100 Mbps
1 Km Cable
200,000 Km/Sec

3 a) Worst case collision is 2* prop delay
avg contention slots before successful transmission is 4
∴ efficiency of 50%

$$\text{prop delay} = \frac{1\text{ km}}{200{,}000\text{ km/sec}} = .000005\text{ sec} = 5\text{ microseconds} = 5\,\mu s$$

$$\text{transmission time} = \frac{\text{Len}}{\text{bandwidth}}$$

$$.50 = \frac{\frac{L}{100\text{ mbps}}}{4 * 2 * 5\,\mu s + \frac{4}{4/10^8} + 5\,\mu s}$$

100 Mbps = 10^8 bps
$5\,\mu s = 5 \times 10^{-6}$

$$.5 = \frac{\frac{L}{10^8}}{8(5\times10^{-6}) + \frac{4}{10^8} + 5\times10^{-6}}$$

$L = 4{,}500$ bits

unsuccessful q.

3 b) Fixed Prob p Find expected delay T

$$T = T_s + (1-P) * T_d / P$$

c) A sends datagram to B addressed MAC to B will C process frames
C will process the frames but will not pass the IP datagrams because the MAC is addressed to B. if A sends w/ MAC broadcast it will pass the IP datagram as well because it sends all frames.

d) $2^5 - 1 = 31$

$[0, 1, 2, \ldots, 31]$

$2^0\ 2^1\ 2^2\ 2^3\ 2^4 = 31$

$b.t = 1/10mbps = .1\ \mu s$

$P_4 = 1/32$

$delay = \frac{k * 512 * .1\mu s}{4 \times 512 \times .1} = 2048\ \mu s$

204.8 micro Seconds