Actuarial Information Summary

Part I. Plan Information and Contributions

1	Name of pension fund			
2	Registration number			
3	Valuation date			
4	Number of years covered			
5	Contribution data	Year 1	Year 2	Year 3
a.	Contribution according to plan provisions			
b.	Solvency normal cost			
	(1) Employees			
	(2) Employer			
c.	Solvency payments			
	(1) Employees			
	(2) Employer			
d.	Minimum contributions			
	(1) Employees			
	(2) Employer			

Part II. Employee Data

					Average Salary			
6	Active employees	Number	Average Age	Ave Service	Last year	This year	Average Accrued Benefits	Accumulated Contributions
7	Termination from fund last year	Number	Average Age	Ave Service	Salary Last Yr.	Salary Yr. Before	Ave Payment	Ave Acc Contrib.
a.	Retirement							
b.	Death							
c.	Total disability							
d.	Partial disability							
e.	Termination							

Part III. Actuarial Method and Assumptions

		Asset Method	Liability Method	Mortality Table	Salary Scale	Interest Rate	Retirement Age	Administrative Expense
8	Ongoing valuation	Market value	Prospective Method	British A49-52 Ultimate	3%	9%	Age 60	2% + L.E. 10 per service
9	Solvency valuation	Market value	Accrued benefit	None	None	7% for first 15 years, 6% thereafter	Age 55	None

Part IV. Funded Status

		Liability	Assets	Surplus / (Deficiciency)	Funded Ratio
10	Ongoing valuation				
11	Solvency valuation				

Part V. Actuarial Gain / (Loss) on Solvency Basis

		Surplus / (Deficiency) last valuation	Contributions plus Interest	Solvency Normal Cost plus Interest	Expected Surplus / (Deficiency)	Actual Surplus / (Deficiency)	Solvency Gain / (Loss)
12	Determination of Gain / (Loss)						

		Asset Experience	Turnover Experience	Salary Increase	Plan Amendments	Interest rate Change
13	Sources of Actuarial Gain / (Loss)					

Actuarial Techniques Training in Egypt
By Michael Sze
May 13, 2007

1- Introduction

This note is intended to serve as a brief summary of our meeting on Wednesday, May 9, 2007 with Dr. Abel, Chairman of EISA, as well as to provide some proposed follow-up actions. This note covers the following items:

- Overview of actuarial training needs
- Specific target towards candidates who are looking to become Qualified Pension Actuaries in Egypt in the coming years.
- Detailed plan for First Basic Course in general actuarial techniques and the Equivalence Qualification Examination 1.

2- Overview of actuarial training needs

Current actuarial practice and valuations on pension plans are not acceptable according to international standards. A retrain of actuaries and particularly in pension is to be increasingly required. The full training program should involve five examinations, which may take several years for actuaries to complete. The aim is to prepare candidates to produce at least twenty fully qualified pension actuaries from them in five years.

Much of the success of the program hinges on the First Basic Course, which leads to the first Qualification Examination. This basic course must serve dual purposes:

1. To attract candidates with good potentials to the actuarial profession, and
2. To weed out candidates who cannot stand the rigor required by the actuarial profession.
3. Prepare candidates who are looking to start taking the professional actuarial examinations

For this reason, the course is only open to candidates and actuaries with Mathematics, Statistics, or related Science background. The course will be intensive, leading to the first actuarial qualification examinations after the course.

In order to build up a broad enough base for subsequent courses, the first basic course will be offered twice at six-month intervals, plus another short two-week review course in-between. The goal is to produce thirty to forty students to go on the subsequent courses.

After the first year, the other courses are successively introduced, and continue to be offered at six-month intervals. A rough schedule of the courses and related examinations are as outlined in the following table:

	Jan. – Mar.	Apr. – Jun.	Jul. – Sept.	Oct. – Dec.
2007			Course/Exam 1	Review/Exam 1
2008	Course/Exam 1		Courses/Exams 1&2	Review/Exam. 2
2009	Courses/Exams 1,2,3		Courses/Exams 1,2,3,4	
2010	Courses/Exams 1,2,3,4,5		Courses/Exams 1,2,3,4,5	

Each course is taught by international experts twice: the first time to set the syllabus, and write all study materials, the second time to train the trainers. After the first two offerings, the courses are taught by local experts.

3- Specific target towards Candidates to become Pension Actuaries in Egypt

In view of the urgent need to train candidates in actuarial profession to become qualified actuaries particularly qualified actuaries in pension to perform pension valuations up to international standards. This course will be directly liked to the core technical actuarial education according to the international standard of the Faculty and Institute of Actuaries in the UK and the Society of Actuaries in the US systems. However, we mainly pattern the training according to the Enrolled Actuaries System in the United States.

In the United States, pension actuaries are considered to be fully qualified after passing Enrolled Actuaries Examinations I and II (EA-1 and EA-2). EA-1 tests knowledge of (1) mathematics of compound interest and practical financial analysis and (2) the mathematics of life contingencies and practical demographic analysis. EA-2 tests (1) the selection of actuarial assumptions, actuarial cost methods, and the calculation of contributions, and (2) knowledge of relevant federal pension laws as they affect pension actuarial practice. In recent years, because of complications of the US pension laws, the two topics of EA-2 are tested in two separate sessions.

