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MIP & BIP HW Answers

Prob 1

1. Jill’s classic optimization problem is the knapsack problem
2. Formulation handwritten and attached separately. Will be turned in during office hours.
3. Python program attached separately
4. The optimal purchase decision is to purchase tool sets 6,7,12, 13,14,15,16,17,18,19, and 27; this purchase combination makes the most sense because it offers the cheapest overall price to get all the needed tools at a total cost of $491.

Prob 2

1. Formulation handwritten and attached separately. Will be turned in during office hours.
2. The minimum possible sum of mine acquisition plus first year costs is $120,757,042.
3. The mines that should be purchased are: 0, 1, 3, 4, 5, 7, 8, 9 and 12
4. The mines that should serve each plant:

Mine 0 should serve plant 0

Mine 1 should serve plant 1

Mine 1 should serve plant 2

Mine 3 should serve plant 3

Mine 4 should serve plant 4

Mine 5 should serve plant 5

Mine 7 should serve plant 6

Mine 7 should serve plant 7

Mine 8 should serve plant 8

Mine 4 should serve plant 9

Mine 1 should serve plant 10

Mine 12 should serve plant 11

Mine 12 should serve plant 12

Mine 9 should serve plant 13

Mine 9 should serve plant 14

1. The optimal purchase decision is whats listed above. This situation makes sense to pursue economically because these mines offer the cheapest combination of costs of service to their respective plants.