Adithya M PES1UG20CS681 K Section

1) Transmission delay = $\frac{0.4}{5} = 0.08$ seconds

Transmission speed = $\frac{500}{0.08} = 6250$ bps

2) 10TB = $10 \times 10^6 \times 8$ Mbps

Time = $\frac{8 \times 10^7}{100} = 8 \times 10^5$ seconds $\approx$ 9 days

Courier better

3) $d_{trans} + 1000\, d_{tens} = 3\ \mu s$

$d_{tens} \approx \frac{3 \times 10^3\ \mu s}{} = 3\ ns$

4) 100TB 550Km 1Gbps 2×10^8 m/s

$d_{bps} = \frac{100 \times 1000 \times 8}{1} = 8 \times 10^5$ s

$d_{propagation} = \frac{350 \times 10^3}{2 \times 10^8} = 1.75 \times 10^{-3}$ s

$d_{total} = 8 \times 10^5$ s + 1.75 ms

$\approx$ 9 days

b) driving better

Transmission delay is dominant

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5) Transmission speed = 10Mbps

$$d_{propagation} = \frac{10000 \times 10^3}{2.5 \times 10^8} = 4 \times 10^{-2} s$$

$$d_{end\text{-}to\text{-}end} = 4 \times 10^{-2} + d_{trans}$$

$$d_{trans} = 5 \times 10^{-3} - 4 \times 10^{-2}$$

negative & not possible

6) Circuit switched

16Kb

$$delay = \frac{8 \times 16 \times 10^3}{10^2 \times 10^6} + 500 \times 10^{-3} = 500 \times 10^{-3}$$

Packet switched

$$10n + \frac{16 \times 10^3 \times 8}{10 \times 10^6} = 10n + 1.6 \times 10^{-3} \times 8$$

$$500 \times 10^{-3} = 10n + 16 \times 8 \times 10^{-3}$$

$$n \approx 50$$

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7) $T = \frac{L}{R} = \frac{10^3}{20 \times 10^6} = \underline{\underline{50\mu s}}$

8) a) $R = 200 \quad R_s = 70 \quad R_c = 90$ Mbps

Thoroughput $= \frac{200}{4} = 50$ Mbps

Max thoroughput = 50 Mbps (min of $R_s R_c$, 80)

b) Utilisation $= \frac{50}{50} = \underline{\underline{1}}$