**BCSS with 6 BCSs and 44 BSSs**

**TABLE I Data of BSSs and BCSs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Vertex | Location | | Battery demand | Unloading time (min) | Time  window |
| X (km) | Y (km) |
| 1 | 5 | 68 | 10 | 8 | [3:30,7:00] |
| 2 | 15 | 76 | 10 | 8 |
| 3 | 26 | 72 | 10 | 8 |
| 4 | 8 | 53 | 10 | 8 |
| 5 | 22 | 48 | 10 | 8 |
| 6 | 31 | 53 | 10 | 8 |
| 7 | 35 | 62 | 10 | 8 |
| 8 | 39 | 70 | 10 | 8 |
| 9 | 12 | 32 | 10 | 8 |
| 10 | 10 | 8 | 10 | 8 |
| 11 | 8 | 22 | 10 | 8 |
| 12 | 18 | 39 | 10 | 8 |
| 13 | 22 | 10 | 10 | 8 |
| 14 | 30 | 35 | 10 | 8 |
| 15 | 32 | 26 | 10 | 8 |
| 16 | 32 | 9 | 10 | 8 |
| 17 | 38 | 45 | 10 | 8 |
| 18 | 44 | 33 | 10 | 8 |
| 19 | 44 | 56 | 10 | 8 |
| 20 | 52 | 65 | 10 | 8 |
| 21 | 57 | 56 | 10 | 8 |
| 22 | 59 | 38 | 10 | 8 |
| 23 | 66 | 45 | 10 | 8 |
| 24 | 62 | 74 | 10 | 8 |
| 25 | 67 | 58 | 10 | 8 |
| 26 | 75 | 48 | 10 | 8 |
| 27 | 73 | 76 | 10 | 8 |
| 28 | 84 | 55 | 10 | 8 |
| 29 | 87 | 75 | 10 | 8 |
| 30 | 92 | 66 | 10 | 8 |
| 31 | 73 | 39 | 10 | 8 |
| 32 | 74 | 30 | 10 | 8 |
| 33 | 85 | 43 | 10 | 8 |
| 34 | 95 | 47 | 10 | 8 |
| 35 | 95 | 34 | 10 | 8 |
| 36 | 97 | 20 | 10 | 8 |
| 37 | 84 | 19 | 10 | 8 |
| 38 | 43 | 20 | 10 | 8 |
| 39 | 55 | 25 | 10 | 8 |
| 40 | 45 | 8 | 10 | 8 |
| 41 | 72 | 7 | 10 | 8 |
| 42 | 68 | 20 | 10 | 8 |
| 43 | 76 | 15 | 10 | 8 |
| 44 | 87 | 7 | 10 | 8 |
| 45 | 18 | 63 | / | / | / |
| 46 | 20 | 20 | / | / | / |
| 47 | 50 | 42 | / | / | / |
| 48 | 75 | 67 | / | / | / |
| 49 | 85 | 32 | / | / | / |
| 50 | 60 | 10 | / | / | / |