Question 1: Access Link Utilization

a) Without Web Cache:

The access link utilization is **1.067**.

- **Calculation:** `(18 requests/sec * 115,000 bits/request) / 1,940,000 bits/sec = 1.067`

b) With 35% Web Cache Hit Rate:

The access link utilization is **0.6935**.

- **Calculation:**
  `(18 requests/sec * (1 - 0.35) * 115,000 bits/request) / 1,940,000 bits/sec = 0.6935`

Question 2: File Distribution Time

The following table shows the minimum distribution times in **seconds**.

N (Peers)	u (Peer Upload Rate)	Client-Server Time (s)	P2P Time (s)
1	1, 2, or 5 Mbps	4,000	4,000
50	1 Mbps	60,000	17,143
	2 Mbps	60,000	10,000
	5 Mbps	60,000	4,444
100	1 Mbps	120,000	20,000
	2 Mbps	120,000	10,909
	5 Mbps	120,000	4,615