

5. (13 marks) Ethernet rate calculation.

(a) On a 10 Mbps Ethernet, what is the maximum frame rate for 1024 byte frames? Show your work, including units. Round your answer to the nearest integer.

Frame rate: 1197 frames per second

$$8B + 1024B + 12B = 1044 \frac{B}{f} = 8352 \frac{B}{f}$$

preamble frame IFG

$$\frac{1E7 \frac{B}{s}}{8352 \frac{B}{f}} = 1197.3 \frac{f}{s}$$

(b) On a 10 Mbps Ethernet, 1024 byte frames are sent equally spaced with an interframe gap of 100 microseconds. What is the data rate? Here, "data" refers to the Ethernet payload, excluding the header fields and the CRC. Show your work, including units.

Data rate: 8,694,901 bits per second

$$8B + 1024B + 125B = 1157 \frac{B}{f} = 9256 \frac{B}{f} \leftarrow \text{total bits}$$

preamble frame IFG *

$$1024B - 18B = 1006 \frac{B}{f} = 8048 \frac{B}{f} \leftarrow \text{data bits}$$

frame header & CRC



$$\frac{8048 \frac{B}{f}}{9256 \frac{B}{f}} \times 1E7 \frac{B}{s} = 8,694,901 \frac{B}{s}$$

* 100 microseconds = 1000 B = 125B