Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2007

APPLIED MATHEMATICS

ORDINARY LEVEL CHIEF EXAMINER'S REPORT

HIGHER LEVEL CHIEF EXAMINER'S REPORT

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1. General Introduction

1.1 The Syllabus

The syllabus for Ordinary Level and Higher Level in Applied Mathematics is set out in the *Rules and Programme for Secondary Schools.* The syllabus is available on the website of the Department of Education and Science in the section headed 'Curriculum, Syllabus & Teaching Guides'.

This syllabus has been in operation for the past number of years. Those parts of the syllabus which are printed in italics belong to the Higher Level only.

The Higher Level course includes the Ordinary Level Course treated in greater depth.

Knowledge of the relevant parts of the Mathematics course is assumed.

1.2 The Examination

At Ordinary Level, the examination consists of one paper, comprising nine questions. Six questions must be answered correctly to obtain full marks. Each question carries 50 marks.

At Higher Level, the examination consists of one paper, comprising ten questions. Six questions must be answered correctly to obtain full marks. Each question carries 50 marks.

The duration of the examination at both levels is two hours thirty minutes.

This report should be read in conjunction with the examination papers and the marking schemes for 2007. These are available for downloading from the website of the State Examinations Commission at www.examinations.ie.

2. Ordinary Level

2.1 Introduction

The number of candidates taking Ordinary Level Applied Mathematics in the Leaving Certificate examination increased slightly in 2007.

Table I shows that 6·4% of the Applied Mathematics cohort is now taking the subject at Ordinary Level.

The total number of candidates taking the Ordinary Level paper 2005-2007 is illustrated in the following table:

Year	Total number of candidates taking Applied Mathematics	Number of Ordinary Level candidates	Percentage of total Applied Mathematics cohort
2005	1366	74	5·4%
2006	1324	78	5·9%
2007	1305	83	6·4%

Table I: Number of Leaving Certificate candidates taking Applied Mathematics (Ordinary Level) 2005 -2007.

2.2 Performance of Candidates

Table II shows how the candidates performed with a summary of the results of the examination for 2007.

	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	D3	E	F	NG	Total
No.	21	8	13	6	6	5	3	4	2	4	4	5	2	0	83
%	25·3	9·6	15·7	7·2	7·2	6·0	3·6	4·8	2·4	4·8	4·8	6·0	2·4	0·0	

Table II: Summary of outcomes Leaving Certificate Applied Mathematics (Ordinary Level) 2007

The following table shows the breakdown of the 2007 results in Ordinary Level Applied Mathematics by gender.

Grade	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	D3	E	F	NG	Total
Total Number	21	8	13	6	6	5	3	4	2	4	4	5	2	0	83
Total %	25·3	9·6	15·7	7·2	7·2	6·0	3·6	4·8	2·4	4·8	4·8	6·0	2·4	0·0	
No. Female	3	0	3	1	0	0	0	0	1	0	1	1	0	0	10
% Female	30·0	0·0	30·0	10·0	0·0	0·0	0·0	0·0	10·0	0·0	10·0	10·0	0·0	0·0	
No. Male	18	8	10	5	6	5	3	4	1	4	3	4	2	0	73
% Male	24·7	11·0	13·7	6·8	8·2	6·8	4·1	5·5	1·4	5·5	4·1	5·5	2·7	0·0	

Table III: Summary of outcomes Leaving Certificate Applied Mathematics 2007 (Ordinary Level) by gender.

Table IV below shows the distribution of grades in Ordinary Level Applied Mathematics 2005-2007.

