SHRI KRISHNA

3a) Transmission = 32 Kbps = R

distance = 200×10^6 km = d

speed = 2×10^8 m/s = s

Packet size = 2000 byte = L

$$T = \frac{L}{R} = \frac{2000 \times 8}{32 \times 10^3} = \frac{1}{2} = 0.5\,s$$

$$\text{Delay} = d/s = \frac{200 \times 10^6 \times 10^3}{2 \times 10^8} = 1000\,s$$

Total time = T + d = <u>1000.5 s</u>

3b) $d_1 = 400$; $d_2 = 200 \times 10^6$ $R_1 = 2$ Mbps

$L_1 = 2000$; $L_2 = 2000$ $R_2 = 64$ Kbps

$$T = \left(\frac{L_1}{R_1} + \frac{L_2}{R_2}\right) + \left(\frac{d_1}{s_1} + \frac{d_2}{s_2}\right)$$

$$= \left(\frac{2000 \times 8}{2 \times 10^6} + \frac{2000 \times 8}{64 \times 10^3}\right) + \left(\frac{400 \times 10^3}{2 \times 10^8} + \frac{200 \times 10^6 \times 10^3}{2 \times 10^8}\right)$$

$= 0.008 + 0.25 + 0.002 + 1000$

$= \underline{1000.26}$