \text{ MB/s} \Rightarrow \boxed{6 \text{ GB/s}}$$

$$c) \boxed{6 \text{ GB/s}}$$

$$d) \text{ RAID 6: } 100 \text{ MB/s} \cdot 58 \text{ discos} = \boxed{5800 \text{ MB/s}}$$

$$\text{RAID 10: } 100 \text{ MB/s} \cdot 30 \text{ discos} = \boxed{3000 \text{ MB/s}}$$

$$\text{RAID 50: } 100 \text{ MB/s} \cdot 57 \text{ discos} = \boxed{5700 \text{ MB/s}}$$

$$\text{RAID 51: } 100 \text{ MB/s} \cdot 24 \text{ discos} = \boxed{2400 \text{ MB/s}}$$

$$e) \text{ RAID 6: } 100 \text{ MB/s} \cdot (60/6) \text{ discos} = \boxed{1 \text{ GB/s}}$$

$$\text{RAID 50: } 100 \text{ MB/s} \cdot (60/4) \text{ discos} = \boxed{1.5 \text{ GB/s}}$$

$$\text{RAID 10: } 100 \text{ MB/s} \cdot (60/2) \text{ discos} = \boxed{3 \text{ GB/s}}$$

$$\text{RAID 51: } 100 \text{ MB/s} \cdot ((60/2)/2) \text{ discos} = \boxed{0.75 \text{ GB/s}}$$