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| **Question (1b)** |  |  |  |  |  |  |  |
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| **Queue length equation for single server** | | | |  |  |  |  |
| |  | | --- | |  | |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |
| **Queue length equation for multi server** | | |  |  |  |  |  |
| |  | | --- | |  | |  |  |  |  |  |  | 1.1457 |
|  |  |  |  |  |  | Po = | 5.2191 |
|  |  |  |  |  |  | Lq = | 184.7881 |
|  |  |  |  |  |  | L = | 185.9339 |
| **Throughput Time Equation** | |  |  |  |  | W= | 148.7471 |
| |  | | --- | |  | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  | **A** | **B** | **C** | **D** | **E** | **I** |  |
| **Arrival Rate,  unit/hr** | 0.625 | 0.625 | 0.625 | 1.25 | 0.625 | 0.625 |  |
| **Service Rate,  unit/hr** | 1.5 | 1.7143 | 6 | 1.091 | 4 | 6 |  |
| **Arrival Rate, ’ unit/hr** | 0.625 | 0.64433 | 0.64433 | 1.25 | 0.64433 | 0.64433 |  |
| **Utilization Ratio, =’/ ** | 0.416667 | 0.375856 | 0.107388 | 1.145738 | 0.161082 | 0.107388 |  |
| **Number of machines, n** | 1 | 1 | 1 | 2 | 1 | 1 |  |
| **Utilization Ratio, =’/n ** | 0.416667 | 0.375856 | 0.107388 | 0.572869 | 0.161082 | 0.107388 |  |
| **= ’/ ** | 0.666667 | 0.60137 | 0.171821 | 0.91659 | 0.257732 | 0.171821 |  |
| **Queue L, unit** | 0.714286 | 0.602194 | 0.120308 | 185.9339 | 0.192012 | 0.120308 |  |
| **Queue in system, units** | 187.683 |  |  |  |  |  |  |
| **Throughput w, hr** | 1.142857 | 0.934606 | 0.186718 | 148.7471 | 0.298003 | 0.186718 |  |
| **v\*w** | 0.761905 | 0.562043 | 0.032082 | 136.3401 | 0.076805 | 0.032082 |  |
| **W=w, hr** | 137.6962 |  |  |  |  |  |  |