UNIVERSITI UTARA MALAYSIA
PEPERIKSAAN AKHIR SEMESTER PERTAMA SESI 2008/2009
FINAL EXAMINATION FIRST SEMESTER SESSION 2008/2009

KOD / NAMA KURSUS : QQS2033 – TEORI PEMUTUSAN BAYESIAN
CODE / COURSE
TARIKH : 15 November 2008
DATE
MASA : 9.00 – 10.45 am (1 JAM 45 MINIT )
TIME
TEMPAT : DP4(1) FTM
VENUE

ARAHAN :
1. Buku soalan ini mengandungi EMPAT (4) soalan di dalam LIIMA (5) halaman bercetak tidak termasuk kulit hadapan.
2. Sila jawab SEMUA soalan di dalam ruang jawapan yang disediakan.

INSTRUCTION :
1. This book script contains FOUR (4) questions in FIVE (5) printed pages excluding the cover page.
2. Answer ALL the questions in the spaces provided.
3. The total mark of this question paper is 40.

NO. MATRIK : ( dengan perkataan/in words )
MATRIC NO. ( dengan angka/in numbers )
NO. KAD PENGENALAN :
IDENTIFICATION NO.
PENSYARAH :
LECTURER
KUMPULAN GROUP : NOMBOR MEJA TABLE NO.

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERI ARAHAN
PLEASE DO NOT OPEN THIS QUESTION BOOKLET UNTIL INSTRUCTION IS GIVEN.

SULIT/CONFIDENTIAL
QUESTIONS 1 (14 MARKS)

a) Gives three advantages of the Bayesian method. (6 marks)

b) Determine whether the following statement is TRUE or FALSE.
   i. Bayes’ theorem allows one to revise his/her belief about the parameter, given the data that occurred. (1 mark)

   ii. A minimax decision is based on minimizing the maximum payoff among the states of nature/the world. (1 mark)

   iii. A maximin decision is based on maximizing the minimum payoff among the actions. (1 mark)

   iv. Expected utility can be used to make decisions similar to the way expected payoff value is used. (1 mark)

c) Explain the difference between decision making under certainty and decision making under uncertainty. (4 marks)
THE PROBABILITY that a person has a certain disease is 0.07. Medical diagnostic tests are available to determine whether the person actually has the disease. If the disease is actually present, the probability that the medical diagnostics test will give a positive result (indicating that the disease is present) is 0.80. If the disease is not actually present, the probability of a positive test result (indicating that the disease is present) 0.04. Suppose that the medical diagnostic test has given a positive result. What is the probability that the disease is actually present?

(6 marks)
QUESTIONS 3 (6 MARKS)

Suppose that the probability that a student passes an examination is 0.8 if she studies for the examination and 0.50 if she does not study. Furthermore, suppose that 60% of the students in a particular class study for a particular examination.

If a student chosen randomly from the class passes the examination, what is the probability that she studied?
**QUESTIONS 4 (14 MARKS)**

You are given the following payoff table.

<table>
<thead>
<tr>
<th>ACTION</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-50</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
<td>40</td>
<td>70</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>30</td>
<td>-30</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>-10</td>
<td>-50</td>
<td>-70</td>
<td>-20</td>
<td>200</td>
</tr>
</tbody>
</table>

a) Are any of the actions inadmissible? If so, eliminate them from further consideration.  

(2 marks)

b) Find the loss table corresponding to the above payoff table. 

(6 marks)

c) Find the actions that are optimal under the following decision-making criteria: 

i. Maximin  

(2 marks)

ii. Maximax  

(2 marks)
iii. minimax loss (2 marks)