2.48. Determine whether each of the following statements concerning LTI systems is true or false. Justify your answers.
(a) If $h(t)$ is the impulse response of an LTI system and $h(t)$ is periodic and nonzero, the system is unstable.
(b) The inverse of a causal

NO.

Date . .

H1

1. Generate a packet (Decode): $\frac{56\times8}{64k} = 7ms$

Transmit a packet: $\frac{56\times8}{5M} = 89.6\mu s$

Total: $7ms + 89.6\mu s + 7ms + 10ms = 24.0896\ ms$

2. (1) $\frac{20M}{200k} = 100$

(2) $p = 10\%$

(3) $P = C_{300}^{n}(10\%)^n(90\%)^{300-n}$

(4) $P = \sum_{n=101}^{300} C_{300}^{n}(10\%)^n(90\%)^{300-n}$

$= 1 - \sum_{n=0}^{100} C_{300}^{n}(10\%)^n(90\%)^{300-n}$

~~$\approx 1 - \frac{e^{-30}\,30^{100}}{100!}$~~

=

3. (1) propagation delay: $\frac{20000k}{2.5\times10^8} = 80ms$

$R \times d_{prop} = 10M \cdot 80ms = 800000bits$

(2) 800000 bits

(3) The maximum number of bits in the link.

(4) The width of a bit = length of link / $R\times d_{prop}$

$= \frac{20000k}{800000} = 25\ m$

Shorter than a football field.

(5) S/R

1. (1) $\frac{4 \times 10^6}{2M} = 2$ s

~~Math store & forward method.~~

Total: $2 \times 3 = 6$ s

(2) 1st packet to 1st switch: $\frac{2000}{2M} = 1$ ms;

1st packet to 2nd switch = 1st packet to 1st ...

= 2 ms

(3) Total: 2000 + 2 = 2002 ms = 2.002 s

better than unsegmented

(4) Packets need to be distributed at the source and re-combined at the destination.

More headers are add to the message.

5. Maximum data rate: $6k \times 20 = 120$ kbps > 56 kbps

∴ possible

6. Transmission delay = x/b

Propagation delay = kd

Total delay of circuit switch network = $s + x/b + kd$

To 1st switch = x/b ......

1st switch to destination = [illegible] $(k-1)p/b$

Total delay of packet-switch network

$= x/b + (k-1)p/b + kd$

When $(k-1)p/b < s$, packet-switch network is better