

*Report to Council from the Board of Examiners*

# *1999 PART III EXAMINATIONS REPORT*

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Institute of Actuaries of Australia

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# **CONTENTS**

	Page
<b>Summary And Recommendations</b>	<b>1</b>
<b>Chairman's Report</b>	<b>4</b>
The Examination Process	4
Examination Administration	5
Examination Papers	6
Results	7
Andrew Prescott Memorial Prizes	9
Recommendations For 2000	10
<b>Chief Examiners' Reports</b>	<b>13</b>
<b>Subject 1: Investment Management</b>	<b>14</b>
Summary	14
Analysis of Questions	14
<b>Subject 2: Life Insurance</b>	<b>17</b>
Summary	17
Analysis of Questions	17
<b>Subject 3: General Insurance</b>	<b>24</b>
Summary	24
Analysis of Questions	24
<b>Subject 4: Superannuation &amp; Other Employee Benefits</b>	<b>28</b>
Summary	28
Analysis of Questions	28
<b>Subject 5: Finance</b>	<b>30</b>
Summary	30
Analysis of Questions	30



## SUMMARY AND RECOMMENDATIONS

The 1999 examinations of the Institute of Actuaries of Australia were held between 7 and 18 October 1999 with candidates sitting in Australia (Sydney, Melbourne, Brisbane, Adelaide, Perth, Canberra) and overseas (Minneapolis, Chicago, London, Rio de Janeiro, Munich, Zurich, Tokyo, Bangkok, Wellington, Auckland, Hong Kong, Kuala Lumpur, Singapore)

Exams were only offered at the specialist level as ordinary exams were discontinued in 1997. The trend away from traditional subjects continued, For the first time, Investment and Finance accounted for more than 50% of entrants. The overall candidates numbers over recent years is detailed in Table 1.1.

**Table 1.1 Candidate Numbers by Part III specialist subject**

	1996	1997	1998	1999	Mix
Investment Management	58	77	99	109	38%
Life Insurance	58	52	66	71	25%
General Insurance	51	49	54	43	15%
Superannuation	34	23	21	21	7%
Finance	27	31	34	42	15%
Total	228	232	274	286	

The process followed in setting the exams and determining the recommended pass list was similar to the process followed in previous years. In summary the numbers of candidates and the recommended passes are detailed in Table 1.2.

**Table 1.2 1999 Candidate Numbers and Recommended % Passes**

	Sat	Passed	Pass %	1998 % Pass
Investment Management	109	51	47	39
Life Insurance	71	29	41	35
General Insurance	43	17	40	24
Superannuation	21	12	57	48
Finance	42	16	38	44
<b>Total</b>	<b>286</b>	<b>125</b>	<b>44</b>	<b>36</b>

At the date of producing this report it was not possible to determine the number of new fellows and associates. Passing the Institute's fellowship examinations is only one contributing factor for the fellowship qualification. Consideration also needs to be given to the results of the Actuarial Control Cycle courses and SIA courses that are not directly examined by the Institute.

Once these results are available the final pass list can be compiled. This process has been improved since last year. SIA results are now available from the SIA in advance of their release date. The compilation of the list of new fellows now happens through the use of linked spreadsheets rather than a manual process. Jac Smit has confirmed that all results have been double-checked.

The Board of Examiners asks Council to approve the award of Prescott Memorial prizes in Investment, Life Insurance, General Insurance and Finance. No award is recommended for Superannuation. Examination and the Control Cycle results have also been reviewed in the light of the conditions required for the major Prescott Prize.

As a result of this review it is recommended that candidate 1247 be awarded the major Prescott Prize for 1999. This Candidate:

- Was first in Superannuation in 1996
- Gained a High Distinction in the Control Cycle in 1997 (through distance learning)
- Gained two distinctions and a high distinction in the SIA subjects in 1998
- Was a very close 2<sup>nd</sup> in Investment in 1999

Recruitment of examination resources (especially markers) is the responsibility of the practice committees and I would like to express my appreciation for the excellent job that they have done.

I would ask Council to express its appreciation to the Chief Examiners. Each Examiner commits over 200 hours per annum of their own time to make the process work. It is a significant commitment and one which must be made within very tight time constraints and ever increasing work pressures. My thanks are also due to Jac Smit (who effectively administers the whole process), Michael Playford (my Assistant who reviews the exam papers and developed a standardised scaling procedure) Craig Ginnane (who efficiently supports the examination centres and runs the Sydney centre) and Jan Heath (who types the exam papers, distributes material to exam centres and processes results).

The recommended constitution for the Board for 2000 is:

Chairman	Steve Miles
Assistant to Chairman	Michael Playford
Secretary	Jac Smit
Investment	Andrew Croft
Life Insurance	Robert Baillie
General Insurance	Andrew Bendall
Superannuation	Graeme Humphrys
Finance	Richard Hitchens
Exams Supervisor	Craig Ginnane

Other recommendations are:

- Candidates' reading time should be extended from 10 minutes to 15 minutes.
- The scaling process be reviewed and either adopted for all subjects or dropped altogether
- A training day to be held for examiners to help them develop a common approach to questions
- The examination team, in each subject, should consist of a Chief Examiner, and a team of question writers. The role of the Chief Examiner would be to coordinate the production of exam questions, ensure quality and recommend the final pass list.

# CHAIRMAN'S REPORT

## ***The Examination Process***

The 1999 examinations of the Institute of Actuaries of Australia were held between 7 and 18 October 1999 with candidates sitting in Australia (Sydney, Melbourne, Brisbane, Adelaide, Perth, Canberra) and overseas (Minneapolis, Chicago, London, Rio de Janeiro, Munich, Zurich, Tokyo, Bangkok, Wellington, Auckland, Hong Kong, Kuala Lumpur, Singapore)

Once again, the 1999 Part III exams were run on an open book basis. Students seem to be able to prepare a better quality answer in this environment even though reference to open book material is only occasional. Nevertheless, the best advice to students is still “Read the question, read the question and then answer the question”.