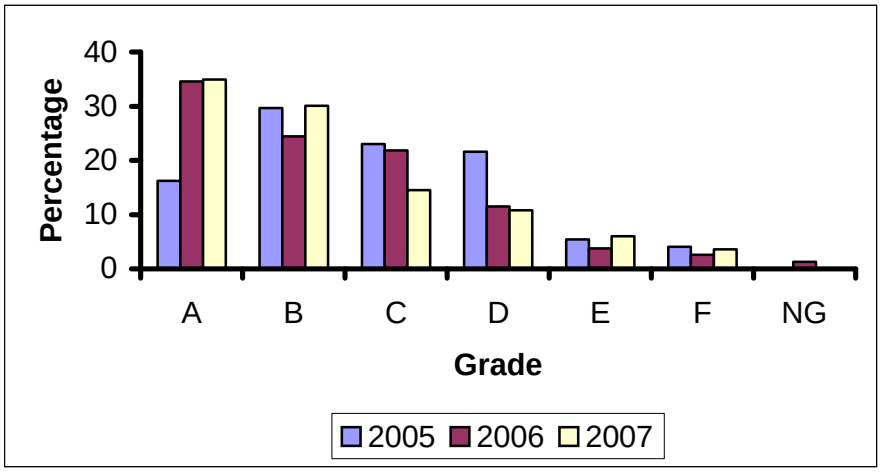

Table IV - Distribution of grades for Applied Mathematics Ordinary Level 2005 – 2007

Table V shows the percentage of candidates who obtained A grades, A+B+C grades, D grades and E+F+NG grades in 2005, 2006 and 2007

Year	No. of Candidates	A	A+B+C	D	E + F + NG
2005	74	16·3%	67·7%	24·4%	8·2%
2006	78	34·6%	80·8%	12·8%	6·5%
2007	83	34·9%	79·5%	12·0%	8·4%

Table V: Summary of outcomes by grade Leaving Certificate Applied Mathematics (Ordinary Level) 2005 – 2007.

Analysis was conducted on the relative popularity of each question and on the performance of candidates in each question. Table VI below ranks each question in two ways. Firstly the questions are ranked according to candidate performance and secondly according to the question's popularity among candidates. Under the heading 'Performance' the average mark per question and corresponding rank order is given.

Under the heading 'Popularity' the response rate per question and corresponding rank order is given.

The topic for each question is also given.

Performance			**Popularity**		
Question	Average Mark (%)	Rank Order	Response Rate (%)	Rank Order	Topic of Question
1	91·4	1	100·0	1	Linear Motion
2	84·4	2	90·0	5	Relative Velocity
3	73·4	7	95·0	3	Projectiles
4	80·8	3	92·5	4	Connected Particles
5	73·6	6	97·5	2	Collisions
6	78·2	4	37·5	6	Centre of Gravity
7	71·2	8	35·0	7	Statics
8	78·0	5	22·5	9	Circular Motion
9	58·0	9	25·0	8	Hydrostatics

Table VI: Ranking of questions according to Average Mark and Response Rate[1]

[1] The statistical data in this report relating to the answering of the individual questions is based on a random sample of 48·2% of the total number of candidates.

2.3 Analysis of Candidate Performance

Question 1 Average Mark 91·4% Response Rate 100%

This was the most popular and the best-answered question on the paper. The first four parts of the question were well answered by almost all candidates.

A small number of candidates had difficulty in calculating the speed of the car when it was 13·5 metres from *p* in part (v).

Examiners noted that common errors included:

- No constant speed section on the graph
- A significant number of candidates misread part (v) and found the speed of the car at 13·5 metres from *q*.

Question 2 Average Mark 84·4% Response Rate 90·0%

Candidates had little difficulty in expressing the velocity of cyclist C or the velocity of B relative to C in terms of $\underset{\sim}{i}$ and $\underset{\sim}{j}$.

Most candidates were able to find the magnitude and direction of the relative velocity and the time it took C to cross the river, but a number of candidates were not able to find how much longer it took B to cross the river.

Common errors included:

- $\underset{\sim}{V}_{BC} = \underset{\sim}{V}_C - \underset{\sim}{V}_B$
- $\underset{\sim}{V}_{CB}$ found instead of $\underset{\sim}{V}_{BC}$.
- time for B to cross = $\frac{72}{4 \cdot 12} = 17 \cdot 48$ seconds

Question 3 **Average Mark 73·4%** **Response Rate 95·0%**

Parts (i) and (ii) were well answered.

Some candidates did not read part (iii) correctly and found the time it took the projectile to travel from its initial position to the ground rather than the time from the maximum height to the ground.

A number of candidates used the incorrect time when calculating the range of the projectile.

Part (v) was poorly answered and many candidates calculated the vertical component of the velocity and stopping.

