Input Instance : A-n32-k5

-----Truck routes after Clarke-Wright Savings-----

Truck 1: [0, 29, 15, 22, 9, 18, 8, 11, 4, 28, 0]

Truck 2: [0, 24, 27, 10, 25, 5, 20, 0]

Truck 3: [0, 21, 31, 19, 17, 2, 3, 23, 0]

Truck 4: [0, 26, 12, 1, 7, 13, 6, 14, 0]

Truck 5: [0, 16, 30, 0]

-----Final Truck routes-----

Truck 1: [0, 29, 22, 9, 18, 8, 11, 28, 0]

Truck 2: [0, 24, 10, 25, 5, 20, 0]

Truck 3: [0, 21, 31, 17, 2, 23, 0]

Truck 4: [0, 26, 1, 7, 6, 14, 0]

Truck 5: [0, 16, 0]

-----Drone routes-----

Truck 1 drones:

Drone 1: [[29, 15, 22], [9, 4, 28]]

Drone 2: []

Truck 2 drones:

Drone 1: [[24, 27, 20]]

Drone 2: []

Truck 3 drones:

Drone 1: [[21, 19, 17], [2, 3, 23]]

Drone 2: []

Truck 4 drones:

Drone 1: [[26, 12, 1], [7, 13, 6]]

Drone 2: []

Truck 5 drones:

Drone 1: [[16, 30, 0]]

Drone 2: []

Only truck cost - 825.5558183441632

Truck 1 drone cost - 63.75747658032597

Truck 1 waiting cost - 0

Truck 2 drone cost - 24.041505165532367

Truck 2 waiting cost - 0

Truck 3 drone cost - 20.368306282085477

Truck 3 waiting cost - 0

Truck 4 drone cost - 48.64726895458496

Truck 4 waiting cost - 0

Truck 5 drone cost - 19.17710238440323

Truck 5 waiting cost - 0

Total drone cost - 175.991659366932

Total waiting cost - 0

Total Cost: 1001.55

Delivery Cost: 551.32

Current Updated. Iteration Reset. Current Cost: 893.2128742038135

Inserting Node : 27.

Drone Insert Cost : inf. Truck Insert Cost : 893.2128742038135. Sub route Insert Cost : inf.Truck Node Inserted for Node #27.

Inserting Node : 31.

Drone Insert Cost : inf. Truck Insert Cost : 898.9362033202276. Sub route Insert Cost : 893.2128742038135.

Sub Drone Route Inserted for Node #31.

Inserting Node : 5.

Drone Insert Cost : inf. Truck Insert Cost : 897.9364319106915. Sub route Insert Cost : 893.2128742038135.

Sub Drone Route Inserted for Node #5.

Inserting Node : 18.

Drone Insert Cost : inf. Truck Insert Cost : 904.8222589344218. Sub route Insert Cost : 893.2128742038135.

Sub Drone Route Inserted for Node #18.

Inserting Node : 19.

Drone Insert Cost : 893.2128742038135. Truck Insert Cost : 896.639544165458. Sub route Insert Cost : inf.

Drone Node Inserted for Node #19.

Inserting Node : 12.

Drone Insert Cost : 893.2128742038135. Truck Insert Cost : 909.3972397642815. Sub route Insert Cost : inf.

Drone Node Inserted for Node #12.

Current Updated. Iteration Reset. Current Cost: 888.4859710911852

Inserting Node : 13.

Drone Insert Cost : 858.1336928197717. Truck Insert Cost : 874.0964644251238. Sub route Insert Cost : inf.

Drone Node Inserted for Node #13.

Inserting Node : 22.

Drone Insert Cost : inf. Truck Insert Cost : 861.4068445552856. Sub route Insert Cost : inf.Truck Node Inserted for Node #22.

Inserting Node : 1.

Drone Insert Cost : inf. Truck Insert Cost : 884.2555684968014. Sub route Insert Cost : inf.Truck Node Inserted for Node #1.

Inserting Node : 29.

Drone Insert Cost : inf. Truck Insert Cost : 888.4859710911852. Sub route Insert Cost : inf.Truck Node Inserted for Node #29.

Inserting Node : 4.

Drone Insert Cost : 888.4859710911852. Truck Insert Cost : 894.1546816190988. Sub route Insert Cost : inf.

Drone Node Inserted for Node #4.

Inserting Node : 27.

Drone Insert Cost : inf. Truck Insert Cost : 891.8668473177646. Sub route Insert Cost : 888.4859710911852.

Sub Drone Route Inserted for Node #27.

Inserting Node : 15.

Drone Insert Cost : inf. Truck Insert Cost : 912.40226537571. Sub route Insert Cost : 888.4859710911852.

Sub Drone Route Inserted for Node #15.

Current Updated. Iteration Reset. Current Cost: 884.573700408952

Inserting Node : 18.

Drone Insert Cost : 854.0025664003672. Truck Insert Cost : 865.6119511309755. Sub route Insert Cost : inf.

Drone Node Inserted for Node #18.

Inserting Node : 24.

Drone Insert Cost : inf. Truck Insert Cost : 861.7249764674362. Sub route Insert Cost : inf.Truck Node Inserted for Node #24.

Inserting Node : 1.

Drone Insert Cost : inf. Truck Insert Cost : 884.573700408952. Sub route Insert Cost : inf.

Truck Node Inserted for Node #1.

Inserting Node : 14.

Drone Insert Cost : inf. Truck Insert Cost : 887.8653819590505. Sub route Insert Cost : 884.573700408952.

Sub Drone Route Inserted for Node #14.

Inserting Node : 27.

Drone Insert Cost : 884.573700408952. Truck Insert Cost : 887.9545766355315. Sub route Insert Cost : inf.

Drone Node Inserted for Node #27.

Inserting Node : 4.

Drone Insert Cost : 884.573700408952. Truck Insert Cost : 890.2424109368657. Sub route Insert Cost : inf.

Drone Node Inserted for Node #4.

Inserting Node : 5.

Drone Insert Cost : inf. Truck Insert Cost : 889.29725811583. Sub route Insert Cost : 884.573700408952.