The Examinations in each subject were set by the following process:

- draft examinations were set by the Chief Examiner and the Assistant Examiners
- draft exams were reviewed by scrutineers for coverage and fairness. The scrutineers were a mix of newly qualified actuaries and experienced actuaries
- one of the scrutineers ‘sat’ the paper to assess the length of the paper
- exams were redrafted after scrutineers feedback
- the redrafted exams were reviewed by the Chairman and Assistant Chairman.
- the final exams were then signed off by the Chief Examiners

The examination results of students were subject to the following process:

- each question was marked by two markers. In most subjects inconsistencies were discussed amongst the markers before results were forwarded to the examiner
- marks were generally scaled to allow for the fact that some questions are hard and some are easy
- candidates were ranked in numerical order
- candidates generally divided into clear passes, clear failures and a middle group
- the middle group of papers were read by the examiners who determined the pass standard by assessing the whole paper and the student’s ability to use judgement
- each question was ranked as an A,B, C, D or E where A and B is a pass
- the recommended passes were examined in light of a reasonable mix of question grades and average grade. Overall results were then reviewed by the full Board of Examiners
- the recommended pass mark was finalised and papers were graded A,B,C,D or E.

The examiners recognise that a student who qualifies as a fellow is subject to the constraints of professional conduct and should recognise the limitations of a lack of



practical experience. Nevertheless new fellows should enhance the reputation of the profession.

### **Examination Administration**

#### **The Board**

The Board of examiners for 1999 comprised:

Mr S Miles	Chairman
Mr M Playford	Assistant Chairman
Mr J Smit	Secretary
Mr D Gorey	Investment Management
Mr J Gribble	Life Insurance
Mr A Greenfield	General Insurance
Mr P May	Superannuation
Mr A Jackson	Finance
Mr A C Ginnane	Exams Supervisor

I would like to take this opportunity to thank all Chief Examiners and their Assistants (who are named in their reports) for their efforts in preparing and marking the examination papers. I also appreciated the support of Michael Playford who was critical in reviewing the overall quality of the exams.

#### **Administration**

The secretary, Mr Jac Smit, issued comprehensive memoranda covering duties of supervisors, instructions to candidates, and so on. The procedures had been improved by Mr Craig Ginnane but were broadly similar to previous examinations. Overall the examinations ran very smoothly and I want to take this opportunity to thank the Institute office staff who handle all the administration matters so ably.

In addition, Jac Smit provided vital support in managing the exam development process (and reducing my workload considerably) and organising the recruitment of resources for Investment. Investment entrants accounted for 38% of entrants which places a severe strain on existing resources.

#### **Examination Sittings**

The examinations were held between 7 and 18 October 1999. The dates were chosen to avoid public holidays and religious holidays. There was at least one day's break between the examinations.

Mr Craig Ginnane has presented a report on the running of the examinations. All went smoothly and some minor improvements were recommended to the verbal instructions given to candidates. A recommendation to have 15 minutes reading time (rather than the current 10) was also adopted.

### **Meetings of the Board**

The Board met on three occasions during the year. The first meeting was held in March and attended by all Examiners. The purpose of the meeting was to -

- Meeting 1 – review timetable
- Meeting 2 – review pass list

It is envisaged that two meetings will be held next year at dates yet to be set in February and November, along with two question setting workshops in February.

### **Examination Papers**

The structure of the examinations in 1999 was:

<b>Subject</b>	<b>Part III</b>
Investment	2 x 2 hours
Life	2 x 3 hours
General	2 x 3 hours
Superannuation	2 x 3 hours
Finance	2 x 3 hours

In each subject there is a mix of questions ranging from interpreting bookwork to the application of familiar and unfamiliar circumstances. The questions aim to cover the whole syllabus. Students should be aware of the fact that the whole syllabus is examinable even when part of that syllabus is also taught and examined by the Securities Institute.

The standards to be achieved by candidates sitting each level, the principles on which papers are to be set and the marking procedures are set out in the Guidelines to Examiners (an abridged copy of which is provided in the Education Handbook). To ensure proper balance guidance as to the proportion of marks given to the interpretation of bookwork, and its application, have been established.

The standards of difficulty as determined by the Chief Examiners at the time they set the papers are set out in Table 4.1:

**Table 4.1**  
**Standards of Difficulty**

	Interpretation of Bookwork		Straightford Application		More Difficult Application	
Subject	Last Year %	This Year %	Last Year %	This Year %	Last Year %	Last Year %
Investment	25	25	35	40	40	35
Life	28	20	29	41	43	35
General	15	18	43	43	38	39
Superannuation	25	18	35	44	40	38
Finance	19	15	38	41	43	44
Recommended	15-25	15-25	35-45	35-45	35-45	35-45

The consensus of views of the standard of difficulty of the examinations was:

Subject	Level of difficulty
Investment	Moderate
Life	Moderate
General	Moderately Difficult
Superannuation	Moderately Difficult
Finance	Moderately Difficult

The papers set by the examiners were reviewed by the scrutineers before being approved by the Chairman. Copies of the papers have not been included within this report in the interests of space. They are available from the Institute if required.

Detailed comments on the answers to the questions are contained in each Chief Examiners report and will be reported separately to the Tuition Service by the Education Manager.

This year, several papers included questions which required candidates to demonstrate their understanding through the use of mathematical examples. These questions proved to be important discriminators for the quality of questions.

## **Results**

The philosophy adopted in setting the pass mark is based on the fact that those who pass all subjects become entitled to the designation of Fellow of the Institute of Actuaries of Australia, subject to attending the professionalism course. They are therefore qualified to provide actuarial advice, subject to the Code of Conduct which requires, among other things, that an actuary not provide advice in areas where he does not have sufficient experience. This requires that the candidate demonstrate the qualities of judgement and common sense.

A candidate is not expected to be a skilled practitioner at this stage. Provided the candidate shows a grasp of the main principles, a pass should be awarded. Conversely, a candidate who demonstrates dangerous misconceptions is viewed more seriously than one who shows ignorance. Overall, successful candidates should enhance the reputation of the profession.