Common errors were:

- maximum height = $10(1)+5(1)^2=15$
- maximum height = $10(1)+5(1)^2+40=55$
- range = $14(3)=42$
- speed = 30 m/s

Question 4 **Average Mark 80·8%** **Response Rate 92·5%**

This was a popular and well answered question.

Part (a) was very well answered. Most candidates had little difficulty in finding the common acceleration of the particles or in finding the tension in the string.

In part (b) candidates were able to show on separate diagrams all the forces acting on each mass. However, a number of candidates had difficulty in writing down the two equations of motion that would enable them to find the common acceleration.

Those candidates who had found the acceleration in part (ii) had little difficulty in finding the tension in the string in the final part of the question.

Common errors were:

- $3g-T=3a$ and $T-2g\sin 30=2a$
- $3g-T=3a$ and $T-2g\sin 30+\mu R=2a$
- $3g-T=3a$ and $2g\sin 30+\mu R-T=2a$
- incorrect resolution of forces
- Weight of the 2 kg particle acting at right angles to the inclined plane rather than vertically downwards.

Question 5 **Average Mark 73·6%** **Response Rate 97·5%**

This was one of the most popular questions on the paper. Most candidates successfully found the speed of sphere A and the speed of sphere B after the collision.

Despite the fact that kinetic energy is defined in the mathematical tables, many candidates failed to use the correct formula for kinetic energy.

Candidates had little difficulty in finding the impulse.

Common errors were:

- $e = -\frac{2}{3}$
- $v_1 - v_2 = e(u_1 - u_2)$
- mass and speed of B were often interchanged.

Question 6 **Average Mark 78·2%** **Response Rate 37·5%**

Part (a) of the question was very well answered. Most candidates were able to find the co-ordinates of the centre of gravity of the system of particles.

A number of candidates who attempted this question made no effort at part (b) of the question. Of those candidates who did attempt part (b), many had very good solutions.

Some candidates had difficulty in finding the centre of gravity of the triangular section of the diagram.

Question 7 **Average Mark 71·2%** **Response Rate 35·0%**

This question was not very popular and it was poorly answered. In part (a), most candidates were able to transfer the information given in the question to a clearly labelled diagram, resolve forces horizontally and vertically and then take moments about a suitable point.

Part (b) was poorly answered. Candidates were able to show on a diagram the forces acting on the ladder but they had difficulty in taking moments about a suitable point. Very few candidates found the correct value for the coefficient of friction between the ladder and the ground.

Common errors included:

- friction force at the wall
- friction force at the ground in the incorrect direction.

Question 8 **Average Mark 78·0%** **Response Rate 22·5%**

This was the least popular question on the paper. Part (a) was well answered. Candidates were able to write down expressions for the speed and acceleration of the particle and hence find the value of r and the value of ω.

Part (b) was poorly answered.

Common errors included:

- Normal reaction omitted
- Components of the Tension often interchanged
- Acceleration = $r\omega$

Question 9 **Average Mark 58·0%** **Response Rate 25·0%**

This question was taken by only 25% of the cohort. It was also the least successfully answered question on the paper.

Most candidates made a reasonable attempt at finding the weight of the sphere in part (a), but part (b) of the question was poorly answered.

Candidates were able to see that $T + B = W$, but were unable to find the buoyancy force or the weight of the solid cylinder.

A common error was to use 7 rather than 0·07 for the radius of the cylinder.

2.4 Conclusions

- In general, candidates showed a good level of ability in extracting, from the text of the given problems, the mathematical processes and equations necessary to solve them. This was particularly evident in questions 1 to 5, where the average mark awarded per question was high

- The drawing of force diagrams was good

- Linear motion under constant acceleration was the topic most adequately covered by candidates. The question was attempted by all candidates and the average mark achieved (%) was 91·4%

- Questions 1, 2 3, 4, 5 were the most popular questions, with in excess of 90% of candidates attempting each. After that the rate of response declined significantly. Questions 6 and 7 attracted less than 40% of candidates, while questions 8 (Circular Motion) and 9 (Hydrostatics) attracted less than 30% of candidates

- Analysis of patterns in answering suggested that the choice of questions was made by some candidates in advance of seeing the examination paper. There was some evidence that parts of the syllabus may not have been studied in detail by all candidates

- Taking moments caused problems and the topics Circular Motion, Statics and Hydrostatics require attention. Hydrostatics also yielded the poorest average mark.