Sub Drone Route Inserted for Node #5.

Current Cost : 884.573700408952

Best Cost : 902.5558183441631

Best Updated.

Inserting Node : 4.

Drone Insert Cost : inf. Truck Insert Cost : 966.0983579340376. Sub route Insert Cost : inf.Truck Node Inserted for Node #4.

Inserting Node : 18.

Drone Insert Cost : 966.0983579340376. Truck Insert Cost : 969.4337378489371. Sub route Insert Cost : inf.

Drone Node Inserted for Node #18.

Inserting Node : 15.

Drone Insert Cost : inf. Truck Insert Cost : 1065.8453381532522. Sub route Insert Cost : inf.

Truck Node Inserted for Node #15.

Inserting Node : 27.

Drone Insert Cost : inf. Truck Insert Cost : 1069.2060222444761. Sub route Insert Cost : inf.

Truck Node Inserted for Node #27.

Inserting Node : 31.

Drone Insert Cost : 1069.2060222444761. Truck Insert Cost : 1074.92935136089. Sub route Insert Cost : inf.

Drone Node Inserted for Node #31.

Inserting Node : 18.

Drone Insert Cost : 1069.2060222444761. Truck Insert Cost : 1072.5414021593756. Sub route Insert Cost : inf.

Drone Node Inserted for Node #18.

Inserting Node : 13.

Drone Insert Cost : inf. Truck Insert Cost : 1110.3539743619174. Sub route Insert Cost : inf.

Truck Node Inserted for Node #13.

Inserting Node : 27.

Drone Insert Cost : inf. Truck Insert Cost : 1165.2769943049059. Sub route Insert Cost : inf.

Truck Node Inserted for Node #27.

LNS completed. Best solution cost: 884.573700408952

Instance = A-n32-k5

DTRC Cost = 902.5558183441631

LNS Cost = 884.573700408952

Edge Travelled: (29, 15), Distance : 19.65, Paylaod : 22, Depletion Percentage : 41.69, Remaining Battery : 58.31

Edge Travelled: (15, 22), Distance : 23.35, Paylaod : 0, Depletion Percentage : 42.36, Remaining Battery : 15.95

Edge Travelled: (9, 4), Distance : 33.84, Paylaod : 19, Depletion Percentage : 70.35, Remaining Battery : 29.65

Edge Travelled: (4, 28), Distance : 12.81, Paylaod : 0, Depletion Percentage : 23.24, Remaining Battery : 6.41

Edge Travelled: (24, 27), Distance : 8.06, Paylaod : 20, Depletion Percentage : 16.88, Remaining Battery : 83.12

Edge Travelled: (27, 20), Distance : 25.00, Paylaod : 0, Depletion Percentage : 45.36, Remaining Battery : 37.76

Edge Travelled: (21, 19), Distance : 12.08, Paylaod : 24, Depletion Percentage : 25.99, Remaining Battery : 74.01

Edge Travelled: (19, 17), Distance : 2.24, Paylaod : 0, Depletion Percentage : 4.06, Remaining Battery : 69.96

Edge Travelled: (2, 3), Distance : 3.16, Paylaod : 6, Depletion Percentage : 6.00, Remaining Battery : 94.00

Edge Travelled: (3, 23), Distance : 7.07, Paylaod : 0, Depletion Percentage : 12.83, Remaining Battery : 81.17

Edge Travelled: (26, 12), Distance : 18.25, Paylaod : 21, Depletion Percentage : 38.46, Remaining Battery : 61.54

Edge Travelled: (12, 1), Distance : 8.25, Paylaod : 0, Depletion Percentage : 14.96, Remaining Battery : 46.58

Edge Travelled: (7, 13), Distance : 14.00, Paylaod : 16, Depletion Percentage : 28.51, Remaining Battery : 71.49

Edge Travelled: (13, 6), Distance : 26.48, Paylaod : 0, Depletion Percentage : 48.04, Remaining Battery : 23.45

Edge Travelled: (16, 30), Distance : 9.49, Paylaod : 14, Depletion Percentage : 19.05, Remaining Battery : 80.95

Edge Travelled: (30, 0), Distance : 16.28, Paylaod : 0, Depletion Percentage : 29.54, Remaining Battery : 51.41

DTRC solution is Valid.

Edge Travelled: (22, 15), Distance : 23.35, Paylaod : 22, Depletion Percentage : 49.54, Remaining Battery : 50.46

Edge Travelled: (15, 9), Distance : 26.02, Paylaod : 0, Depletion Percentage : 47.21, Remaining Battery : 3.25

Edge Travelled: (8, 18), Distance : 9.43, Paylaod : 21, Depletion Percentage : 19.88, Remaining Battery : 80.12

Edge Travelled: (18, 18), Distance : 0.00, Paylaod : 20, Depletion Percentage : 0.00, Remaining Battery : 80.12

Edge Travelled: (18, 4), Distance : 25.71, Paylaod : 19, Depletion Percentage : 53.45, Remaining Battery : 26.67

Edge Travelled: (4, 11), Distance : 8.54, Paylaod : 0, Depletion Percentage : 15.50, Remaining Battery : 11.16

Edge Travelled: (24, 14), Distance : 3.00, Paylaod : 23, Depletion Percentage : 6.41, Remaining Battery : 93.59

Edge Travelled: (14, 27), Distance : 10.77, Paylaod : 20, Depletion Percentage : 22.55, Remaining Battery : 71.05

Edge Travelled: (27, 29), Distance : 37.01, Paylaod : 0, Depletion Percentage : 67.16, Remaining Battery : 3.89

Edge Travelled: (25, 5), Distance : 21.54, Paylaod : 7, Depletion Percentage : 41.15, Remaining Battery : 58.85

Edge Travelled: (5, 20), Distance : 21.38, Paylaod : 0, Depletion Percentage : 38.79, Remaining Battery : 20.06

Edge Travelled: (21, 31), Distance : 9.00, Paylaod : 33, Depletion Percentage : 20.53, Remaining Battery : 79.47