The examiners in the Specialist subjects place great emphasis on the questions which require the candidate to demonstrate the ability to apply bookwork to specific situations. When grading borderline candidates, their ability to do well in such questions has a great bearing on whether they pass or fail. The examiners however, are very conscious of the fact that it is unreasonable to expect students to demonstrate the degree of understanding of an actuary of some years experience. In addition, actuaries are supposed to be able to demonstrate their skills to those outside the profession. Therefore lack of clarity in the use of the English language will be regarded as a negative feature when assessing the candidates' papers.

Candidate's results in each subject and at each level are set out in the attachments to each Chief Examiner's report. In summary the results are found in Table 5.1

**Table 5.1 1999 Candidate Numbers and Recommended Passes**

	<b>Sat</b>	<b>Passed</b>	<b>Pass %</b>	<b>1998 % Pass</b>
Investment Management	109	51	47	39
Life Insurance	71	29	41	35
General Insurance	43	17	40	24
Superannuation	21	12	57	48
Finance	42	16	38	44
<b>Total</b>	<b>286</b>	<b>125</b>	<b>44</b>	<b>36</b>

Overall, the pass rate for specialist subjects has increased to 44% in part reflecting that fact that open book exams are leading to a higher quality of answers. I believe that all efforts have been made to pass candidates who were worthy of a pass. Each examiner's recommendations were reviewed by me and discussed with the individual examiners. A further review was conducted at the Board meeting to ensure consistency between the exams.

Table 5.2 provides the pass rates over the past 5 years.

**Table 5.2 Comparison of % Pass Rates 1995-1999 by Part III Subject**

	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
Investment Management	48	52	35	39	47
Life Insurance	48	43	42	35	41
General Insurance	41	35	31	24	40
Superannuation	28	44	43	48	57
Finance	Na	48	45	44	38
<b>Total</b>	<b>42</b>	<b>44</b>	<b>38</b>	<b>36</b>	<b>44</b>

There were no significant problems in running the exams.

Two students asked for special consideration. The examiners recommended that one be passed and one be failed. In neither case was it necessary to amend marks to allow for special consideration.

**Table 5.3 Comparison of Specialist Pass Rates by Centre**

Centre	1995	1996	1997	1998	1999
Sydney	48	47	38	38	49
Melbourne	35	38	32	31	34
Other	38	42	44	37	40
Total	42	44	38	36	44

Melbourne and Sydney results are still significantly different although it is difficult to draw any useful conclusions from this analysis.

### Pass Marks

The scaled pass marks for the last five years is outlined in Table 5.4

**Table 5.4 Comparison of pass marks (out of 400) 1995-1999**

	1995	1996	1997	1998	1999	
Investment Management	224	2126	215	220	230	Scaled
Life Insurance	225	228	224	205	219	Scaled
General Insurance	230	229	204	203	220	Unscaled
Superannuation	228	204	208	210	206	Unscaled
Finance	na	234	230	230	239	Unscaled

Pass marks were generally higher than 1998 even though pass rates have increased.

### Andrew Prescott Memorial Prizes

In December 1978 Council agreed to establish the 'Andrew Prescott Memorial Prize' in honour of the late Andrew Prescott for meritorious performance in the Australian Institute's examinations. Prizes are awarded in two divisions:

- Prizes for the highest mark in the examination in each subject at Specialist level provided a certain minimum standard is attained.
- A prize for outstanding performance over the whole examination on completing the Fellowship.

### Subject Prizes

The minimum standard for a subject prize has been set at 115% of the pass mark. Under the previous four-subject system it was considered possible that four subject prizes might be awarded in a year, but it was expected that on average, prizes would be awarded in two subjects each year.

Four candidates met the criteria and presented outstanding papers. Consequently the Board recommends prizes be awarded to the following candidate numbers:

- Investment - 1020
- Life Insurance - 1048

- General Insurance - 1162
- Finance - 1206

No prize is recommended for Superannuation.

### **Major Prize**

A candidate for the major prize must complete the whole of the examinations in a reasonable period. Candidates should not have failed a subject. Candidates should be in the top five for each of their chosen specialist subjects and have an average rank of five or better. The candidate's rank should be taken into account when determining the average rank.

As a result of this review, it is recommended that Candidate 1247 be awarded the major Prescott prize for 1999. This Candidate:

- Was first in Superannuation in 1996
- Gained a High Distinction in the Control Cycle in 1997 (through distance learning, marks were 91% and 94%)
- Gained two distinctions and a high distinction in the SIA subjects in 1998
- Was a very close 2<sup>nd</sup> in Investment in 1999

### **Recommendations For 2000**

Board Chief Examiners in Life, Superannuation, General Insurance and Finance retired at the end of 1999.

The recommended constitution for the Board for 2000 is:

Chairman	Steve Miles
Assistant to Chairman	Michael Playford
Secretary	Jac Smit
Investment	Andrew Croft
Life Insurance	Robert Baillie
General Insurance	Andrew Bendall
Superannuation	Graeme Humphrys
Finance	Richard Hitchens
Exams Supervisor	Craig Ginnane



## Examination Dates

The dates for the examinations in 2000 and 2001 are as follows:

Subject	2000	2001
Life Insurance	Thursday 12 October	Thursday 4 October
Investment Management	Thursday 10 October	Tuesday 2 October
General Insurance	Monday 16 October	Monday 8 October
Superannuation	Friday 20 October	Friday 12 October
Finance	Wednesday 18 October	Wednesday 10 October

The unusually late start date next year makes allowance for the impact of the Olympics.

Other recommendations made in this report are:

- Candidates' reading time should be extended from 10 minutes to 15 minutes.
- The scaling process be reviewed and either adopted for all subjects or dropped altogether.
- A training day be held for examiners to help them develop a common approach to questions.
- The examination team, for each subject, should consist of a Chief Examiner, and a team of question writers. The role of the Chief Examiner would be to coordinate the production of exam questions, ensure quality and recommend the final pass list.





