5.2.4.

Consider the figure with 10 Mbps, $d(A,C) = 2000m$, v_{prop} $2e8 \frac{m}{s}$.

Node A starts sending a long frame at $t_1 = 0$

Node C starts sending a long frame at $t_2 = 3\mu s$

Frames are long enough to ~~[illegible]~~ ensure CD.

Find:

a) The time when C hears the collision

$$T_{prop} = \frac{d}{v_{prop}} = \frac{2000m}{2 \cdot 10^8 \frac{m}{s}} = 10\mu s$$

$$t_{coll,C} = t_2 + T_{prop}(A,C) = 0 + 10\mu s = \boxed{10\mu s}$$

b) The time when A hears the collision

$$t_{coll,A} = t_2 + T_{prop}(C,A) = 3\mu s + 10\mu s = \boxed{13\mu s}$$

c) The number of bits A sent before hearing the collision

$$n_{sent,A}(t = t_{coll,A}) = R \cdot (t_{coll,A} - t_1) = 10\ Mbps \cdot (13\mu s - 0) = \boxed{130\ b}$$

d) The number of bits C sent before hearing the collision

$$n_{sent,C}(t = t_{coll,C}) = R(t_{coll,C} - t_2) = 10\ Mbps(10\mu s - 3\mu s) = \boxed{70\ b}$$