Edge Travelled: (31, 19), Distance : 5.39, Paylaod : 24, Depletion Percentage : 11.58, Remaining Battery : 67.88

Edge Travelled: (19, 17), Distance : 2.24, Paylaod : 0, Depletion Percentage : 4.06, Remaining Battery : 63.83

Edge Travelled: (2, 3), Distance : 3.16, Paylaod : 6, Depletion Percentage : 6.00, Remaining Battery : 94.00

Edge Travelled: (3, 23), Distance : 7.07, Paylaod : 0, Depletion Percentage : 12.83, Remaining Battery : 81.17

Edge Travelled: (7, 13), Distance : 14.00, Paylaod : 32, Depletion Percentage : 31.74, Remaining Battery : 68.26

Edge Travelled: (13, 13), Distance : 0.00, Paylaod : 16, Depletion Percentage : 0.00, Remaining Battery : 68.26

Edge Travelled: (13, 6), Distance : 26.48, Paylaod : 0, Depletion Percentage : 48.04, Remaining Battery : 20.22

Edge Travelled: (16, 12), Distance : 10.05, Paylaod : 35, Depletion Percentage : 23.23, Remaining Battery : 76.77

Edge Travelled: (12, 30), Distance : 15.26, Paylaod : 14, Depletion Percentage : 30.65, Remaining Battery : 46.12

Edge Travelled: (30, 0), Distance : 16.28, Paylaod : 0, Depletion Percentage : 29.54, Remaining Battery : 16.58

LNS solution is Valid.

Instance : A-n32-k5

DTRC Cost : 902.5558183441631

LNS Cost : 884.573700408952

Input Instance : A-n33-k5

-----Truck routes after Clarke-Wright Savings-----

Truck 1: [0, 12, 10, 17, 9, 3, 16, 0]

Truck 2: [0, 8, 7, 26, 5, 27, 25, 30, 0]

Truck 3: [0, 29, 31, 1, 21, 14, 19, 6, 11, 0]

Truck 4: [0, 2, 32, 13, 20, 4, 15, 0]

Truck 5: [0, 24, 18, 28, 23, 22, 0]

-----Final Truck routes-----

Truck 1: [0, 12, 17, 9, 16, 0]

Truck 2: [0, 8, 26, 5, 25, 30, 0]

Truck 3: [0, 29, 1, 21, 14, 19, 6, 11, 0]

Truck 4: [0, 2, 32, 13, 20, 15, 0]

Truck 5: [0, 24, 18, 28, 23, 0]

-----Drone routes-----

Truck 1 drones:

Drone 1: [[12, 10, 17], [9, 3, 16]]

Drone 2: []

Truck 2 drones:

Drone 1: [[8, 7, 26], [5, 27, 25]]

Drone 2: []

Truck 3 drones:

Drone 1: [[29, 31, 11]]

Drone 2: []

Truck 4 drones:

Drone 1: [[20, 4, 15]]

Drone 2: []

Truck 5 drones:

Drone 1: [[24, 22, 0]]

Drone 2: []

Only truck cost - 681.1856161798029

Truck 1 drone cost - 52.355529063703706

Truck 1 waiting cost - 0

Truck 2 waits 2.57 units at node 26 for drone 1

Truck 2 drone cost - 22.949169125648318

Truck 2 waiting cost - 2.5654236490922386

Truck 3 drone cost - 25.678856352455462

Truck 3 waiting cost - 0

Truck 4 drone cost - 30.348338503047316

Truck 4 waiting cost - 0

Truck 5 drone cost - 27.217941143675947

Truck 5 waiting cost - 0

Total drone cost - 158.54983418853072

Total waiting cost - 2.5654236490922386

Total Cost: 842.30

Delivery Cost: 508.72

Current Updated. Iteration Reset. Current Cost: 746.0997285981954

Inserting Node : 4.

Drone Insert Cost : 727.2127679678973. Truck Insert Cost : 732.4654155115625.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #4.

Inserting Node : 6.

Drone Insert Cost : inf. Truck Insert Cost : 734.4999062054492. Sub route Insert Cost : 727.2127679678973.

Sub Drone Route Inserted for Node #6.

Inserting Node : 30.

Drone Insert Cost : inf. Truck Insert Cost : 733.1390420294874. Sub route Insert Cost : inf.

Truck Node Inserted for Node #30.

Inserting Node : 14.

Drone Insert Cost : inf. Truck Insert Cost : 736.144551546504. Sub route Insert Cost : 733.1390420294874.

Sub Drone Route Inserted for Node #14.

Inserting Node : 32.

Drone Insert Cost : inf. Truck Insert Cost : 746.0997285981954. Sub route Insert Cost : inf.

Truck Node Inserted for Node #32.

Inserting Node : 22.

Drone Insert Cost : inf. Truck Insert Cost : 751.1367833600383. Sub route Insert Cost : 746.0997285981954.

Sub Drone Route Inserted for Node #22.

Inserting Node : 7.

Drone Insert Cost : inf. Truck Insert Cost : 758.778815966679. Sub route Insert Cost : 746.0997285981954.

Sub Drone Route Inserted for Node #7.

Current Updated. Iteration Reset. Current Cost: 743.5856932426699

Inserting Node : 6.

Drone Insert Cost : 685.2486832002254. Truck Insert Cost : 692.5358214377773.

Sub route Insert Cost : 685.2486832002254.

Drone Node Inserted for Node #6.

Inserting Node : 30.

Drone Insert Cost : inf. Truck Insert Cost : 691.1749572618155. Sub route Insert Cost : 685.2486832002254.

Sub Drone Route Inserted for Node #30.

Inserting Node : 11.

Drone Insert Cost : 685.2486832002254. Truck Insert Cost : 688.7435749924738.

Sub route Insert Cost : 685.2486832002254.

Drone Node Inserted for Node #11.

Inserting Node : 13.

Drone Insert Cost : inf. Truck Insert Cost : 735.5164605801956. Sub route Insert Cost : inf.

Truck Node Inserted for Node #13.

Inserting Node : 22.

Drone Insert Cost : inf. Truck Insert Cost : 740.8317572440534. Sub route Insert Cost : 735.5164605801956.