2.5 Recommendations to Teachers and Students

- Complete coverage of the syllabus is recommended. Confining syllabus coverage to 6 or 7 topics limits choice and may also presents difficulties if parts of topics are examined in the same question

- The regular practice of examples is an essential part of preparation for this examination

- Candidates should read questions thoroughly when choosing which questions to attempt and in order to extract the mathematical methods to be employed in solution of the problems

- Candidates should start each new question at the beginning of a new page in the answer-book

- Candidates should draw neat diagrams with clear labels. This is particularly important when the question instructs the candidate to draw a diagram. Good clear diagrams are a step in the solution of questions and assist in leading to a solution

- Candidates should note that when force diagrams are asked for, the component parts of forces are not required

- Candidates should check the accuracy of written formulae. Candidates should be aware that some of the required formulae are given on the Applied Mathematics page of the Mathematical Tables. They should be able to interpret the formulae given here correctly

- Candidates should be careful not to make careless mistakes in addition, subtraction etc. These errors are inclined to make subsequent calculations more difficult and, in some cases, impossible

3. Higher Level

3.1 Introduction

The examination consists of one paper, comprising ten questions. Six questions must be answered correctly to obtain full marks. Each question carries 50 marks. The duration of the examination is two hours thirty minutes.

The number of candidates taking Higher Level Applied Mathematics in the Leaving Certificate examination decreased slightly this year. Table I illustrates the proportion of candidates take the Higher Level paper.

Year	Total number of candidates taking Applied Mathematics	Number of Higher Level candidates	Percentage of total Applied Mathematics cohort
2005	1366	1292	94·6%
2006	1324	1246	94·1%
2007	1305	1222	93·6%

Table I: Number of Leaving Certificate candidates taking Applied Mathematics (Higher Level) 2005-2007.

2.1 Performance of Candidates

Table II shows how the candidates performed in 2007

Grade	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	D3	E	F	NG	Total
No.	242	107	131	94	129	99	75	86	48	45	73	53	32	8	1222
%	19·8	8·8	10·7	7·7	10·6	8·1	6·1	7·0	3·9	3·7	6·0	4·3	2·6	0·7	

Table II: Grade outcomes Leaving Certificate Applied Mathematics (Higher Level) 2007

Table III below shows the breakdown of the 2007 results in Higher Level Applied Mathematics by gender.

Grade	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	D3	E	F	NG	Total
Total Number	242	107	131	94	129	99	75	86	48	45	73	53	32	8	1222
Total %	19·8	8·8	10·7	7·7	10·6	8·1	6·1	7·0	3·9	3·7	6·0	4·3	2·6	0·7	
No. Female	58	33	44	23	27	16	19	17	6	11	21	11	9	2	297
% Female	19·5	11·1	14·8	7·7	9·1	5·4	6·4	5·7	2·0	3·7	7·1	3·7	3·0	0·7	
No. Male	184	74	87	71	102	83	56	69	42	34	52	42	23	6	925
% Male	19·9	8·0	9·4	7·7	11·0	9·0	6·1	7·5	4·5	3·7	5·6	4·5	2·5	0·6	

Table III: Grade outcomes Leaving Certificate Applied Mathematics (Higher Level) 2007 by gender

The chart below shows the distribution of grades in Applied Mathematics (Higher Level) for the years 2005-2007:

