Question 1:

The correct answer is b. Reverse order of decision and chance nodes.

This technique involves calculating the Expected Value of Perfect Information (EVPI) by first considering the outcomes of chance nodes before making any decisions. This approach helps in understanding the best possible decisions by evaluating the potential outcomes and their probabilities, thereby optimizing the decision-making process under uncertainty.

Question 2:

False.

The Expected Value of Sample Information (EVSI) cannot be larger than the Expected Value of Perfect Information (EVPI). This is because perfect information removes all uncertainty about the state of nature, providing the maximum possible benefit, while sample information only partially reduces uncertainty, thus offering less potential value.

Question 3:

The correct answer is c. A combination of two or more lotteries.

A compound lottery is a scenario where the outcome of one lottery determines the play of another lottery, essentially creating a sequence of lotteries where the probabilities of outcomes are determined by the combination of these individual lotteries. This concept is often used in decision theory to analyze decisions under uncertainty, where the overall risk and reward are affected by multiple stages of random outcomes.

Question 4:

The correct answer is a. The preferences regarding car choice are not independent.

This is because the person's choice of car (Porsche vs. Land Rover) is directly influenced by their choice of home location (Kruununhaka vs. Lemmenjoki). The preference for one option (the car) changes based on the selection of another option (the home location), indicating that the preferences are interdependent rather than being made in isolation.

Question 5:

The correct answer is b. They prefer going to Bali to going to prison.

This follows from the transitivity property of rational preferences, which states that if a person strictly prefers option A (going to Bali) over option B (staying at home), and prefers option B over option C (going to prison), then they must also prefer option A over option C. Thus, the decision maker would prefer going to Bali over going to prison.

Question 6:

The probability of testing positive for the disease, using the total probability rule, is 0.0492. This calculation takes into account both the probability of those with the disease testing positive and the probability of those without the disease also testing positive.

```
# Given probabilities
p_disease = 0.04  # Probability of having the disease
p_positive_given_disease = 0.99  # Probability of testing positive given having the disease
p_positive_given_no_disease = 0.01  # Probability of testing positive given not having the disease
# Probability of not having the disease
p_no_disease = 1 - p_disease
# Total probability of testing positive
p_positive = (p_positive_given_disease * p_disease) + (p_positive_given_no_disease * p_no_disease)
=======
p_positive
0.0492
```

Question 7:

True.

In the betting approach for eliciting probabilities, the outcomes of the lotteries are indeed adjusted until the respondent is indifferent between the choices. This method is used to determine the individual's subjective probabilities for uncertain events by finding the point at which they are equally willing to opt for either of two gambles, implying a balance in their perceived value or risk.

Question 8:

a. A and B are efficient alternatives.

Given the person's objectives of minimizing price and maximizing performance, alternatives A (cheap and poor in performance) and B (expensive and high in performance) can be considered efficient because each offers a trade-off between the two objectives that the other does not. Alternative C, being expensive and poor in performance, does not offer any advantage on either objective, making it an inefficient choice compared to A and B.

Question 9:

The person's expected utility over the lottery, given their utility function $u(x) = \sqrt{x}$, is approximately 2.4. This value represents the weighted average of the utility of each outcome, based on their probabilities. [>-]

```
probability_4 = 0.6  # Probability of winning 4€
probability_9 = 0.4  # Probability of winning 9€
utility_4 = (4)**0.5  # Utility of winning 4€
utility_9 = (9)**0.5  # Utility of winning 9€
# Expected utility calculation
expected_utility = (probability_4 * utility_4) + (probability_9 * utility_9)
=================
expected_utility = 2.4000000000000004
```

Question 10:

b. Availability

This bias occurs when a person overestimates the likelihood of events based on their availability in memory, which is often influenced by recent exposure or emotional impact. In this scenario, reading about airplane crashes in the news makes those events more readily retrievable from memory, leading the person to judge such crashes as more likely than they statistically are.

Question 11:

True.

The SWING weighting method involves comparing the importance of attributes by considering their impact relative to an artificial 'worst' alternative. Decision-makers are asked to evaluate how much they value improvements from the worst case scenario across different criteria, thereby establishing the weights through a process of sequential rating, indicating the relative importance of each attribute.