Sub Drone Route Inserted for Node #22.

Inserting Node : 31.

Drone Insert Cost : inf. Truck Insert Cost : 746.1137881419236. Sub route Insert Cost : 735.5164605801956.

Sub Drone Route Inserted for Node #31.

Inserting Node : 10.

Drone Insert Cost : inf. Truck Insert Cost : 743.5856932426699. Sub route Insert Cost : inf.

Truck Node Inserted for Node #10.

Current Cost : 743.5856932426699

Best Cost : 763.1856161798029

Best Updated.

Inserting Node : 31.

Drone Insert Cost : inf. Truck Insert Cost : 738.4568779346811. Sub route Insert Cost : inf.

Truck Node Inserted for Node #31.

Inserting Node : 30.

Drone Insert Cost : inf. Truck Insert Cost : 751.3203214736437. Sub route Insert Cost : inf.

Truck Node Inserted for Node #30.

Inserting Node : 9.

Drone Insert Cost : inf. Truck Insert Cost : 829.1229451185538. Sub route Insert Cost : inf.

Truck Node Inserted for Node #9.

Inserting Node : 19.

Drone Insert Cost : inf. Truck Insert Cost : 881.9779897863044. Sub route Insert Cost : inf.

Truck Node Inserted for Node #19.

Inserting Node : 3.

Drone Insert Cost : inf. Truck Insert Cost : 975.8845352052125. Sub route Insert Cost : inf.

Truck Node Inserted for Node #3.

Inserting Node : 14.

Drone Insert Cost : 975.8845352052125. Truck Insert Cost : 979.9157547470938.

Sub route Insert Cost : 975.8845352052125.

Drone Node Inserted for Node #14.

Inserting Node : 6.

Drone Insert Cost : inf. Truck Insert Cost : 1020.9450405285602. Sub route Insert Cost : inf.

Truck Node Inserted for Node #6.

LNS completed. Best solution cost: 743.5856932426699

Instance = A-n33-k5

DTRC Cost = 763.1856161798029

LNS Cost = 743.5856932426699

Edge Travelled: (12, 10), Distance : 16.64, Paylaod : 20, Depletion Percentage : 34.84, Remaining Battery : 65.16

Edge Travelled: (10, 17), Distance : 26.93, Paylaod : 0, Depletion Percentage

: 48.86, Remaining Battery : 16.31

Edge Travelled: (9, 3), Distance : 22.56, Paylaod : 14, Depletion Percentage : 45.31, Remaining Battery : 54.69

Edge Travelled: (3, 16), Distance : 6.40, Paylaod : 0, Depletion Percentage :

11.62, Remaining Battery : 43.07

Edge Travelled: (8, 7), Distance : 11.05, Paylaod : 19, Depletion Percentage : 22.96, Remaining Battery : 77.04

Edge Travelled: (7, 26), Distance : 10.30, Paylaod : 0, Depletion Percentage : 18.68, Remaining Battery : 58.36

Edge Travelled: (5, 27), Distance : 6.08, Paylaod : 23, Depletion Percentage : 12.99, Remaining Battery : 87.01

Edge Travelled: (27, 25), Distance : 1.00, Paylaod : 0, Depletion Percentage : 1.81, Remaining Battery : 85.19

Edge Travelled: (29, 31), Distance : 20.52, Paylaod : 24, Depletion Percentage : 44.13, Remaining Battery : 55.87

Edge Travelled: (31, 11), Distance : 15.00, Paylaod : 0, Depletion Percentage

: 27.22, Remaining Battery : 28.66

Edge Travelled: (20, 4), Distance : 13.45, Paylaod : 13, Depletion Percentage

: 26.83, Remaining Battery : 73.17

Edge Travelled: (4, 15), Distance : 29.07, Paylaod : 0, Depletion Percentage : 52.74, Remaining Battery : 20.43

Edge Travelled: (24, 22), Distance : 30.02, Paylaod : 19, Depletion Percentage : 62.41, Remaining Battery : 37.59

Edge Travelled: (22, 0), Distance : 7.81, Paylaod : 0, Depletion Percentage :

14.17, Remaining Battery : 23.42

DTRC solution is Valid.

Edge Travelled: (12, 30), Distance : 20.22, Paylaod : 20, Depletion Percentage : 42.33, Remaining Battery : 57.67

Edge Travelled: (30, 17), Distance : 31.26, Paylaod : 0, Depletion Percentage

: 56.71, Remaining Battery : 0.95

Edge Travelled: (9, 3), Distance : 22.56, Paylaod : 14, Depletion Percentage : 45.31, Remaining Battery : 54.69

Edge Travelled: (3, 16), Distance : 6.40, Paylaod : 0, Depletion Percentage :

11.62, Remaining Battery : 43.07

Edge Travelled: (8, 7), Distance : 11.05, Paylaod : 19, Depletion Percentage : 22.96, Remaining Battery : 77.04

Edge Travelled: (7, 26), Distance : 10.30, Paylaod : 0, Depletion Percentage : 18.68, Remaining Battery : 58.36

Edge Travelled: (5, 27), Distance : 6.08, Paylaod : 23, Depletion Percentage : 12.99, Remaining Battery : 87.01

Edge Travelled: (27, 25), Distance : 1.00, Paylaod : 0, Depletion Percentage : 1.81, Remaining Battery : 85.19

Edge Travelled: (29, 31), Distance : 20.52, Paylaod : 24, Depletion Percentage : 44.13, Remaining Battery : 55.87

Edge Travelled: (31, 1), Distance : 17.49, Paylaod : 0, Depletion Percentage : 31.74, Remaining Battery : 24.13

Edge Travelled: (21, 14), Distance : 1.00, Paylaod : 27, Depletion Percentage

: 2.19, Remaining Battery : 97.81

Edge Travelled: (14, 6), Distance : 25.71, Paylaod : 18, Depletion Percentage

: 53.09, Remaining Battery : 44.72

Edge Travelled: (6, 19), Distance : 16.76, Paylaod : 0, Depletion Percentage : 30.42, Remaining Battery : 14.30