## ***CHIEF EXAMINERS' REPORTS***

- Subject 1: Investment Management
- Subject 2: Life Insurance
- Subject 3: General Insurance
- Subject 4: Superannuation and other employee benefit
- Subject 5: Finance



# Subject 1: Investment Management

## Summary

The 1999 Investment Management examination was the last to test the current syllabus. As expected, the level of enrolment was again very high. The pass rate for 1999 was higher than 1998, with an average raw mark of 51% (compared to 44% in 1998). This may reflect:

- Better technique shown for open-book exams – students answering the question and not resorting to just reciting slabs of bookwork or formulae.
- Extra incentive for students to pass the subject in its current form, so that they can retain credit for their SIA subjects passed, and need not learn a new syllabus.
- Familiarity of the style of the exam, as there was the same Chief Examiner for two years running – for the first time in years.
- Some parts of the questions designed to allow students to score some marks from basis knowledge – more so than in 1998, so that the exam was on the whole easier than in 1998. This was allowed for in scaling, as 65 achieved a raw mark of at least 200/400 (with only 51 passes), compared to 1998 where 21 achieved a raw mark of at least 200/400 (with 37 passes).

## Markers

The following markers assisted with the 1999 exam marking :

Andrew Harrex	Hugh Sarjeant
Andrew Leung	Jason Doughty
Andrew P. Martin	Ken Liow
Ashtutosh Bhalerao	Ken Ragell Mark Stewart
Dai-Trang Nguyen	Mark Thompson
David McNeil	Michael Dermody
Denis Gorey	Nick Callil
Gavin Rogers	Ray Loudon
George Attard	Stephen Milburn-Pyle
Grant Peters	Terry Nelson

## Analysis of Questions

### Paper 1, Question 1

This question was a collection of short questions, covering various parts of the course, including:

- equity analysis
- option strategies,

- neutral asset allocation (given liabilities), and
- emerging markets.

It was generally well answered, with most students doing well in some parts, and poorly in others. This resulted in marks clustered around the median, and as a result the question was a poor discriminator. It was also a poor indicator of overall student strength.

### **Paper 1, Question 2**

This was a “calculation” question, testing the students’ knowledge of basic performance reporting allowing for derivative exposures.

It was generally well answered, and was a good discriminator and good indicator of overall student strength.

### **Paper 1, Question 3**

This question was a fairly straightforward application of bond immunisation, with students required to:

- explain immunisation in simple terms,
- set up an immunised portfolio, and
- explain the practical short-comings of the approach.

It was an easy question, with a correspondingly high pass rate.

### **Paper 1, Question 4**

This was a practical question on asset allocation using a “Markowitz” approach calibrated with real data.

This was poorly answered.

### **Paper 1, Question 5**

This was a practical question on fixed interest index construction. It was quite poorly answered, with many students giving contradictory statements. A number of students appeared to have run short on time, and many appeared to have little or no understanding of fixed interest markets.

### **Paper 2, Question 1**

This question involved the straightforward application of knowledge of equity valuations learned in the SIA course. It was similar in coverage to a question in the 1998 exam, but presented in a much more straightforward manner.

On the whole, this was well answered. It is clear that students have difficulty interpreting information set out in the form of financial statements (eg balance sheets : 1998 paper 1, question 5), but have a reasonable understanding of the general principles. In future, I would suggest that the education of students give greater practice on the interpretation of financial statements.

The question was a reasonable discriminator, and a good indicator of a student’s overall strength.

### **Paper 2, Question 2**

This question was on the characteristics of fixed-interest investments, applied in a practical funds management example.

This question was a good discriminator, but a poor indicator of a student's overall strength.

### **Paper 2, Question 3**

This question covered active and passive funds management, comparing the approaches taken by equity and fixed interest managers, and placing in the context of recent developments. The question required students to show some understanding of fiscal and monetary policy, and the forces driving markets. This was generally well answered – and the understanding of recent events and fiscal policy was an improvement on 1998. Most students were able to answer the more straightforward parts of the question.

Part of the question directly tested the student's ability to express an opinion backed up reasoning where there is no "right" answer – as a result there was a wide range of answers, and the question was difficult to mark. It was not a good discriminator, nor was it a good indicator of a student's overall strength.

### **Paper 2, Question 4**

This question was on asset-liability modelling. A substantial portion of the question tested simple understanding of some basic concepts. Most students did well on this part. Part of the question required students to demonstrate a deeper understanding of the practical aspects of asset-liability modelling – and many students did poorly on this part. This is disappointing given that this is a core topic, which is a substantial part of the IAA course.

The pass mark was set at 60% of the total marks available, reflecting the substantial straightforward component of the question. Overall, the question was poorly answered, but it was both a good discriminator and a very good indicator of a student's overall strength.

### **Paper 2, Question 5**

This question tested quite basic knowledge of debt/equity hybrids, and gave students plenty of scope to score well with the application of clear thinking. The question was similar to a question in the 1997 paper, and it appears that many students took to writing answers based on the model solution of that paper, without appreciating the differences between the 1997 question and this question. Accordingly the marks were quite low for this question.

The question also tested the student's knowledge of basic (non-mathematical) option pricing theory, by testing the understanding of implied volatility input into the Black-Scholes model. This required students to "think outside the square", and the results were poor. This question was a reasonable discriminator, and a good indicator of a student's overall strength.

## **Subject 2: Life Insurance**

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### **Summary**

71 Candidates enrolled for the 1999 exam.

It is recommended that 29 candidates be awarded a pass, which implies a pass rate of 41%. This compares with a pass rate of 38% in 1998.

### **Examiners**

Examiners for the 1999 Exam were:

Jules Gribble	-	Chief Examiner
Robert Baillie	-	Assistant Examiner
Anthony Bofinger	-	Assistant Examiner
Trevor McMahon	-	Assistant Examiner

### **Markers**

The following markers assisted with the 1999 exam marking :

Robert Baillie	Jules Gribble
Andrew Barker	Lawrence Heyman
Mark Barda	Jonathan Hughes
Peter Barnes	Cynthia Hui
Caroline Bennet	Steven Huppert
Anthony Bofinger	Henry Josling
Andrew Boldeman	Craig Lamb
Wayne Brazel	Trevor McMahon
Andrew Brown	Chris Murphy
Sheila Colls	Paul Pesavento
Inbam Devadason	Lisa Simpson
Natalie Eckersall	David Ticehurst
Peter Fallows	David Underwood

### **Analysis of Questions**

#### **Paper 1, Question 1**

The question was poorly answered in general. The main difficulty being that students could not apply their theoretical knowledge of the requirements of asset distribution to the particular products in question.



