ASSIGNMENT 5 – Problem 4 Utility — SUHANI ARORA

Rocky : 2km/hr = 30min/km

Sandy : 3km/hr = 20min/km

Smooth : 5km/hr = 12min/km

PART 1 : Expected Time for each Route

R1 (5km):

20% Sandy → 5 × 20 × 0.2 = 20 min
30% Smooth → 5 × 12 × 0.3 = 18 min
50% Rocky → 5 × 30 × 0.5 = 75 min
→ R1 sum = 113 minutes

R2 (7km):

40% Sandy → 7 × 20 × 0.4 = 56 min
20% Smooth → 7 × 12 × 0.2 = 16.8 min
40% Rocky → 7 × 30 × 0.4 = 84 min
→ R2 sum = 156.8 minutes

R3 (6km):

50% Sandy → 6 × 20 × 0.5 = 60 min
40% Smooth → 6 × 12 × 0.4 = 28.8 min
10% Rocky → 6 × 30 × 0.1 = 18 min
→ R3 sum = 106.8 minutes

ROUTE 3

PART 2 : R1 + crater ; R3 + bridge

R1 (70% −20min ; 30% +15min) ⇒ (0.7 × (−20)) + (0.3 × 15) = −9.5 min

⇒ 113 − 9.5 = **103.5 min** **ROUTE 1**

R3 (60% +40 min) ⇒ (0.6 × 40) = 24 min

⇒ 106.8 + 24 = **130.8 min**

PART 3 : satellite confirmed R2 not rocky

67% Sandy : 7 × 20 × 0.67 = 93.8 min
33% Smooth : 7 × 12 × 0.33 = 27.7 min
→ R2 Total = **121.5 min**

PART 4: probability that satellite will tell us this → P(R2 not rocky) = **60% chance**

PART 5: if R2 is rocky, we should take the **new R1 ⇒ 103.5 min**

PART 6: should we wait? **no**

⇒ 60% Not Rocky of (121.5 min) + 40% Rocky of R1-best route 103.5

⇒ (0.6 × 121.5) + (0.4 × 103.5) = 114.3 min

⇒ 114.3 > 103.5 ; so we should not wait for the satellite, and just take Route 1.