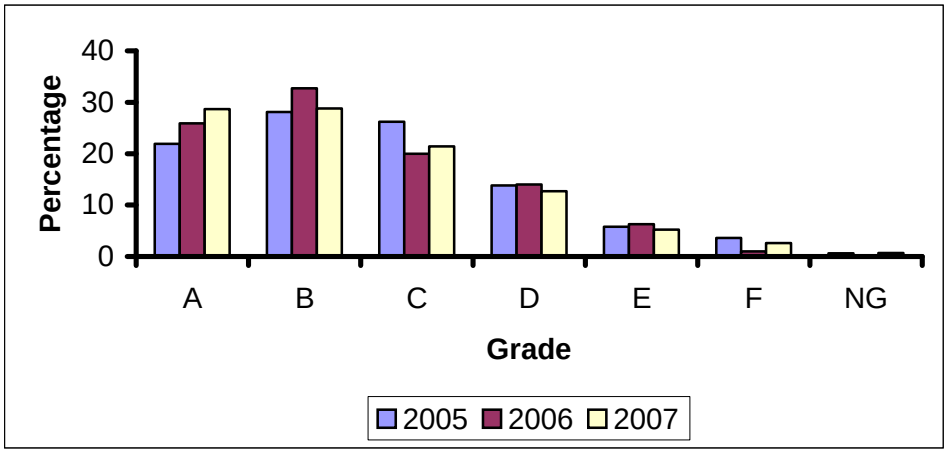

Table IV: Distribution of grades for Applied Mathematics (Higher Level) 2005 – 2007

Table V shows the percentage of candidates who obtained A grades, A+B+C grades, D grades and E+F+NG grades in the years 2005, 2006 and 2007.

Year	Number of Candidates	A	A+B+C	D	E + F + NG
2005	1291	22%	75·9%	14·8%	9·2%
2006	1246	26·5%	78·4%	16·3%	5·3%
2007	1222	28·6%	78·8%	13·6%	7·6%

Table V: Percentages of grades awarded in Applied Mathematics (Higher Level) 2005-2007

Table VI ranks each question in two ways. Firstly the questions are ranked according to candidate performance and secondly, according to the question's popularity among candidates.

Under the heading 'Performance' the average mark per question and corresponding rank order is given. Under the heading 'Popularity' the response rate per question and corresponding rank order is given. The topic for each question is also given.

Performance			**Popularity**		
Question	Average Mark (%)	Rank Order	Response Rate (%)	Rank Order	Topic of Question
1	71·2	3	90·6	4	Linear Motion
2	69·2	5	65·0	6	Relative Velocity
3	71·4	2	92·5	3	Projectiles
4	72·0	1	94·4	1	Connected Particles
5	69·0	6	93·1	2	Collisions
6	60·2	8	12·5	9	SHM & Circular Motion
7	45·8	10	19·4	8	Statics
8	64·4	7	33·8	7	Rigid Body Motion
9	49·2	9	8·8	10	Hydrostatics
10	70·6	4	90·0	5	Differential Equations

Table VI: Average mark and response rate per question[2]

[2] The statistical data in this report relating to the answering of the individual questions is based on a random sample of 13·1% of the total number of candidates.

3.3 Analysis of Candidate Performance

Question 1 Average Mark 71·2% Response Rate 90·6%

This was a popular and well-answered question. In part (a) almost all candidates correctly found the value of the initial speed u and the height of the tower. However, quite a few candidates did a lot of unnecessary work to get the correct value of u.

A small number of candidates had difficulty in transferring the information in the question into correct equations of motion.

Common errors were:

- acceleration = – 9.8
- confusing the initial velocities at different stages of the motion
- letting final speed = 0.

Part (b) of the question was reasonably well answered. Most candidates drew a correct speed-time graph and were able to find the time for each stage of the motion in terms of p, q, d and v. However a number of candidates had difficulty in calculating the average speed of the train and hence finding the value of b.

The candidates who substituted the expression $\frac{v}{p+q+b}$ for the average speed into their calculations had most difficulty in solving correctly for the value of b.

Question 2 Average Mark 69·2% Response Rate 65·0%

Part (a) (i) was very well answered but some candidates, having correctly found the relative velocity in terms of $\underset{\sim}{i}$ and $\underset{\sim}{j}$, failed to find the magnitude and direction of the velocity of A relative to B.

Part (ii) was well answered by most candidates but a number of candidates had difficulty in calculating the time for which the ships are less than or equal to 8 km apart.

Common errors were:

- $|\angle BAX| = 53{\cdot}13^\circ$
- time = $\frac{16\sin 8{\cdot}13^\circ}{40}$ or $\frac{8\sin 8{\cdot}13^\circ}{40}$

Part (b) was very well answered by most candidates and the two solutions given in the marking scheme were the most popular approaches used by the candidates.

