A diagram of a diagram

AI-generated content may be incorrect.Q1.) The minimal cuts that separate node **A** from node **B** are:

* **Minimal cut with 2 edges**: **{C → F, E → B}**
* **Minimal cut with 3 edges**: **{A → C, D → F, E → B}**

The **minimum cut** (the smallest possible cut) is **{C → F, E → B}**, as removing these two edges disconnects A from B with the least number of edges.

* (Refer to Assignment Index for answer explanation and calculation breakdown)

A diagram of a network

AI-generated content may be incorrect.Q2.) The probability that the attacker reaches the **target node** is **0.554** (rounded to three decimal places). This was calculated by considering the probabilities of three independent paths leading to the target and applying the **union rule**:  
  
P(Target)=1−(1−0.0896)(1−0.448)(1−0.112)=0.554P(Target)=1−(1−0.0896)(1−0.448)(1−0.112)=0.554

Working:

P1​=0.2×0.7×0.8×0.8=0.0896

P2​=0.7×0.8×0.8=0.448

P3​=0.7×0.8×0.2=0.112

P(Target)=1−(1−P1​)(1−P2​)(1−P3​) 🡪 P(Target)=1−(1−0.0896)(1−0.448)(1−0.112)

Therefore, P(Target)=1−(1−0.0896)(1−0.448)(1−0.112)=0.554.

* (Refer to Assignment Index for answer explanation and calculation breakdown)

Q3.)

The cost function **Cost(S) = max(S)** satisfies the given properties:

1. **Monotonicity:** If S1⊆S2S1​⊆S2​, then max⁡(S1)≤max⁡(S2)max(S1​)≤max(S2​) because all elements of S1S1​ are in S2S2​.
2. **Subadditivity:** max⁡(S1∪S2)≤max⁡(S1)+max⁡(S2)max(S1​∪S2​)≤max(S1​)+max(S2​) since the maximum of a union cannot exceed the sum of individual maximums.

Thus, the function meets the required conditions.

* (Refer to Assignment Index for answer explanation and calculation breakdown)