Edge Travelled: (20, 4), Distance : 13.45, Paylaod : 26, Depletion Percentage

: 29.32, Remaining Battery : 70.68

Edge Travelled: (4, 4), Distance : 0.00, Paylaod : 13, Depletion Percentage :

0.00, Remaining Battery : 70.68

Edge Travelled: (4, 15), Distance : 29.07, Paylaod : 0, Depletion Percentage : 52.74, Remaining Battery : 17.93

Edge Travelled: (24, 6), Distance : 10.77, Paylaod : 23, Depletion Percentage

: 23.01, Remaining Battery : 76.99

Edge Travelled: (6, 11), Distance : 14.87, Paylaod : 5, Depletion Percentage : 27.99, Remaining Battery : 49.00

Edge Travelled: (11, 18), Distance : 7.81, Paylaod : 0, Depletion Percentage : 14.17, Remaining Battery : 34.83

Edge Travelled: (28, 22), Distance : 16.28, Paylaod : 19, Depletion Percentage : 33.84, Remaining Battery : 66.16

Edge Travelled: (22, 23), Distance : 11.18, Paylaod : 0, Depletion Percentage

: 20.29, Remaining Battery : 45.87

LNS solution is Valid.

Instance : A-n33-k5

DTRC Cost : 763.1856161798029

LNS Cost : 743.5856932426699

Input Instance : A-n34-k5

-----Truck routes after Clarke-Wright Savings-----

Truck 1: [0, 33, 2, 16, 22, 9, 12, 3, 21, 0]

Truck 2: [0, 32, 28, 31, 25, 17, 19, 11, 15, 0]

Truck 3: [0, 6, 8, 1, 23, 27, 0]

Truck 4: [0, 14, 7, 29, 24, 30, 5, 0]

Truck 5: [0, 10, 13, 18, 20, 4, 26, 0]

-----Final Truck routes-----

Truck 1: [0, 33, 2, 22, 9, 12, 3, 21, 0]

Truck 2: [0, 32, 28, 31, 17, 19, 15, 0]

Truck 3: [0, 6, 1, 23, 27, 0]

Truck 4: [0, 14, 7, 24, 30, 5, 0]

Truck 5: [0, 10, 18, 20, 4, 0]

-----Drone routes-----

Truck 1 drones:

Drone 1: [[33, 16, 22]]

Drone 2: []

Truck 2 drones:

Drone 1: [[32, 25, 17], [19, 11, 15]]

Drone 2: []

Truck 3 drones:

Drone 1: [[6, 8, 1]]

Drone 2: []

Truck 4 drones:

Drone 1: [[14, 29, 30]]

Drone 2: []

Truck 5 drones:

Drone 1: [[10, 13, 18], [20, 26, 0]]

Drone 2: []

Only truck cost - 780.7464287043372

Truck 1 drone cost - 21.094859537070974

Truck 1 waiting cost - 0

Truck 2 drone cost - 60.42652387723076

Truck 2 waiting cost - 0

Truck 3 drone cost - 16.57329521125078

Truck 3 waiting cost - 0

Truck 4 drone cost - 22.224622190406564

Truck 4 waiting cost - 0

Truck 5 drone cost - 54.03944160660604

Truck 5 waiting cost - 0

Total drone cost - 174.35874242256511

Total waiting cost - 0

Total Cost: 955.11

Delivery Cost: 538.33

Current Updated. Iteration Reset. Current Cost: 855.3777259074083

Inserting Node : 13.

Drone Insert Cost : 810.2696086228118. Truck Insert Cost : 816.5989546083741.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #13.

Inserting Node : 22.

Drone Insert Cost : inf. Truck Insert Cost : 814.8977292991408. Sub route Insert Cost : 810.2696086228118.

Sub Drone Route Inserted for Node #22.

Inserting Node : 31.

Drone Insert Cost : inf. Truck Insert Cost : 814.4588016251994. Sub route Insert Cost : 810.2696086228118.

Sub Drone Route Inserted for Node #31.

Inserting Node : 23.

Drone Insert Cost : inf. Truck Insert Cost : 826.213880532811. Sub route Insert Cost : inf.

Truck Node Inserted for Node #23.

Inserting Node : 2.

Drone Insert Cost : inf. Truck Insert Cost : 834.5193397261446. Sub route Insert Cost : inf.

Truck Node Inserted for Node #2.

Inserting Node : 3.

Drone Insert Cost : inf. Truck Insert Cost : 852.075057540244. Sub route Insert Cost : inf.

Truck Node Inserted for Node #3.

Inserting Node : 16.

Drone Insert Cost : inf. Truck Insert Cost : 861.4319409720637. Sub route Insert Cost : 852.075057540244.

Sub Drone Route Inserted for Node #16.

Inserting Node : 25.

Drone Insert Cost : inf. Truck Insert Cost : 855.3777259074083. Sub route Insert Cost : inf.

Truck Node Inserted for Node #25.

Current Updated. Iteration Reset. Current Cost: 837.43822115769

Inserting Node : 29.

Drone Insert Cost : 772.2741948056491. Truck Insert Cost : 779.6111280912589.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #29.

Inserting Node : 4.

Drone Insert Cost : inf. Truck Insert Cost : 825.6854373685597. Sub route Insert Cost : inf.

Truck Node Inserted for Node #4.

Inserting Node : 7.

Drone Insert Cost : 825.6854373685597. Truck Insert Cost : 829.8030305327122.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #7.

Inserting Node : 24.

Drone Insert Cost : inf. Truck Insert Cost : 831.5182530985572. Sub route Insert Cost : inf.

Truck Node Inserted for Node #24.

Inserting Node : 15.

Drone Insert Cost : inf. Truck Insert Cost : 837.43822115769. Sub route Insert Cost : inf.

Truck Node Inserted for Node #15.

Inserting Node : 31.

Drone Insert Cost : inf. Truck Insert Cost : 845.2535028631972. Sub route Insert Cost : 837.43822115769.

Sub Drone Route Inserted for Node #31.

Inserting Node : 11.