Question 3 **Average Mark 71·4%** **Response Rate 92·5%**

This was a popular question and it was one of the best answered questions on the paper. In general, part (a) was very well answered.

Most candidates were able to find expressions for the time of flight and the range and were then able to obtain a correct value for $\sin 2\alpha$.

A number of candidates who had not seen the $\sin 2\alpha$ went on to do some complicated trigonometric work successfully.

Common errors were:

- $\alpha = 15°$ or $\alpha = 165°$
- $\alpha = 15°$ only

Part (b) was well answered. There were two approaches to this problem.
Most candidates found the time of flight, expressions for the velocity components and substituted into $\tan 45 = \dfrac{-v_j}{v_i}$ to show that $\tan\theta = 2$.
A small number of candidates with a very good knowledge of projectile motion used the alternative solution in the marking scheme.

Many candidates tended to expand $\cos(\theta - 45)$ and $\sin(\theta - 45)$ first and therefore tended to make less algebraic errors in the final calculation.

A small number of candidates found the time to reach the greatest height and failed to double this time when substituting for *t* in the expressions for the velocity components at the point where the particle hit the inclined plane.

Question 4 **Average Mark 72·0%** **Response Rate 94·4%**

This was the most popular question on the paper and it was also the most successfully answered question.

Part (a) was very well answered. Most candidates were able to write out the equations of motion, find the acceleration of the system and hence find the time of descending a distance 4 metres from rest.

Part (b) was well answered by most candidates. In part (ii), a number of candidates had incorrect accelerations in the equations of motion.

Part (iii) was poorly answered. Examiners noted that it appeared that the idea of average/relative acceleration had been somewhat neglected in students' revision.

Common errors were:

- $T - 4g = 4a$ $T - 6g = 6a$ $mg - 2T = ma$
- $T - 4g = 4a$ $6g - T = 6b$ $mg - 2T = m\left(\frac{a+b}{2}\right)$
- Many candidates found the acceleration of pulley B, but failed to find the acceleration of the two particles to prove that pulley B remained at rest while the two particles were in motion.

Question 5 **Average Mark 69·0%** **Response Rate 93·1%**

This was again one of the most popular questions. Part (a) was very well answered. Most candidates found, in terms of *e*, the speed of each sphere after the collision and were able to show that the magnitude of the momentum transferred from one sphere to the other was $6(1+e)$.

Part (*b*) proved more difficult. Many candidates, having found values for v_1 and v_2, failed to find the speed of each sphere after impact.

Part (ii) was poorly answered.

In part (iii) the candidates who found the loss of kinetic energy along the line of centres at the moment of impact were more successful than the candidates who found the loss by considering the total kinetic energies before and after the collision.

Some candidates lost marks in part (*b*) of the question by not reading the question carefully.

Question 6 **Average Mark 60·2%** **Response Rate 12·5%**

This was not a popular question and it was also one of the least successfully answered questions on the paper.

Part (a) was reasonably well answered. Most candidates were able to show that the motion of the particle was simple harmonic but had difficulty in finding, in terms of *d*, the period of the motion.

A common error in part (ii) was to express the period in terms of the elastic constant rather than *d*.

Part (b) was poorly answered. A small number of candidates got full marks for this part but most candidates had difficulty in showing that the combined mass did not reach the point *c* in the subsequent motion. This was also the case even with candidates who had correctly found the initial speed of the combined mass at the point *d*.

Question 7 **Average Mark 45·8%** **Response Rate 19·4%**

This was one of the least popular questions and was also the least successfully answered question on the paper.

Part (a) was poorly answered. Many candidates could have avoided errors by drawing larger diagrams and labelling distances carefully.

Part (b) was poorly answered. Most candidates drew a diagram of the forces acting on the disc and resolved the forces correctly. Many candidates had difficulty taking moments about a suitable point and failed to complete the question.

Small, untidy diagrams caused errors in finding the inclination to the horizontal of the reaction at the kerb stone.

Question 8 **Average Mark 64·4%** **Response Rate 33·8%**

Part (a) was very well answered.

