UNIVERSITY OF MALTA

THE MATRICULATION CERTIFICATE EXAMINATION
INTERMEDIATE LEVEL

PURE MATHEMATICS

May 2008

EXAMINERS' REPORT

MATRICULATION AND SECONDARY EDUCATION
CERTIFICATE EXAMINATIONS BOARD

IM Pure Mathematics
May 2008 Session
Examiners' Report

Part 1: Statistical Information

Table 1 shows the distribution of grades for the May 2008 session.

Table 1: Distribution of Grades awarded in May 2008

GRADE	A	B	C	D	E	F	Abs	Total
Number	28	42	153	66	100	113	18	520
% of Total	5.38	8.08	29.42	12.69	19.23	21.73	3.46	100

Part 2: Comments regarding candidates' performance

Q1: a) Most attempts were good. In some cases however, some candidates thought that: $\log(a+b) = \log a + \log b,$ or that $-\log 9 - \log 10 = -\log \frac{9}{10}.$

b) Parts i) and ii) were well attempted. Some candidates thought that $4e^0 = 4e$ or 1. In iii), very few managed to obtain the correct time. Some obtained a negative value of *t*.

c) was generally well attempted.

Q2: This was well answered by most candidates.

Q3: This was generally poorly answered.

a) Very few used the direct method to find the nth term, i.e. $u_n = S_n - S_{n-1}.$ Most candidates equated $5n - 2n^2$ to $\frac{n}{2}\{2a + (n-1)d\},$ but only two managed to find *a* and *d* by comparing coefficients of *n* and $n^2.$

b) Most candidates erroneously concluded that if the sum to infinity of the geometric progression is $a, ar, ar^2,$ .... is $a/(1-r),$ then the sum to infinity of the squares of its terms is $[a/(1-r)]^2$ and deduced that $r = 1$ and $S_{10} = 0.$

Q4: The errors committed in this question showed that the candidates lacked the appropriate knowledge of $\exp x$ and $\ln x$.

Q5: a) Generally speaking, the two quadratic expansions were attempted correctly. However, the final approximation was not correctly worked out in a number of cases.
b) and c) Quite a few candidates showed that they do not understand concept of probability.

Q6: a) The candidates who used the suggested identity correctly very often managed to find the values of the variable *x* correctly. However, a good number of candidates failed to find the values of the variable *y* to define the points of intersection.

b) Many students incorrectly thought that the triangle formed by the radii and the line joining the centres was right angled. As a result, most candidates failed to use the sine and cosine formulae. The result of the rest of the problem was incorrect.

Q7: a) was well attempted by a good number of students.

b) Whilst many students did arrive to the initial equation relating the sides of the rectangle with its perimeter, most of them did not know how exactly to proceed in this problem.

Q8: a) The differential equation was solved correctly by about half the students. The other half of the candidates tackled this problem very poorly or barely attempted it all.

b) The definite integral was worked out incorrectly by several students. Some students used degrees rather than radians in the evaluation of the integral. Very few drew the required sketch.

Q9: Most candidates found the matrices A, B, AB and $(AB)^{-1}$ correctly. However, few gave the geometrical interpretation in iii), or the required explanation in iv).

Q10: This was generally well attempted by most candidates. Some candidates did not know that a matrix has no inverse if and only if its determinant is zero. Others confused the determinant of a matrix with its inverse. In the last part, marks were lost because candidates did not use the method of the matrix inverse to solve the given system of equations.

Chairperson
Board of Examiners
July 2008