Drone Insert Cost : inf. Truck Insert Cost : 852.6663039421115. Sub route Insert Cost : 837.43822115769.

Sub Drone Route Inserted for Node #11.

Current Cost : 837.43822115769

Best Cost : 865.7464287043371

Best Updated.

Inserting Node : 26.

Drone Insert Cost : inf. Truck Insert Cost : 782.7425703959494. Sub route Insert Cost : inf.

Truck Node Inserted for Node #26.

Inserting Node : 24.

Drone Insert Cost : inf. Truck Insert Cost : 788.5753861259468. Sub route Insert Cost : inf.

Truck Node Inserted for Node #24.

Inserting Node : 32.

Drone Insert Cost : inf. Truck Insert Cost : 825.7271009408636. Sub route Insert Cost : inf.

Truck Node Inserted for Node #32.

Inserting Node : 3.

Drone Insert Cost : inf. Truck Insert Cost : 843.2828187549629. Sub route Insert Cost : inf.

Truck Node Inserted for Node #3.

Inserting Node : 31.

Drone Insert Cost : inf. Truck Insert Cost : 851.0981004604702. Sub route Insert Cost : 843.2828187549629.

Sub Drone Route Inserted for Node #31.

Inserting Node : 16.

Drone Insert Cost : inf. Truck Insert Cost : 852.6397021867826. Sub route Insert Cost : 843.2828187549629.

Sub Drone Route Inserted for Node #16.

Inserting Node : 13.

Drone Insert Cost : inf. Truck Insert Cost : 918.3938442642427. Sub route Insert Cost : inf.

Truck Node Inserted for Node #13.

LNS completed. Best solution cost: 837.43822115769

Instance = A-n34-k5

DTRC Cost = 865.7464287043371

LNS Cost = 837.43822115769

Input Instance : A-n36-k5

-----Truck routes after Clarke-Wright Savings-----

Truck 1: [0, 12, 31, 19, 4, 3, 6, 23, 14, 0]

Truck 2: [0, 15, 8, 35, 2, 34, 28, 9, 0]

Truck 3: [0, 21, 18, 33, 29, 30, 17, 13, 32, 22, 1, 0]

Truck 4: [0, 20, 5, 25, 27, 24, 11, 16, 0]

Truck 5: [0, 26, 7, 10, 0]

-----Final Truck routes-----

Truck 1: [0, 12, 31, 19, 4, 6, 23, 14, 0]

Truck 2: [0, 15, 8, 2, 34, 28, 9, 0]

Truck 3: [0, 21, 33, 29, 30, 17, 13, 32, 22, 1, 0]

Truck 4: [0, 20, 25, 27, 11, 16, 0]

Truck 5: [0, 26, 7, 0]

-----Drone routes-----

Truck 1 drones:

Drone 1: [[12, 3, 6]]

Drone 2: []

Truck 2 drones:

Drone 1: [[8, 35, 2]]

Drone 2: []

Truck 3 drones:

Drone 1: [[21, 18, 32]]

Drone 2: []

Truck 4 drones:

Drone 1: [[20, 5, 25], [27, 24, 11]]

Drone 2: []

Truck 5 drones:

Drone 1: [[26, 10, 0]]

Drone 2: []

Only truck cost - 796.4975469169239

Truck 1 drone cost - 13.091774010397344

Truck 1 waiting cost - 0

Truck 2 drone cost - 15.199326582148888

Truck 2 waiting cost - 0

Truck 3 drone cost - 10.432740427115679

Truck 3 waiting cost - 0

Truck 4 drone cost - 40.19158297333003

Truck 4 waiting cost - 0

Truck 5 drone cost - 13.47406836728532

Truck 5 waiting cost - 0

Total drone cost - 92.38949236027727

Total waiting cost - 0

Total Cost: 888.89

Delivery Cost: 506.53

Current Updated. Iteration Reset. Current Cost: 851.5670126175348

Inserting Node : 10.

Drone Insert Cost : inf. Truck Insert Cost : 842.3552311885474. Sub route Insert Cost : inf.

Truck Node Inserted for Node #10.

Inserting Node : 17.

Drone Insert Cost : inf. Truck Insert Cost : 851.502339735641. Sub route Insert Cost : 842.3552311885474.

Sub Drone Route Inserted for Node #17.

Inserting Node : 1.

Drone Insert Cost : inf. Truck Insert Cost : 851.5670126175348. Sub route Insert Cost : inf.

Truck Node Inserted for Node #1.

Inserting Node : 33.

Drone Insert Cost : 851.5670126175348. Truck Insert Cost : 874.3274051520154.

Sub route Insert Cost : 851.5670126175348.

Drone Node Inserted for Node #33.

Inserting Node : 30.

Drone Insert Cost : 851.5670126175348. Truck Insert Cost : 862.7708393851351.

Sub route Insert Cost : 851.5670126175348.

Drone Node Inserted for Node #30.

Inserting Node : 29.

Drone Insert Cost : 851.5670126175348. Truck Insert Cost : 873.6945606146055.

Sub route Insert Cost : 851.5670126175348.

Drone Node Inserted for Node #29.

Inserting Node : 31.

Drone Insert Cost : inf. Truck Insert Cost : 855.2309531772689. Sub route Insert Cost : 851.5670126175348.

Sub Drone Route Inserted for Node #31.

Inserting Node : 18.

Drone Insert Cost : inf. Truck Insert Cost : 857.7387483318735. Sub route Insert Cost : 851.5670126175348.

Sub Drone Route Inserted for Node #18.

Current Updated. Iteration Reset. Current Cost: 833.7681652966451

Inserting Node : 35.

Drone Insert Cost : 819.010436957117. Truck Insert Cost : 822.83576086933. Sub route Insert Cost : inf.

Drone Node Inserted for Node #35.

Inserting Node : 34.

Drone Insert Cost : inf. Truck Insert Cost : 823.7747724988926. Sub route Insert Cost : 819.010436957117.

Sub Drone Route Inserted for Node #34.

Inserting Node : 11.

Drone Insert Cost : inf. Truck Insert Cost : 822.1939649818299. Sub route Insert Cost : 819.010436957117.