In part (b), most candidates were able to find the moment of inertia of the uniform lamina but had difficulty in finding the value of *r*.

Candidates had some difficulty negotiating the final part of the question with many having difficulty in calculating the height through which the centre of mass of the lamina fell.

Common errors included:

- $I = \frac{1}{3}mr^2 + 2mr^2$ for the moment of inertia about the axis.
- miscalculating *h*, in the formula for the period for a compound pendulum.
- having found ω , using an incorrect value for the radius in finding the value of *v*.

Question 9 **Average Mark 49·2%** **Response Rate 8·8%**

This was the least popular question on the paper.

Part (a) was reasonably well answered. Many candidates had difficulty in getting an expression for the length of the column of water.

Common errors were:

- $1000g(26 \cdot 2 + x) = 13600g(x)$
- $1000g(x) = 13600g(x - 26 \cdot 2)$

Part (b) (i) was reasonably well answered but part (ii) was poorly answered. Most candidates had difficulties in determining how to approach the problem.

A common error was:

- $B = T$.

Question 10 **Average Mark 70·6%** **Response Rate 90·0%**

Part (a) was very well answered. A small number of candidates made algebraic errors or did not integrate correctly.

Common errors included:

- $\int \sin x \, dx = +\cos x$
- $\int \frac{1}{y^2} \, dy = \ln\left(y^2\right)$
- $1 = y(\cos x + 1)$

Part (b)(i) was well answered. Separating the variables or omitting 1600 ln3200 when substituting the limits was the main source of error.

Part (b)(ii) was not very well answered by some candidates who otherwise scored highly, whereas many low scoring candidates got full marks for this part.

Candidates who did not put acceleration = 0 tried an approach similar to the alternative solution in the marking scheme and tried to find Lim v as either $x \to \infty$ or $t \to \infty$.

3.4 Conclusions

- In general, candidates showed a good level of ability in extracting, from the text of the given problems, the mathematical processes and equations necessary to solve them. This was particularly evident in Questions 1 to 5 and in Question 10, where the average mark awarded per question was high

- The drawing of force diagrams was good

- Questions 1, 3, 4, 5 and 10 were the most popular questions, with 90% or more of candidates attempting each. The rate of response declined sharply in other questions. Question 8 attracted only 33·8% of candidates, while questions 6, 7 and 9 attracted less than 20% of candidates

- Analysis of patterns in answering suggested that the choice of questions was made by some candidates in advance of seeing the examination paper. There was some evidence that certain parts of the syllabus may not have been covered in detail. In particular, Question 6 (SHM and Circular Motion), Question 7 (Statics), and Question 9 (Hydrostatics) had a low rate of uptake

- Connected particles was the topic most adequately covered by candidates. The question was attempted by 94·4% of candidates and the average mark achieved (%) was 72·0%

- Taking moments caused problems and candidates should pay further attention to the topics SHM and Circular Motion, Statics and Hydrostatics. Statics also yielded the poorest average mark.

3.5 Recommendations to Teachers and Students

- Complete coverage of the syllabus is recommended. Confining syllabus coverage to 6 or 7 topics limits candidate choice. Limiting syllabus coverage also presents problems if parts of topics are examined in the same question

- The regular practice of examples is an essential part of preparation for this examination

- Candidates should read questions thoroughly in order to extract the mathematical methods to be employed in solution of the problems. They are advised to make their question choices after they have read the paper

- Candidates should start each new question at the beginning of a new page in the answer-book

- Diagrams should be neat and clearly labeled. This is particularly important when the question instructs the candidate to draw a diagram. Good, clear diagrams are a step in the solution of questions and assist in leading to a solution

- Candidates should note that when force diagrams are asked for, the component parts of forces are not required

- Candidates should check written formulae. They should be aware that some of the required formulae are given on the Applied Mathematics page of the Mathematical Tables and should be able to interpret the formulae given here correctly

- Candidates should be careful not to make errors in addition, subtraction etc. These errors are inclined to make subsequent calculations more difficult and, in some cases, impossible

- Candidates should note that, when a given differential equation is required to be solved, an explicit expression for the required variable, say y, is required in order to be awarded full marks.