10.3 A multiplattered hard disk is divided into 1100 sectors and 40,000 cylinders. There are six platter surfaces. Each block holds 512 bytes. The disk is rotating at a rate of 4800 rpm. The disk has an average seek time of 12 msec.

a. What is the total capacity of this disk?

$1100 \times 40000 \times 6 \times 512 = 135{,}168{,}000{,}000$ bytes

10.4 The average latency on a disk with 2200 sectors is found experimentally to be 110 msec.

a. What is the rotating speed of the disk?

average latency = $(1 / 2) \times (1 /$ rotational speed$)$

$110 / 1000 = (1 / 2) \times (1 /$ rotational speed$)$

rotational speed = 4.55 r/s

For a display of 1920 pixels by 1080 pixels at 16 bits per pixel how much memory, in megabytes, is needed to store the image?

$1920 \times 1080 \times 16 = 33{,}177{,}600$ bits = 4,147,200 bytes = 3.96 megabytes

What is the average rotational latency of a hard drive rotating at 7,200 RPM or 120 revolutions per second? (Give your answer in milliseconds)

average latency = $(1 / 2) \times (1 /$ rotational speed$)$

$= 0.5 / 120 = 0.00417$ seconds = 4.17 milliseconds

What is the transfer time for a hard drive rotating at 7,200 RPM or 120 revolutions per second? Assume there are 30 sectors per track. (Give your answer in milliseconds)

transfer time = $1 /$ (number of sectors $\times$ rotational speed)

$= 1 / (30 \times 120) = 0.28$ milliseconds