Sub Drone Route Inserted for Node #11.

Inserting Node : 7.

Drone Insert Cost : inf. Truck Insert Cost : 830.010436957117. Sub route Insert Cost : inf.

Truck Node Inserted for Node #7.

Inserting Node : 16.

Drone Insert Cost : 830.010436957117. Truck Insert Cost : 845.0032844804098. Sub route Insert Cost : inf.

Drone Node Inserted for Node #16.

Inserting Node : 3.

Drone Insert Cost : inf. Truck Insert Cost : 855.8685655410393. Sub route Insert Cost : 830.010436957117.

Sub Drone Route Inserted for Node #3.

Inserting Node : 24.

Drone Insert Cost : 830.010436957117. Truck Insert Cost : 838.1096132958186. Sub route Insert Cost : inf.

Drone Node Inserted for Node #24.

Inserting Node : 5.

Drone Insert Cost : inf. Truck Insert Cost : 833.7681652966451. Sub route Insert Cost : inf.

Truck Node Inserted for Node #5.

Current Cost : 833.7681652966451

Best Cost : 889.4975469169242

Best Updated.

Inserting Node : 34.

Drone Insert Cost : inf. Truck Insert Cost : 825.2966053880502. Sub route Insert Cost : 822.258635387353.

Sub Drone Route Inserted for Node #34.

Inserting Node : 16.

Drone Insert Cost : inf. Truck Insert Cost : 829.6523416954426. Sub route Insert Cost : inf.

Truck Node Inserted for Node #16.

Inserting Node : 10.

Drone Insert Cost : inf. Truck Insert Cost : 832.6587937122854. Sub route Insert Cost : inf.

Truck Node Inserted for Node #10.

Inserting Node : 12.

Drone Insert Cost : inf. Truck Insert Cost : 837.4041432652066. Sub route Insert Cost : inf.

Truck Node Inserted for Node #12.

Inserting Node : 5.

Drone Insert Cost : inf. Truck Insert Cost : 841.1618716047346. Sub route Insert Cost : inf.

Truck Node Inserted for Node #5.

Inserting Node : 10.

Drone Insert Cost : inf. Truck Insert Cost : 864.1618716047346. Sub route Insert Cost : inf.

Truck Node Inserted for Node #10.

Inserting Node : 29.

Drone Insert Cost : inf. Truck Insert Cost : 927.0955914244065. Sub route Insert Cost : inf.

Truck Node Inserted for Node #29.

Inserting Node : 11.

Drone Insert Cost : inf. Truck Insert Cost : 930.2371872813957. Sub route Insert Cost : 927.0955914244065.

Sub Drone Route Inserted for Node #11.

Inserting Node : 3.

Drone Insert Cost : inf. Truck Insert Cost : 1060.4584026591183. Sub route Insert Cost : inf.

Truck Node Inserted for Node #3.

Inserting Node : 35.

Drone Insert Cost : inf. Truck Insert Cost : 1111.6946494077692. Sub route Insert Cost : inf.

Truck Node Inserted for Node #35.

LNS completed. Best solution cost: 833.7681652966451

Instance = A-n36-k5

DTRC Cost = 889.4975469169242

LNS Cost = 833.7681652966451

Input Instance : A-n37-k5

-----Truck routes after Clarke-Wright Savings-----

Truck 1: [0, 23, 14, 2, 19, 20, 11, 27, 8, 9, 24, 3, 0]

Truck 2: [0, 17, 12, 10, 6, 5, 33, 13, 7, 0]

Truck 3: [0, 29, 32, 28, 31, 18, 35, 25, 30, 26, 34, 0]

Truck 4: [0, 16, 1, 22, 4, 36, 15, 0]

Truck 5: [0, 21, 0]

-----Final Truck routes-----

Truck 1: [0, 23, 14, 2, 19, 20, 11, 27, 9, 24, 0]

Truck 2: [0, 17, 10, 6, 5, 33, 7, 0]

Truck 3: [0, 29, 28, 31, 18, 35, 25, 26, 34, 0]

Truck 4: [0, 16, 1, 4, 36, 15, 0]

Truck 5: [0, 21, 0]

-----Drone routes-----

Truck 1 drones:

Drone 1: [[23, 8, 9], [24, 3, 0]]

Drone 2: []

Truck 2 drones:

Drone 1: [[17, 12, 10], [5, 13, 7]]

Drone 2: []

Truck 3 drones:

Drone 1: [[29, 32, 28], [31, 30, 26]]

Drone 2: []

Truck 4 drones:

Drone 1: [[16, 22, 0]]

Drone 2: []

Truck 5 drones:

Drone 1: []

Drone 2: []

Only truck cost - 703.2479160905071

Truck 1 drone cost - 63.93153857245084

Truck 1 waiting cost - 0

Truck 2 drone cost - 50.617708452384974

Truck 2 waiting cost - 0

Truck 3 drone cost - 33.32531381677077

Truck 3 waiting cost - 0

Truck 4 drone cost - 28.272297539908884

Truck 4 waiting cost - 0

Truck 5 drone cost - 0

Truck 5 waiting cost - 0

Total drone cost - 176.14685838151547

Total waiting cost - 0

Total Cost: 879.39

Delivery Cost: 658.60

Current Updated. Iteration Reset. Current Cost: 794.914679997327

Inserting Node : 22.

Drone Insert Cost : 660.9711327869302. Truck Insert Cost : 668.3229900066534.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #22.

Inserting Node : 6.

Drone Insert Cost : inf. Truck Insert Cost : 697.5459957448704. Sub route Insert Cost : inf.

Truck Node Inserted for Node #6.

Inserting Node : 25.

Drone Insert Cost : inf. Truck Insert Cost : 729.2547536398416. Sub route Insert Cost : 697.5459957448704.

Sub Drone Route Inserted for Node #25.

Inserting Node : 19.

Drone Insert Cost : inf. Truck Insert Cost : 701.8994262339338. Sub route Insert Cost : 697.5459957448704.

Sub Drone Route Inserted for Node #19.