Part a): Students generally realised the WoL products were long term, and the reserves for YRT were small. Quite a number, however, thought that TPD and Trauma were longer term products requiring a different investment strategy from the YRT. Many were confused by the accidental death cover in the first 2 years of the WoL, suggesting it would be a major drain on funds.

Part b): On average the best answered part.

Part c): This was the worst answered part. Less than half the students mentioned that benefits may be inflation linked and that suitable assets were required for this.

*Conclusion:* The question required the application of theory to a specific situation, relating to investment strategies. Poor understanding of the specific issues involved was shown, as well a surprisingly poor level of understanding of TPD and trauma products.

### **Paper 1, Question 2**

In general it was a bookwork or applied bookwork question. The marks were quite closely bunched. Not many students answered the question very badly, but only a few answered it very well. In general parts b) and c) were answered better than part a), but maybe that was because you would have needed around 15 points to get everything in a) and this is next to impossible in an exam situation. Quite a few students felt part c) was related to parts a) and b) (that the insurance risk was to be discussed in terms of how it was affected by the agency structure). In the marking guide it was not related to a) or b), ie insurance risk was to be discussed as a separate topic. We feel students who made this mistake should not be penalised as they made a reasonable interpretation of the question.

*Conclusion:* This question discussed agency and multi-agent distribution channels. With marks being tightly bunched it was not a good discriminator.

### **Paper 1, Question 3**

Some candidates gave a “textbook” answer on premium rating issues to which some marks were generally awarded, even though they weren’t in the marking guide.

Some candidates got very confused about whether premiums would be higher or lower under the level premium structure – the two influences, ie aggregate rates and level premiums would mean that premiums would mostly be higher except possibly for male smokers at some ages. Very few came up with a limiting age for insurance with a few commenting that old lives would find it unaffordable – perhaps showing little commercial experience of term insurance. We tended to be harsh on advocates of using population mortality, shows a poor understanding of mortality tables.

We also looked for answers to c) to be in the form of a recommendation. Part b) gave relatively “easy” marks – the quality of answers varied, and we tried to reward better quality answers. The transfer value part produced a variety of answers. There wasn’t much discussion of how this would in practice be used to calculate premium rates after transfer.

*Conclusion:* This question addressed a number of issues relating to product development and analysis, under the guide of a proposed legislative change. The level of commercial understanding of the possible implications was poor.

## Paper 1, Question 4

Some students suggested alternative, valid fee structures, and marks were provided accordingly. Additionally, negative marks were allocated in a handful of cases where students showed a dangerous lack of understanding.

Overall, most students answered this question poorly. In particular:

- Many students did not read the question correctly;
- Most students attempted less than 50% of the question;
- Of the students that attempted to calculate the current profit margin (and under half did), many had a reasonable idea of the calculations required. However, very few students were able to illustrate that they understood that the profit at issue was required to be respread over the life of the contract. Also, tax deductibility of expenses was frequently ignored.
- Very few students recognised that if the asset fee was increased, a surrender penalty should be applied on early surrender to allow for the unrecouped expense charges.
- Only a very small percentage of students made any attempt to perform calculations on the alternative fee structures.
- Many students found the following confusing:
  - For the purposes of MoS calculations, the fund grows at the net earning rate and is then discounted at the same earning rate;
  - How to allow for lapses in the calculations.
- A few students adopted an accumulation rather than a projection method to calculate the current profit margin. Some of these were performed quite well, however once started on this path the question became quite confusing. This could have been avoided if a statement that the projection method was to be used was made.

Given time pressures, the amount of marks available for this question and the lack of ‘number manipulation;’ in the course, only top students would be expected to get more than half marks for this question.

*Conclusion:* The question required a practical application of knowledge, as well as an understanding that issues can be addressed in more than one way. The markers comments, including the lack of ‘number manipulation, in the course, illustrate general issues which should be addressed in terms of course preparation and presentation (they are not exam’ issues per se).

## Paper 1, Question 5

Most students in general had a very limited understanding of appraisal values (with the exception of the 3 components).

Part a) – well answered, almost all students understood Appraisal Value was made up of 3 components.

Part b) – typically well answered.

Part c) – not well answered. Many students didn’t recognise that a roll forward of Appraisal Value was required to obtain the June 1999 value – many answers

indicated that some students didn't realise that an Appraisal Value is essentially a DCF calculation. Many students didn't recognise that the earnings rate on the net assets was different to the discount rate with which the value of in force was to be rolled forward. Many students used the incorrect amount of capital to roll forward at the earnings rate, and consequently incorrect value to roll forward at discount rate. Many students did not deduct the dividend paid to shareholders from the appraisal value.

Part d) – reasonably answered. Many students calculated impact on profits as (best est exp + best est inv) – (actual exp + actual inv). This approach didn't take into account that higher earnings than expected had a positive impact on AV, while higher expenses than expected had a negative impact on AV.

Part e) – not well answered. Very few students attempted to give a numerical analysis of the impact on AV. Many students didn't understand what impact the locking-in of additional capital had on an AV.

*Conclusion:* It is again disappointing to see what can be considered to be fairly basic questions poorly handled. This is an issue which should be addressed in the study materials, and the mechanisms by which these materials are delivered.

### **Paper 1, Question 6**

Generally the question was very poorly answered, only 20% of students scored half marks or more. The wording of the question in part c) was unfortunate and led most candidates in the wrong direction. We feel that part c) should have been the best answered part of the question as it is purely bookwork and a large majority of students would have known exactly the procedure for profit testing but this was not born out in the papers, as almost universally, students answered this part very poorly and many candidates scored very few marks in this section. Part a) and b) which required more thought and judgement generally were better answered.

*Conclusion:* A large number of candidates had marks bunched in the SBS category. This is particularly reflective of the poor results achieved on part c) – which should be expected to be well answered. This lack of understanding of profit testing requirements and procedures is disappointing at this level.

### **Paper 1, Question 7**

Overall, we were disappointed in the attempts at this question. On reading the question we felt it to be a good one - only 2 or 3 marks for each section, a bonus for just including "Dear Sir". Only two-thirds of the students picked up this bonus.

