(a) The operations can be categorized into the following types:

- "Short" ENQUEUE: A simple PUSH which costs \$2.
- "Long" ENQUEUE: A PUSH following the migration of 12 elements from S_1 to S_2, whose cost is $5 \times 12 + 2 =$ \$62.
- "Short" DEQUEUE: A simple POP which costs \$3.
- "Long" DEQUEUE: A POP following the migration of all elements from S_1 to S_2, whose cost is $5k + 3$ (with k being the number of elements to migrate).

The sequence of 50 ENQUEUE and 50 DEQUEUE operations then looks as follows:

- 12 short ENQUEUES,
- 1 long ENQUEUE,
- 37 short ENQUEUES,
- 12 short DEQUEUES,
- 1 long DEQUEUE with the migration of 38 elements,
- 37 short DEQUEUES.

The total cost is:

$$12 \cdot \$2 + 1 \cdot \$62 + 37 \cdot \$2 + 12 \cdot \$3 + 1 \cdot (\$5 \cdot 38 + 3) + 37 \cdot \$3 = \$500.$$

Therefore the amortized cost per operation is:

$$\$500/100 = \$5.$$

(b) Using the accounting method, we charge \$10 for each ENQUEUE operation and \$0 for each DEQUEUE operation. Imagine that this \$10 is "attached" to the element that was ENQUEUED: \$2 pays for pushing the element into S_1, \$5 for migrating the element from S_1 to S_2 (1 PUSH + 1 POP), and \$3 for popping the element out of S_2. This \$10 per element is enough to pay for all operations since each element is pushed, migrated and popped at most once during any sequence of operations. Hence, the amortized cost per operation for any sequence is *at most* 10 units of time (maybe less depending on the sequence).