Inserting Node : 4.

Drone Insert Cost : inf. Truck Insert Cost : 721.7421928454695. Sub route Insert Cost : inf.

Truck Node Inserted for Node #4.

Inserting Node : 33.

Drone Insert Cost : inf. Truck Insert Cost : 727.5293034758524. Sub route Insert Cost : inf.

Truck Node Inserted for Node #33.

Inserting Node : 10.

Drone Insert Cost : inf. Truck Insert Cost : 731.0962636822102. Sub route Insert Cost : inf.

Truck Node Inserted for Node #10.

Inserting Node : 3.

Drone Insert Cost : inf. Truck Insert Cost : 735.0135320063163. Sub route Insert Cost : 731.0962636822102.

Sub Drone Route Inserted for Node #3.

Inserting Node : 12.

Drone Insert Cost : inf. Truck Insert Cost : 794.914679997327. Sub route Insert Cost : inf.

Truck Node Inserted for Node #12.

Current Updated. Iteration Reset. Current Cost: 738.8960486126488

Inserting Node : 3.

Drone Insert Cost : 727.4282010572493. Truck Insert Cost : 731.349117976488. Sub route Insert Cost : 727.4282010572493.

Drone Node Inserted for Node #3.

Inserting Node : 11.

Drone Insert Cost : inf. Truck Insert Cost : 739.4065628530071. Sub route Insert Cost : 727.4282010572493.

Sub Drone Route Inserted for Node #11.

Inserting Node : 14.

Drone Insert Cost : 727.4282010572493. Truck Insert Cost : 735.4282595703074.

Sub route Insert Cost : 727.4282010572493.

Drone Node Inserted for Node #14.

Inserting Node : 23.

Drone Insert Cost : 727.4282010572493. Truck Insert Cost : 737.8776895078244.

Sub route Insert Cost : 727.4282010572493.

Drone Node Inserted for Node #23.

Inserting Node : 24.

Drone Insert Cost : 727.4282010572493. Truck Insert Cost : 730.4474247985498.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #24.

Inserting Node : 1.

Drone Insert Cost : inf. Truck Insert Cost : 730.5060217741117. Sub route Insert Cost : 727.4282010572493.

Sub Drone Route Inserted for Node #1.

Inserting Node : 8.

Drone Insert Cost : inf. Truck Insert Cost : 738.8960486126488. Sub route Insert Cost : inf.

Truck Node Inserted for Node #8.

Inserting Node : 30.

Drone Insert Cost : inf. Truck Insert Cost : 747.5082795745221. Sub route Insert Cost : 738.8960486126488.

Sub Drone Route Inserted for Node #30.

Current Updated. Iteration Reset. Current Cost: 734.1995521590014

Inserting Node : 3.

Drone Insert Cost : 716.9445939732192. Truck Insert Cost : 720.8655108924578.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #3.

Inserting Node : 1.

Drone Insert Cost : 716.9445939732192. Truck Insert Cost : 720.0224146900815.

Sub route Insert Cost : 716.9445939732192.

Drone Node Inserted for Node #1.

Inserting Node : 28.

Drone Insert Cost : 716.9445939732192. Truck Insert Cost : 721.6410904268665.

Sub route Insert Cost : 716.9445939732192.

Drone Node Inserted for Node #28.

Inserting Node : 33.

Drone Insert Cost : inf. Truck Insert Cost : 722.7317046036022. Sub route Insert Cost : inf.

Truck Node Inserted for Node #33.

Inserting Node : 8.

Drone Insert Cost : inf. Truck Insert Cost : 734.1995521590014. Sub route Insert Cost : inf.

Truck Node Inserted for Node #8.

Inserting Node : 25.

Drone Insert Cost : inf. Truck Insert Cost : 765.9083100539727. Sub route Insert Cost : 734.1995521590014.

Sub Drone Route Inserted for Node #25.

Inserting Node : 32.

Drone Insert Cost : inf. Truck Insert Cost : 738.6048291937126. Sub route Insert Cost : 734.1995521590014.

Sub Drone Route Inserted for Node #32.

Inserting Node : 14.

Drone Insert Cost : 734.1995521590014. Truck Insert Cost : 742.1996106720595.

Sub route Insert Cost : 734.1995521590014.

Drone Node Inserted for Node #14.

Inserting Node : 3.

Drone Insert Cost : 734.1995521590014. Truck Insert Cost : 738.12046907824. Sub route Insert Cost : inf.

Drone Node Inserted for Node #3.

Current Cost : 734.1995521590014

Best Cost : 797.247916090507

Best Updated.

Inserting Node : 11.

Drone Insert Cost : inf. Truck Insert Cost : 800.5231479537271. Sub route Insert Cost : inf.

Truck Node Inserted for Node #11.

Inserting Node : 28.

Drone Insert Cost : 800.5231479537271. Truck Insert Cost : 805.2196444073744.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #28.

Inserting Node : 17.

Drone Insert Cost : 800.5231479537271. Truck Insert Cost : 805.5203690986882.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #17.

Inserting Node : 30.

Drone Insert Cost : inf. Truck Insert Cost : 832.4996866297389. Sub route Insert Cost : inf.

Truck Node Inserted for Node #30.

Inserting Node : 22.

Drone Insert Cost : 832.4996866297389. Truck Insert Cost : 842.9219646090743.

Sub route Insert Cost : 832.4996866297389.

Drone Node Inserted for Node #22.

Inserting Node : 24.

Drone Insert Cost : 832.4996866297389. Truck Insert Cost : 835.5189103710392.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #24.

Inserting Node : 23.

Drone Insert Cost : 832.4996866297389. Truck Insert Cost : 840.1911223661942.

Sub route Insert Cost : inf.

Drone Node Inserted for Node #23.

Inserting Node : 1.

Drone Insert Cost : inf. Truck Insert Cost : 838.1663930667406. Sub route Insert Cost : inf.

Truck Node Inserted for Node #1.

LNS completed. Best solution cost: 734.1995521590014

Instance = A-n37-k5

DTRC Cost = 797.247916090507

LNS Cost = 734.1995521590014