Our general feeling is that the poor results are not a reflection on the question itself. There was nothing in parts a) to d) that was particularly difficult, but for some reason the students were unable to work out the key issues that were being sought from the questions. Is this the fault of the exam, the students, or the way the course is taught. Probably a bit of all three, but the last of these should be a concern to the Institute.

*Conclusion:* The question picked up on FCR's and MoS, and was not considered to be particularly difficult. The results for the last 2 parts, which required demonstrating an understanding of MoS, were poor, and perhaps illustrate an issue which should be picked up in the course materials in the future.



## Paper 2, Question 1

Generally the question was answered poorly, particularly as it was an open book exam; part (a) was bookwork, and reasonably well answered; answers to part (b) were generally poor, part (c) was answered poorly as well.

There were also a lot of answers to part (b) that were applicable to DI in general and not the product proposed by the Marketing Manager. A lot seemed to think that there would be no ratings for Gender, Smoking Status etc. The proposed ways of dealing with the concerns were often the answers you would expect from a question asking the ways in which Underwriters could deal with sub-standard risks, ie impose longer waits, restrict benefit periods. Further, in part (b) very few people identified that the policy in the question was not a continuous disability policy as defined in the Life Act. A lot of students thought that the premium discount was excessive. However, not many actually suggested ways to solve this, other than profit testing. There were some valid points to part (b) which were not in the marking guide.

With part (c) we did not give any marks for just stating that they would go to APRA unless they had identified that there was a reason to go to APRA in previous parts or stating under what circumstances they would be justified in going to APRA.

*Conclusion:* The question required knowledge of product development, and sought to have candidates explain the role of the actuary to non actuaries – the classical marketing ‘dilemma’. Solution exemplified a number of standard exam problems, including lack of focus on the questions actually asked, and lack of application of principles to specific issues.

## Paper 2, Question 2

No detailed comments were received.

*Conclusion:* This question focussed on the pricing and experience monitoring for a Unit Linked product. The relatively low marks achieved, on a question involving a familiar and widely used product, is not encouraging. The level of integration of materials from various parts of the course is also, by implication, not high – also potential cause for concern.

## Paper 2, Question 3

Many candidates missed the fact that the life company wrote only risk business. They wrote about investment strategies etc.

Many didn’t really answer Part (a). They just launched into suggesting solutions without first discussing what the problem was (ie the impact if there were no changes to procedures and practices).

Because they just started suggesting solutions rather than defining the problem, many didn’t really demonstrate that they knew what the concepts were. We considered this to be an important issue.

While we agree that bullet points are preferred, the candidates should still use complete sentences so that they explain what their point actually is. For example, several would just include a bullet point saying “anti-selection”, or “effect of anti-selection”, without explaining how the anti-selection might arise, or why it’s a problem.

Many didn't consider the marketing/administration/premium rating impact of their suggestions in part (b).

Many believed that homogeneity of risks is a requirement of unit rating.

*Conclusion:* This question was about underwriting, and the practical issues involved. A couple of typical exam issues arise from the solutions provided: not reading the question and answering it (as opposed to providing generalities), and a lack of appreciation of practical implementation issues. These issues relate to exam technique, and the orientation of the study materials.

#### **Paper 2, Question 4**

Some confusion with regards to timing due to the switch between years 1,2,3 and 4 in part a) and the calendar years in part f). Parts a) to d) were generally well answered and couldn't be used to differentiate students. e) and f) generally poorly answered.

Many students missed the point about the numbers of annuitants in force being different because of experience variations. Too many students in part f) thought that the profit margin would have changed – they could not recognise the difference in the data was a result of experience instead of changing assumptions.

Many students forgot to take into account interest in the calculation. Many students took the difference in BEL instead of MoS liabilities.

*Conclusion:* This question was numerical and about MoS. As the markers comments indicate, it showed a lack of understanding of basic building blocks of MoS. While it is accepted that time constraints limit numerical accuracy in exams, this is a continuation of an established trend in the life exams (namely, poor performance on numerical questions).

#### **Paper 2, Question 5**

Overall the question was poorly answered. The average mark for the 68 candidates that scored above zero was 9.2 and the maximum was 17.5, out of a possible 26 marks.

All parts of the question were marked generously in an attempt to award as many marks as possible. The main mistake of candidates was that they failed to understand what was required in each part of the question.

In part (a), many candidates discussed each of the main assumptions like investment earning rates, expenses and mortality, whereas the solution required a high level approach and a general discussion about the meaning of best estimate assumptions.

In part (b), most candidates did not cover the actual discretions and instead gave general comments on solvency and capital adequacy that weren't relevant to the question.

In part (c) most students gave a reasonable answer but many missed easy marks by omitting bookwork points like auditor's approval and the 4 principles that the actuary should consider. Some students mistakenly thought the question was related to the apportionment of profit.

Part (d) was poorly answered and candidates did not understand what was required as an answer. Many did not appreciate that the question was about professionalism the

responsibilities of various parties and ethics. Many candidates thought the focus of the question was on the distribution of profits and their answers concentrated on the 80% - 20% split as well as relevant issues in determining bonus rates. Many also discussed the Financial Condition Report and what should be included. Part (d) was the worst performing part of the question and many candidates lost most of their marks here.

Part (e) was similarly answered to (d). Candidates did not understand the point of the question and did not appreciate that it was about the avenues open to the actuary if he or she was being squeezed by the CEO.

*Conclusion:* This question was about professionalism. It was poorly answered, which is a potential cause for concern. The markers comments clearly identify the lack of knowledge and understanding prevalent.

### **Paper 2, Question 6**

No detailed comments received.

*Conclusion:* This question considered issues of equity and professional responsibilities. A good spread of marks was not achieved and, considering perhaps both parts a) and b) could be considered straightforward, the quality of solutions provided was poor.

## **Subject 3: General Insurance**

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### **Summary**

This year was the second occasion that the exam was open book.

