

Name: .....

Student identification number: .....

**Group A**

This exam consists of 11 pages with ten questions and one answer sheet. It is not allowed to open the binding. Please do not forget to enter your name and student identification number above. For each of the ten questions you can choose between six different answers, of which only **one** is correct. For each correct answer you will receive one point. If more than one answer to a question is marked, the answer will be considered as incorrect. For an incorrect answer or no answer to a question you will receive no points. If you have at least five correct answers, you will pass the examination.

**Only the answer box below is used as the basis for grading.** The numbered columns in the answer box on this page correspond to the numbered exam questions. Each row, characterized by letters a-f, represents an alternative answer to the respective exam question. Please mark your answers carefully by completely filling in the corresponding circle. If corrections are necessary, please indicate them clearly on this answer sheet.

Admitted Aids: Non-programmable pocket calculator;  
Dictionary without handwritten notes.

<b>Answer box</b>										
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>a</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>f</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Question 1:

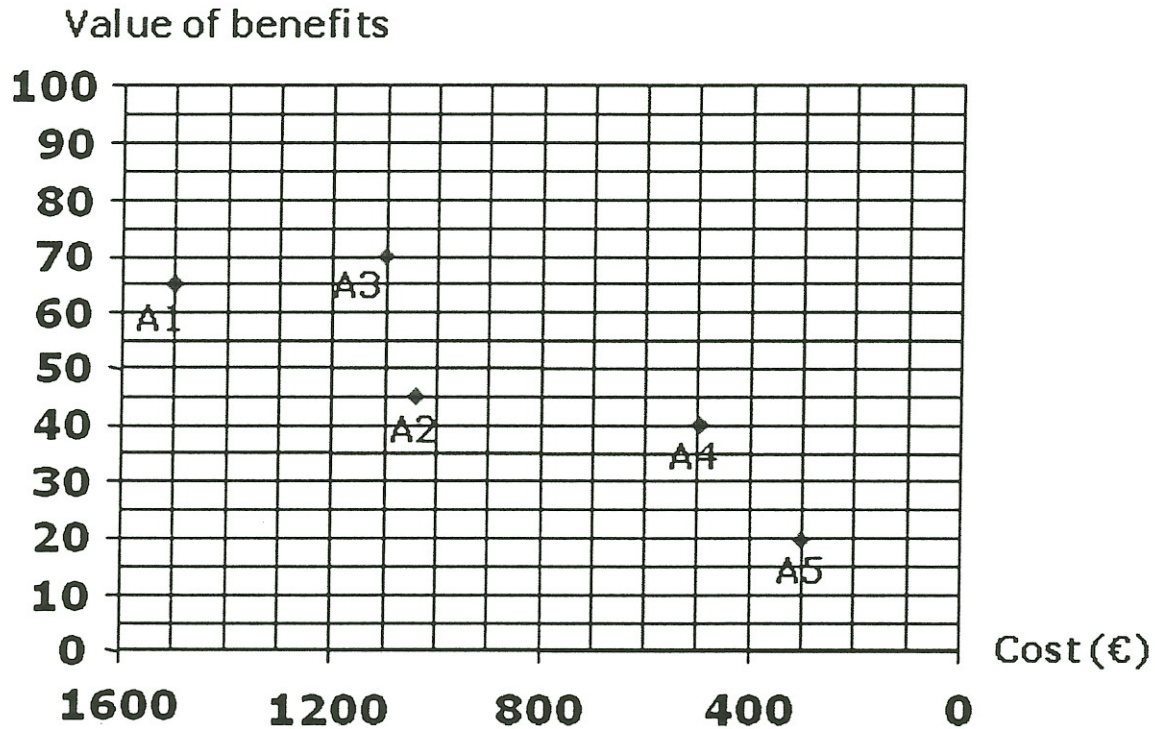
As a participant of an inquiry concerning the influence of travel time and passenger classes on the choice among different airlines, Joe answers: "In general, I prefer airlines that offer a First Class. In comparing two airlines that offer First Class, I choose the one that is at least as fast as the other one."

Which statement referring to preferences is correct?

- a) The preference statement is complete but not transitive.
- b) The preference statement reveals continuous indifference curves in the Passenger Class / Speed - room.
- c) The preference statement is incomplete but transitive.
- d) The preference statement is incomplete and not transitive.
- e)  $a \succ b$  stands for: a "is greater than" b.
- f) The stated preferences are rational.

## Question 2:

Lu Simeone has to decide on the new private school for his two sons. He evaluated all possible alternatives and applied the SMART-method to aggregate all benefit attributes. The following graph contrasts benefits and costs for the five remaining alternatives.



Which statement referring to the graphical representation is correct?

- A5 is the optimal choice if the weight on costs is close to zero.
- There are exactly two alternatives that do not survive the elimination of dominated alternatives.
- A2 will never be chosen, if Lu's preferences are linear.
- With a willingness to pay of 25€ per benefit point Lu would be indifferent between A3 and A4.
- If Alternatives can be linearly combined, alternatives 1, 2 and 5 are dominated by A3 and A4.
- If total benefits and costs are perfect complements A1 & A2 will never be chosen.

