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3. Given: link between R1 and R2 to be of length 10 kms.
 Bandwidth of the link = 100 Gbps.
 Speed of propagation = $\frac{2}{3}$ speed of light.

a) $T_p = \frac{\text{length of the link}}{\text{propagation speed.}}$

$$c = 3 \times 10^8 \text{ m/s}$$

$$T_p = \frac{10 \times 10^3 \text{ m}}{\frac{2}{3} \times 3 \times 10^8 \text{ m/s}}$$

$$T_p = 5 \times 10^{-5} \text{ s} = 0.5 \mu\text{s.}$$

- b) Maximum number of bits that R1 can send, until the first bit sent by R1 reaches R2 = $T_p \times \text{Bandwidth.}$
- $$= 5 \times 10^{-5} \times 100 \times 10^9 \frac{\text{bits}}{\text{s}}$$
- $$= 5 \times 10^6 \text{ bits}$$

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$$c) \text{ bit width} = \frac{\text{length of link}}{\text{Max}^m \text{ no. of bits that can be in link}}$$

$$= \frac{2 \times 10^3 \text{ m}}{5 \times 10^6 \text{ bits}} \times 10^3$$

$$= 2 \times 10^{-3} \text{ m/bit}$$