### **Examiners**

Alan Greenfield – Chief Examiner

Gae Robinson – Assistant Examiner

Andrew Bendall – Assistant Examiner

### **Markers**

Clive Amery

Andrew Huszczo

Robyn Bateup

Adrian Lim

Jason Bunn

Richard Mayo

Scott Collings

Christa Marjoribanks

Michael Crouch

Blair Nicholls

Julie Demark

Ian Petersen

Paul Do

Daniel Smith

Adam Driussi

Geoff Trahair

Julie Evans

Bruce Watson

Martin Fry

David Whittle

Kevin Gomes

Stephen Wilson

David Heath

Noeline Woof

Rod Hoskinson

Richard Yee

### **Analysis of Questions**

#### **Paper 1, Question 1**

This was a simple question, which asked candidates to state the advantages and disadvantages of compulsory insurance being written either in the private or public sector.

This question was reasonably well answered by most candidates.

#### **Paper 1, Question 2**

This question was a mathematical question, asking candidates to complete three calculations with given data: a case estimate development factor; a PPCI in operational time; and a Bornhuetter-Ferguson claim reserve.

This question was not well answered. Many students misinterpreted the format of the data (presented by payment year not accident year). Also many students did not carry

out the adjustments for inflation properly. The question discriminated well between candidates. The course in future years should highlight the different formats in which data is provided. Especially, the format used in this question which is quite common.

### **Paper 1, Question 3**

This question asked candidates about superimposed inflation, making specific reference to two products (motor and public liability) and to two valuation methods (chain ladder and PPCF).

This question was very well answered and hence a poor discriminator between students. Perhaps it was too much a bookwork question.

### **Paper 1, Question 4**

This question related to forecasting and curve fitting of numbers of claims reported and claim payments. Candidates were asked to comment on an analysis undertaken by the claims department. The department's analysis was poor and did not take into account the shape of the data (ie underlying trends and seasonality). The question required some thought in discerning the trends, but was essentially straightforward. The marks were fairly well spread.

### **Paper 1, Question 5**

This question asked candidates to discuss issues relating to the decision to operate an insurance company at the statutory minimum solvency level. Students were required to list the interested parties in such a decision and discuss the proposal in relation to the risk of insolvency. It was considered a straightforward question with many students coming up with similar points.

The question was fairly well answered by most students.

### **Paper 1, Question 6**

This question related to the issues facing an insurer on whether to cover Y2K in its policies. This was a difficult question that required the application of sound judgement to a complex practical situation.

The question was answered poorly by many students. In fact no one was awarded an "A" grade. There was a reasonable spread of marks in the remaining 4 grades.

### **Paper 1, Question 7**

This question asked candidates to draw up a profit and loss statement for a class of business and to compare the resulting profit with a defined hurdle return. Follow on questions asked students to discuss issues relating to exiting the business and consideration of the alternatives available. The question required both a good understanding of general insurance accounts as well as application of judgement to an M&A type situation.

The mathematical part of the question was answered moderately well although many extremely basic errors were made by many students. Few students managed to do well on all parts of the question. Time pressure towards the end of the exam may have exacerbated this.

### **Paper 2, Question 1**

This question asked for distinctions to be made between Lenders Mortgage Insurance and Home Buildings and Contents Insurance. The question was meant to test the students' ability to compare the characteristics of the two products, one that would be very familiar and one that required some thought. However, it seems either the wording of the question was unclear or that students had a very weak understanding of Mortgage insurance.

The question was answered poorly by most students especially given that this was meant to be one of the more straightforward questions.

### **Paper 2, Question 2**

This question asked students to define and discuss a stop loss arrangement in relation to limiting the risk of losses in relation to a run-off portfolio. The first and third parts of the question were straightforward while the second part required a deeper understanding of the issues involved.

Overall the question was answered poorly with very few candidates scoring an "A" grade.

### **Paper 2, Question 3**

This question was a GLM question. Candidates were required to discuss different issues in relation to two sets of premium relativities for a motor portfolio. The question required a sound grasp of the GLM technique as well as a general understanding of pricing issues. Candidates were asked to present their answer in memo style. The course material refers only to a proprietary software package GLIM and not to GLM's. The question had to be written in this context. It would be preferable to introduce additional readings that corrected for this perceived shortcoming.

Generally this question was not answered very well. Few candidates were able to achieve good marks on all parts of the question.

### **Paper 2, Question 4**

This question asked candidates to comment on the different type of loss ratios in use. That is, by cohort (accident year, underwriting year and accounting year), undiscounted versus discounted and net versus gross. The question also asked for a recommendation of which loss ratio would be most appropriate for monitoring public liability profitability.

This question was poorly answered for what is a straightforward question.

### **Paper 2, Question 5**

In this question candidates were given the some sparse data relating to a reinsurance XOL contract. Students were required to price the contract, recommend whether it should be written at a specific price and indicate other information that would aid the analysis. The pricing required a fair degree of judgement due to the nature of the data.

Many candidates failed to justify their calculations although this was specifically requested in the question. Overall the answers were mediocre.

## Paper 2, Question 6

This question was the longest question on the two papers. It asked students to calculate outstanding claims liabilities using two methods (PPCI and PPCF). It also asked the students to comment on the data to recommend a single estimate based on their two results and to describe what other information should be sought.

To enable students to cover such a wide range of topics the question was set up to offer the students a number of shortcuts. Some calculations were required but not many. For example, PPCI's and PPCF's were already calculated. All data was presented in current values. Simplifying assumptions were given (ie inflation and discounting were not required and IBNR claims were assumed to be not). Finally only one accident year was required to be estimated. This had the advantage of requiring the students to assess all the data but only having to do a limited number of calculations.

Despite such endeavours on the part of the examiners many students failed to understand the question. Many calculated estimates for all accident years while many others inflated and discounted their answers. Some did both. These candidates obviously put themselves under extreme time pressure and were heavily penalised by being unable to answer the question properly. Both markers felt the question was clearly worded. The critical points could have been in bold text but it shouldn't be necessary. I see no easy solution other than stressing to candidates every year to read the question thoroughly and underline all the important bits.

The question required judgement in many aspects and tested the candidates' ability to notice and deal with unusual features in the data. Overall the answers were poor. Many missed the existence of superimposed inflation, estimating the tail and the features in the data. Some could not perform a simple PPCI estimation. The question discriminated very well between candidates.

