HW2.

1. (a) Circuit Switch is more appropriate.
Because the transmission from application is steady and continuous, it is better to use circuit switch with a fixed bandwidth. In so doing, we don't need to worry about the switch cost of packet switch.
However, we can't put many links on circuit switch. For example, if we have n links, then the bandwidth would be shared by $\frac{1}{n}$ bandwidth for each link.

(b) No need for congestion control.
The reason why we don't need is because in packet switching, we can use the capacity of the link until we finished transmitting the very packet. And if the sum of the application data is less than capacity, then we don't need to worry about the congestion because we won't be faced with the problem.

2. (a) $3Mb / 150kb = 20$ Ans: 20 users ※.

(b) 0.1 ※

(c) $C_n^{120}(0.1)^n(0.9)^{120-n}$ ※

(d) $1 - \sum_{i=0}^{20} C_i^{120}(0.1)^i(0.9)^{120-i}$ ※

3. $1/100 = 0.01$ sec (Transmission delay)

$(10+1) = a \cdot (0.01+0.01) = 0.02a$

$a = 11/0.02 = 550$

Ans 550 packets/sec ※

4. (a) m/s is the d_{prop}

(b) L/R

(c) $m/s + L/R$

(d) $\frac{120}{56000} = \frac{m}{2.5 \cdot 10^8} \Rightarrow m = \frac{12}{5600} \times 2.5 \times 10^8 = \frac{20}{56} \times 10^6 = \frac{15}{28} \times 10^6$

Ans: $\frac{15}{28} \times 10^6$ (meters)

5. $\frac{56.8}{64.1000} = 0.007$ sec $= 7$ msec

$\frac{56.8}{2 \times 10^6} = \frac{224}{10^6} = 0.224$ msec

$7 + 0.224 + 10 = 17.224$

Ans: 17.224 msec

6. $Min(R_s, Min(R_c, R/M))$