### Question 3:

Mr. Fuji is in search of the optimal office location for his business. In the following table he gathered the necessary information on all relevant attributes and the scored performance of the remaining three alternatives A, B and C, which survived the application of the dominance criterion.

Attributes	Alternatives		
	A	B	C
<i>Closeness to Customers</i>	100	80	60
<i>Visibility</i>	60	70	100
<i>Image</i>	100	60	40

Unfortunately, Mr. Fuji is only able to state the rank order of the attributes but not the relative weights for them: *Visibility* is the most important and *Closeness to Customers* the least important attribute.

He applies the Rank Order Centroid (ROC) Weights of the SMARTER-method. Which of the following statements is not correct?

- a) Rank Order Centroid (ROC) Weights can be determined for each possible number of criteria.
- b) Alternative A is the optimal choice.
- c) If the SMART method could be applied, then the resulting decision would be at least as good for Mr. Fuji as the decision with the SMARTER-method.
- d) Alternative C is the optimal choice.
- e) If you only have two attributes the more important one receives an artificial weight of 75%.
- f) The SMARTER-method does not take into consideration, that some attributes might be equally important.

#### Question 4:

Mr. Mijagi is also in search of the optimal office location for his business. In the following table he gathered the necessary information on all relevant attributes, their importance and the scored performance of the remaining three alternatives A, B and C. Mr. Mijagi decided to apply the SMART-method.

Attributes	Weights	Alternatives		
		A	B	C
<i>Closeness to Customers</i>	<b>32</b>	100	80	60
<i>Visibility</i>	<b>26</b>	60	70	100
<i>Image</i>	<b>23</b>	100	0	20
<i>Size</i>	<b>10</b>	75	0	50
<i>Comfort</i>	<b>6</b>	0	10	50
<i>Car Parking</i>	<b>3</b>	90	100	80
<b>Costs</b>		<b>0</b>	<b>100</b>	<b>95</b>

Unfortunately, he is uncertain about the relative weight on costs  $\omega_c$ . Determine the interval of relative weights on costs where alternative C will be the optimal choice.

Which of the following statements is correct?

- a)  $\omega_c > 76.8$
- b)  $\omega_c < 42.4$
- c) Alternative C will never be the optimal choice.
- d)  $17.8 < \omega_c < 71.9$
- e) Alternative C will always be the optimal choice.
- f)  $24.9 < \omega_c < 66.8$

### Question 5:

Consider the following matrix game with payoffs for players 1 (first value) and 2 (second value), respectively, where player 1 has the choice between strategies A, B, and C, while player 2 chooses between X, Y, and Z.

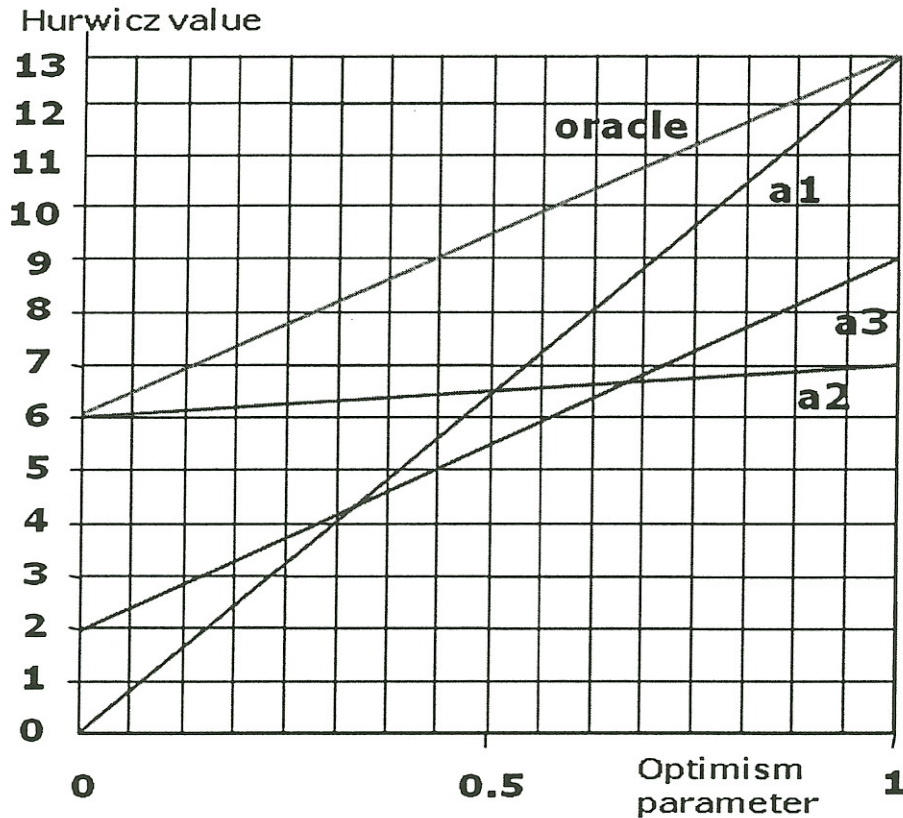
	<b>X</b>	<b>Y</b>	<b>Z</b>
<b>A</b>	1,5	1,2	2,-3
<b>B</b>	2,-1	1,1	3,2
<b>C</b>	1,1	0,2	3,0

Which of the following statements is correct?