## ***Subject 4: Superannuation & Other Employee Benefits***

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### ***Summary***

21 candidates presented themselves for examination. It is recommended that the pass mark be set at 205 out of 400 with the result that 12 candidates passed.

### **Examiners**

Chief Examiner:	Peter May
Senior Assistant Examiner:	Graeme Humphrys
Assistant Examiner:	Melissa Napier

### **Markers**

Peter Vere	Nark Nelson
Darren Wickham	Graeme Humphrys
Melissa Napier	Peter Chun
Michael Burt	Catherine Rush
Bruce Thomson	Angela Mastrippolito
Alan Creighton	David Shade
Kevin Deeves	Andrea McDonnell
	Shane Mather

### ***Analysis of Questions***

#### **Paper 1, Question 1**

The question tested students knowledge of crediting rate policies and setting an investment policy for defined benefit funds and accumulation funds. Generally answers were long winded and took some time to get to the major issues. Apart from that, the standard of answers was reasonable.

#### **Paper 1, Question 2**

This question tested students knowledge of member investment choice. A few students confused this with choice of fund.

Most students took a practical approach although a few went overboard on options that could be offered.

#### **Paper 1, Question 3**

This was an insurance question which required a broad knowledge as well as specific knowledge in evaluating group insurance tenders.

Generally answered were reasonable.



**Paper 1, Question 4**

This question was on the risks faced by a defined benefit fund. Many students missed the point of the question or at least only briefly touched on the major points. The major issue was variations from expected experience.

**Paper 2, Question 1**

This was a question on funding methods. Most students understood the aggregate method but some were confused with the new entrant method.

**Paper 2, Question 2**

This question related to Notional Surchargeable Contributions Certification and the overall standard was low with many significant issues being missed by many students. Particular points missed were dealing with part-time members, new entrants and exits and dealing with persons on unpaid leave.

**Paper 2, Question 3**

This question dealt with a return of surplus to an employer. Overall standard was not high with many students missing the influence that the return of surplus would have on the employer contribution rate and the need for adequate security.

**Paper 2, Question 4**

This question dealt with the trend away from defined benefit funds. The question was strong on bookwork and was generally well answered.

**Paper 2, Question 5**

This question covered benefit design issues and competitiveness amongst superannuation funds. Reasonably well answered overall.

**Paper 2, Question 6**

This question related back to question 5 and dealt specifically with the issues involved in converting from defined benefit to accumulation.

Most students understood the major issues.

**Paper 2, Question 7**

This question dealt with long service leave liabilities. Many easy marks were missed by many candidates. Given the amount of bookwork the overall standard was disappointing.

## **Subject 5: Finance**

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### **Summary**

#### **Examiners**

Chief Examiner:	Andrew Jackson
Assistant Examiner:	Mark Wong
Assistant Examiner:	Dean Stewart

#### **Markers**

Marcus Arena	Adrian Liu
Fred Chan	David McNeil
Sue Clarke	Michael Price
Shauna Ferris	Sachi Purcal
Vincent Hua	Eric Ranson
Andrew Jackson	Ed Swayne
Tim Kyng	Mark Wong
	Jaron Yuen

### **Analysis of Questions**

#### **Paper 1, Question 1**

This question covered duration and convexity. This was a simple application of bookwork question and should not have been difficult. Most students performed well in this question.

#### **Paper 1, Question 2**

This question examined an example of an equity takeover. It required students to examine different ways that the takeover could be funded. Students generally performed well on this question.

#### **Paper 1, Question 3**

This question examined an example of an equity takeover. It required students to examine different ways that the takeover could be funded. Students generally performed well on this question.

#### **Paper 1, Question 4**

This question covered put call parity. Given a practical problem, students had to identify that put-call parity was required and then construct an arbitrage portfolio to take advantage of the mispricing. Most students identified that put-call parity was required, but a number could not properly construct an arbitrage portfolio of stock and options.

### **Paper 1, Question 5**

This paper was a slightly non-standard futures valuation question, requiring the students to construct an arbitrage portfolio to take advantage of mispricing in a futures contract. Once again, a number of students could identify that the futures were mispriced, but could not construct a set of transactions to profit from the arbitrage. For the better students, this represented no problem.

### **Paper 1, Question 6**

This question covered value at risk and involved discussing a particular implementation of a VAR approach. The question was generally well answered.

### **Paper 1, Question 7**

This question was a challenging question requiring an application of mathematical techniques involved in option pricing to a non-standard situation. The question involved deriving the partial differential equation used to price options based on a traded asset, sugar cane, and options based on a non-traded asset, the number of Mauritian Kestrel on an island at a particular date. Some students performed very well on this question, however most had difficulty applying standard option pricing techniques in a non-standard environment.

### **Paper 2, Question 1**

This question was a reasonably straightforward application of Itos Lemma to two different processes. This question was similar to an assignment question already done by students so was generally answered well.

### **Paper 2, Question 2**

This question required students to balance an option book, ensuring that the delta, gamma and vega exposures were neutralised. This question was reasonably well answered.

### **Paper 2, Question 3**

This question was a long one on leveraged leasing. Students were required to discuss aspects of leasing, and then had to perform a leasing calculation.

### **Paper 2, Question 4**

This question required students to value an interest rate futures contract and determine a set of transactions that result in an arbitrage profit. The second part of the question required students to recalculate the set of transactions required in the presence of transactions costs. This question was quite difficult and both markers noted that it was difficult to mark due to the variety of approaches tried by students. Overall this question had the best discriminating power of the exam, with good students performing quite well given the difficulty of the question.

### **Paper 2, Question 5**

This question related to the Merton jump diffusion process. Students were required to plot a stochastic diffusion process over three time steps given a sample of random shocks and jumps.

**Paper 2, Question 6**

This question related to finite difference approaches. Students were given a diffusion process, were required to derive the appropriate partial differential equation and finally show how explicit and implicit finite difference methods could be used to solve the pde. A number of students had a reasonably good understanding of this process and the question was answered quite well.

**Paper 2, Question 7**

This question was based on interest rate derivative pricing. No calculations were required, but students were required to discuss when various models should be used, and the limitations of different types of models. The understanding of interest rate derivative pricing models was relatively weak in comparison to other areas of the course.

