1994 Paper 9 Question 4

Computer Systems Modelling

A distributed database is organised as four servers with 100 terminals attached via 10 terminal concentrators. The concentrators and the servers are connected by a 100 Mbps network. Each server has a single disk. A typical query generates the following load on the system:

terminal concentrator	70 ms
server CPU	60 ms
disk	25 ms
network	1 Kbyte transfer

Give estimates and bounds of average system response time when each terminal generates

(*a*) a query every minute

(*b*) a query every 10 seconds

(*c*) a query every 5 seconds

[Recall that in a balanced system the utilisation of each device is given by

$$U = \frac{N}{N + K - 1}$$

where N is the number of customers and K is the number of devices.]

[20 marks]