- a) In the mixed strategy equilibrium player 1 applies strategy B with probability  $2/3$ .
- b) If both players behave according to their mixed strategy equilibrium, B-Y is the strategy combination with the highest joint probability.
- c) In the mixed strategy equilibrium player 2 applies strategy Y with probability  $2/3$ .
- d) If both players behave according to their mixed strategy equilibrium, A-X is the strategy combination with the highest joint probability.
- e) In the mixed strategy equilibrium player 2 applies strategy Z with certainty.
- f) There is no mixed strategy equilibrium.

### Question 6:

Consider a decision situation under uncertainty with three different alternatives, where the optimal alternative is chosen according to the Hurwicz-rule. The performance of the three alternatives (a1,a2,a3) depending on the type of decision maker are depicted in the following graph. The upper line indicates the performance of an oracle, an institution that has full information.



Which of the following statements is correct?

- a) Alternative 3 is dominated by Alternative 1.
- b) An oracle always has a positive informational value.
- c) The highest informational value of the oracle is where the profiles of Alternative 1 and 2 intersect.
- d) Alternative 2 will never be chosen.
- e) For all decision makers with an optimism parameter lower (higher) than 0.5 Alternative 1 (2) is optimal.
- f) A decision maker with an optimism parameter of 0.5 cannot decide for an optimal alternative.

### Question 7:

A venture capitalist is thinking of financing two alternative ventures. To market product **A** would yield an expected profit of \$120,000. The second project would require investing \$40,000 in developing product **B**, but success is uncertain. There is a 50% chance that product **B** is technically possible, in which case the product could be marketed, requiring an additional investment of \$60,000. With a 40% chance the new product will be successful, yielding an overall profit of \$800,000. If the new product fails, it generates no revenues at all. Based on the given information, determine the profit-maximizing decision of the venture capitalist, assuming that he is risk neutral.

Which of the following statements is correct?

- a) The expected profit maximum is \$120,000.
- b) To market product **B** has an expected value of \$260,000.
- c) To market product **B** has an expected value of \$100,000.
- d) To market product **B** has an expected value of \$90,000.
- e) The venture capitalist is indifferent between the two ventures.
- f) In 25% of all states of nature product **B** will succeed.



### Question 8:

Mike and Robert want to negotiate over the items, which are stated in the following table together with their subjective value of all items measured in €. Both agree to apply the Knaster-Steinhaus-Procedure.

Item	Kai	Robert
1	2,100	1,700
2	2,100	1,200
3	350	400
4	1,400	1,800
5	700	300
6	350	600
<b>Overall value</b>	<b>7,000</b>	<b>6,000</b>

What is the resulting final value that Robert receives?

- a) 800
- b) 4,100
- c) 2,800
- d) 6,000
- e) 3,600
- f) 1,200

### Question 9:

Consider the following statements concerning different rules in decision situations under uncertainty. Which of the following statements is correct?

- a) For the Hurwicz rule it holds that, if one alternative strictly dominates another alternative, then it will be chosen.
- b) For the Laplace rule it holds that the rank order of alternatives remains unchanged when one state of nature with all its consequences is duplicated.
- c) The Minimax-Regret rule assumes an equal probability for all possible outcomes.
- d) For the Minimax-Regret rule it holds that the rank order of alternatives is not influenced by the introduction of a new alternative that is not chosen.
- e) The Maximax rule only considers the best and worst possible outcome.
- f) The Maximin rule is extremely optimistic.

### Question 10:

The principal of a local school is faced with the decision on the improvement of the schoolyard with a given budget of 2400 €, an amount of time to invest of nine hours and a stock of a critical resource of six units. Time, money and the critical resource can be invested in plants (P), trees (T) or some additional applications (A), where a plant always delivers eight, a tree nine and an application five positive votes among the students. A plant requires two working hours, a tree takes three and an application four hours. Each plant and tree costs 600 € and both are, therefore, three times as expensive as an application. For a plant or a tree you need only one unit of the critical resource, whereas an application needs two units.

The principal wants to achieve the highest possible acceptance among the students. Which of the following statements is correct?

- a) The principal decides to add three applications and three plants.
- b) The principal will only invest into applications.
- c) The principal will only invest into plants.
- d) In the optimum the critical resource restriction is not binding.
- e) The maximum amount of possible votes is 34.
- f) The principal decides to add two plants, one tree and one application.