Part B.

In order to prevent the producer and consumer from accessing the same memory segment, Semaphore S functions as a mutual exclusion semaphore. The consumer continually reads from the buffer while the producer continuously writes to a different buffer. Only when there is no data stored in the buffer may the producer and consumer access the same buffer. Now, the consumer must read from the same buffer block while the producer must write to it. Semaphore S is not required when there is only one producer and consumer because semaphore N can handle this situation. The producer will always move ahead of the consumer thanks to Semaphore N, which is a synchronisation semaphore.

Thus, Semaphore S is not needed