Q2

Note: the calculation process doubles the flows, so the optimal solution here is 2570.

b)

trial	initial solution	best cost
1	5 16 0 10 2 6 4 17 19 12 15 9 11 1 14 3 13 18 7 8	2574
2	15 13 10 2 3 19 17 7 0 14 1 6 4 12 5 8 18 9 11 16	2570
3	8 10 14 3 5 7 6 15 1 0 18 9 16 13 19 17 2 11 4 12	2574
4	0 9 6 15 7 18 1 4 14 10 3 19 5 11 16 12 2 17 13 8	2578
5	14 8 2 3 6 9 0 12 10 5 11 1 17 7 19 15 13 18 16 4	2570
6	0 8 19 14 3 11 16 9 18 13 10 5 15 6 4 12 17 2 7 1	2570
7	7 1 18 17 4 0 14 11 9 6 5 16 13 8 19 15 2 12 10 3	2574
8	6 10 5 13 1 3 15 11 16 17 14 9 2 12 19 0 7 4 18 8	2574
9	15 16 8 9 5 11 0 13 12 17 1 7 3 14 10 4 19 2 18 6	2570
10	12 16 10 0 7 2 18 11 3 1 4 17 5 9 13 15 19 8 14 6	2574

Changing the tabu tenure:

trial	tabu tenure 10	tabu tenure 30
1	2618	2570
2	2578	2574

Dynamic tabu list size:

By introducing a dynamic tabu list size, the algorithm can adapt its search behavior over time, striking a balance between exploration and exploitation.

trial	best cost
1	2690
2	2612
3	2654
4	2660
5	2592
6	2706
7	2672
8	2664
9	2574
10	2574

Add aspiration criteria on the best solution so far:

trial	best cost
1	2612
2	2574
3	2574
4	2574
5	2612
6	2570
7	2570
8	2570
9	2574
10	2570

Add aspiration criteria on the best move in the neighborhood:

trial	best cost
1	2664

2	2574
3	2632
4	2692
5	2612
6	2692
7	2714
8	2692
9	2574
10	2692

Use less than the whole neighborhood to select the next solution:

trial	best cost
1	2664
2	2664
3	2720
4	2678
5	2604
6	2650
7	2666
8	2604
9	2642
10	2640

Add a frequency-based tabu list to encourage the search:

trial	best cost
1	2626
2	2604
3	2570
4	2570

5	2604
6	2570
7	2574
8	2570
9	2574
10	2574