(a) Find all frequent itemsets using Apriori with minimum support 60%

- Generate 1-item candidate itemsets. Count occurrences for each item.

Item	Count
Q	6
L	3
M	4
N	4
J	1
K	4
O	4
P	2

- Prune and generate frequent 1-item itemsets.
- With a total of 6 transactions, 60% of 6 is 3.6, so use a minimum support of 4 transactions.
- Frequent 1-item itemsets:

Item	Count
Q	6
M	4
N	4
K	4
O	4

- Generate 2-item candidate itemsets
- pair up the frequent 1-item itemsets.

Pair	Count
Q,M	3

Pair	Count
Q,N	3
Q,K	3
Q,O	4
M,N	3
M,K	2
M,O	1
N,K	2
N,O	2
K,O	2

- Prune and generate frequent 2-item itemsets.
- Frequent 2-item itemsets:

Pair	Count
Q,M	3
Q,N	3
Q,K	3
Q,O	4
M,N	3

- Generate 3-item candidate itemsets.
- Based on frequent 2-item sets.

Triple	Count
Q,M,N	2
Q,M,K	1
Q,M,O	2
Q,N,K	2

Triple	Count
Q,N,O	2
Q,K,O	2
M,N,K	1
M,N,O	1

- Prune.
- No 3-item candidate itemsets have the minimum support of 4.

Final frequent itemsets:

- 1-item: Q, M, N, K, O
- 2-item: Q,M; Q,N; Q,K; Q,O; M,N

(b) Find association rules with minimum confidence 83%

- Generate association rules from frequent 2-item itemsets.

Using the formula:

$$\text{Confidence}(X \to Y) = \frac{\text{Support}(X \cup Y)}{\text{Support}(X)}$$

Rules and their confidence:

1. Q → M: 3/6 = 50%
2. M → Q: 3/4 = 75%
3. Q → N: 3/6 = 50%
4. N → Q: 3/4 = 75%
5. Q → K: 3/6 = 50%
6. K → Q: 3/4 = 75%
7. Q → O: 4/6 = 66.67%
8. O → Q: 4/6 = 66.67%
9. M → N: 3/4 = 75%
10. N → M: 3/4 = 75%

- Prune.

- No association rule has a confidence ≥ 83%.

Thus, no association rules are found with the given threshold.