King Saud University

College of Computer and Information Sciences
Information Systems Department

Course Code/Title: IS466 (Decision Support System)
TOTAL MARKS: 20
Exam: **Midterm II** **Semester / Year**: Fall 2016-17
Exam date: December 20, 2016
Time Allowed: 1.0 Hours

Student ID: _____ Name: _____

EXAM POLICY&ETHICS:

- Read the paper carefully, should have any query be asked within first 15 minutes.
- Closed-book exam, no course-related papers are allowed.
- During examination, any form of communications with peer students is strictly forbidden.
- Students will not be allowed to attend the exam if arrived 20 minutes after the exam starts.
- Mobile phones should strictly be off.

QUESTIONS/ Questions TOTAL STUDENT OUTCOMES: This exam covers the following student outcomes (SOs):

Outcomes Covered	Questions	TOTAL
	Question 1	**X 0.5= /7**
	Question 2	**/3**
	Question 3a	**/3**
	Question 3b	**/2**
	Question 3c	**/2**
	Question 4	**/3**
	Total	**/20**

FEEDBACK SUMMARY:

…….....
……
…….....

Question No. 1 (7 marks): Select the appropriate answer from multiple choice questions.

1. The expected value of perfect information is calculated by subtracting:
   (i) the maximum EMV from the expected return with perfect information.
   (ii) EVSI from the expected return with perfect information.
   (iii) the maximum EMV from the minimum expected opportunity loss.
   (iv) the minimum expected opportunity loss from the expected opportunity loss with perfect information.

2. The maximin criterion is a feature of which of the following?
   (i) Decision-making under certainty
   (ii) Optimization
   (iii) Decision-making under uncertainty
   (iv) Deterministic model

3. In order to use Bayes' Theorem to calculate the P(A/B), it is necessary to know which of the following:
   (i) P(B) and P(B/A)
   (ii) P(A), P(B), and P(B/A)
   (iii) P(A) and P(B/A)
   (iv) P(A) and P(B)

4. The EVSI is always:
   (i) smaller than the expected value of the best decision without sample information.
   (ii) greater than the EVPI.
   (iii) non-negative.

5. Which of the following statements is true?
   (i) The maximax criterion is a conservative approach to decision making.
   (ii) Someone who is indifferent to risk would have a utility function that is a straight line.
   (iii) Prior probabilities are probability estimates after a test market.
   (iv) Maximin, maximax, and minimax regret criterion all lead to the same optimal decision.

6. When making a decision under risk, which of the following is a valid decision-making criterion?
   (i) Minimize expected opportunity loss
   (ii) Maximin
   (iii) Minimax regret
   (iv) Maximax

7. Which of the following occurs in decision making under uncertainty?
   (i) Conditional probabilities.
   (ii) Equally likely probabilities for all states of nature.
   (iii) A payoff table for each possible combination of decisions and outcomes.
   (iv) Exactly one state of nature.

8. Which of the following statements is true?
   (i) The EVPI can be determined without using probabilities.
   (ii) A decision tree usually begins with a decision node.
   (iii) Payoff tables will always contain positive numbers.

9. A bad decision is:
   (i) does not employ appropriate decision modeling techniques
   (ii) does not use all available information
   (iii) does not consider all alternatives
   (iv) all the above

10. The minimax criteria finds the alternative that:
   (i) minimize the maximize the opportunity loss of all the alternatives
   (ii) minimize the maximize the profit of all the alternatives

11. Which of the following statements is true?
   (i) MAD penalizes a forecasting technique more for larger errors than MSE does.
   (ii) Trend always measures the linear increase in a certain variable over time.
   (iii) Cyclical variations cover longer periods of time than do seasonal variations.
   (iv) Business cycles are seasonal variations.

12. Which measure tells us the strength of the linear relationship between X and Y?
    (i) Correlation coefficient
    (ii) Independent variable
    (iii) Coefficient of determination
    (iv) Standard error

13. When a forecast is close to the actual values and considered as a 'good' forecast then the measure of forecast error called MAPE is:
    (i) close to 1
    (ii) close −1
    (iii) close to 0
    (iv) close to 0.5

14. The weight values used in the weighted moving average are:
    (i) each weight is assigned an equal value
    (ii) determined by a formula.
    (iii) assigned some arbitrarily chosen values, where most recent has high weighted.
    (iv) assigned so that the sum of the weights is equal to 10.

Question No. 2. Consider the payoff table, furnish the regret table and find the optimal decision under the "Minimax Regret Criterion"? (3 points)

Decision	The Payoff Table				
Alternative	Large Rise	Small Rise	No Change	Small Fall	Large Fall
Gold	-100	100	200	300	0
Bond	250	200	150	-100	-150
Stock	500	250	100	-200	-600
C/D account	60	60	60	60	60
Stock option	200	150	150	-200	-150
Prior Prob.	0.2	0.3	0.3	0.1	0.1

Decision	The Regret Table					
Alternative	Large Rise	Small Rise	No Change	Small Fall	Large Fall	Maximum Regret
Gold	600	150	0	0	60	600
Bond	250	50	50	400	210	400
Stock	0	0	100	500	660	660
C/D account	440	190	140	240	0	440
Stock option	300	100	50	500	210	500

Question No. 3. Consider the following forecasting technique applied to stationary time series:

Time	1	2	3	4	5	6
Time Series	100	110	90	80	105	115
3-period moving average						
Error for 3-Period MA						
3-period weighted moving average						
Error for 3-Period WMA						

(a) Find the forecast and errors applied to the following stationary time series for (i) 3-period moving average technique (ii) 3-period weighted moving average technique with probabilities are 0.5,0.3,0.2? (3 points)

3-period moving average				100	93.3	91.6
Error for 3-Period MA				-20	11.6	23.4
3-period weighted moving average				98	89	85.5
Error for 3-Period WMA				-18	16	29.5

(b) Find the performance measure using mean square error (MSE) for forecasting techniques? (2 points)

MSE for 3-Period MA is 361.24
MSE for 3-Period WMA is 483.4

(c) Find the performance measure using mean absolute difference (MAD) for forecasting techniques? (2 points)

MAD for 3-Period MA is 18.35
MAD for 3-Period WMA is 21.17

Question No. 4. Consider the following payoff table with three state, three decision problem and two decision makers with corresponding utility values, find the decision for decision maker I and decision maker II under the "Expected Utility Criterion"? (3 points)

Decision	**The Payoff Table**		
Alternative	**S1**	**S2**	**S3**
Gold	100,000	40,000	-60,000
Bond	50,000	20,000	-30,000
Stock	20,000	20,000	-10,000
Prob.	0.1	0.3	0.6

Decision	**Utility**	
Amount	**Decision Maker I**	**Decision Maker II**
100,000	100	100
50,000	94	58
40,000	90	50
20,000	70	40
-10,000	60	18
-30,000	40	10
-60,000	30	5

	Decision Maker I				**Decision Maker II**			
Alternative	**S1**	**S2**	**S3**	**Expected Utility**	**S1**	**S2**	**S3**	**Expected Utility**
Gold	100	90	30	55	100	50	5	28.0
Bond	94	70	40	54.4	58	40	10	23.8
Stock	70	70	60	64.0	40	40	18	26.8