We shall adapt the US system to the Egyptian environment and circumstances.
First Basic Actuarial Course will cover the same material as those of EA-1. Qualification Examination 1 will be set to the comparable standard as EA-1.
Second Actuarial Course will cover relevant topics in (1) the selection of actuarial assumptions, actuarial cost methods, and the calculation of contributions, and (2) knowledge of Egyptian pension laws as they affect pension actuarial practice.
Since the Egyptian pension laws are substantially simpler than the US laws, only one examination is needed. This will be Qualification Examination 2.
The beauty of this approach are two-folds:

1. We are not compromising on the standards of actuarial pension practice in Egypt,
2. We may be able to help in producing qualified pension actuaries by as early as end of 2008.

This will take care of the vacuum, which may result in other approaches.

Detailed plan for First Basic Course and Qualification Examination 1.

Syllabus Same as for EA-1
Reference Books Same as for EA-1
(A copy of the Enrolled Actuaries Examination Syllabus is attached).

Date of Course August 12, 2007 – September 13, 2007

Instructors August 12, 2007 – August 23, 2007: To be invited by Michael Sze
August 26, 2007 – September 13, 2007: Michael Sze

Tutors Two local actuaries or professors from local universities

Qualification Examination 1.
Will be all multiple choice questions, to be set by the instructors. A Qualification Board will be set up by invitation of the Chairman of the EISA to be in charge of the Examination and the passing standards.

"As I indicated in my discussion with Mike and Gail that this will not be acceptable in the market. I prefer for the time being to introduce the first course as a training course in Actuarial Techniques even though it is linked to cover the same material as those of EA-1. Qualification Examination 1."

Make-up Examination 1. Will be offered in November or December, after a two week review course. The format of the Make-up Examination is exactly the same as the regular Qualification Examination 1. Exact timing and instructors, etc., should be determined after the results of Qualification Examination 1.

A Proposal for the First Course in Actuarial Techniques Training

1- The name of the course,
"Foundation of Actuarial Techniques".

2- Date plane,
The first course would take place for 5 weeks starting in August 2007 and ends in September 2007.
The suggested starting date to be on either Sunday 5/08/2008 or Sunday 12/08/2008 and ends on Thursday 6/09/2007 or Thursday 13/09/2007.

3- Hours of classroom time
The course should be run on the basis of 7 hours of teaching per day on the following suggested basis
8:00 – 9:45 first session
9:45 -10:00 tea break
10:00 – 11:45 second session
11:45 – 12:30 lunch

12:30 – 14:15 third session
14:15 – 14:30 tea break
14:15 – 14:30 tea break
14:30 – 16:15 fourth session

4- Outline of the course,

I think that Mike has got it already in place and if he would like we can talk about it in a meeting together.

5- Place of classroom and classroom equipment

Many insurance companies and the insurance federation have expressed interest to host such events. If you agree I can start negotiate with them to arrange hosting this event. Mike can let us know what equipments course will need and we can take this into account when we make the arrangements for booking the classroom.

6- Exam dates,

Between Sunday 9/09/2007 and Thursday 20/09/2007 according to the time plan of the course.

7- required textbooks

Mike can advise on this and if he would like we can talk about it in a meeting between us.

8- Prerequisites for the candidates taking the course.

1- Candidates with a university degree in Mathematics, Statistics, computing or engineering.
2- Individuals with good level and background in Mathematics, Statistics, or related Science.

9- Targeted Institutions

This training Programme should target the followings:-

1- Graduates from Cairo University and American University with Actuarial Science qualifications.
2- Employees in the actuarial departments in the private and public pension funds in Egypt
3- Employees in the actuarial departments in the private and public pension funds in the Middle East
4- Employees in the actuarial department in EISA
5- Candidates from the banking sector in Egypt
6- Candidates from the insurance companies in Egypt and the Middle East.

Actuarial Training Course 1
Fundamentals of Actuarial Techniques
– August, 2007

Mid Term Examination 1

Name: _____

Time allowed: 3 hours

There are twenty questions in this test, each worth 1 point.

Question 1

Data:
Face amount of bond: $100,000
Maturity value: $100,000
Maturity date:12/31/99
Coupon rate: 7% per year, compounded semiannually
Coupon dates: 6/30 and 12/31
Return on reinvested coupons: 6% per year, compounded semiannually
Purchase date: 1/1/87
Purchase price: $97,500
Sale date: 7/1/88
Sale price: $103,000
Question: In what range is the annual effective yield rate earned by the seller?

(a) Less than 10.70%

(b) 10.70% but less than 10.80%

(c) 10.80% but less than 10.90%

(d) 10.90% but less than 11.00%

(e) 11.00% or more

Question 2

Data:
Amount of loan: $25,000
Period of loan: 5 years
Interest rate: Years 1-3: 8% per year, compounded quarterly
Years 4-5: 6% per year, compounded quarterly
Repayments: Equal installments at the end of each quarter
Question: In what range is the quarterly installment?

(a) Less than $1,485

(b) $1,485 but less than $1,495

(c) $1,495 but less than $1,505

(d) $1,505 but less than $1,605

(e) $1,605 or more

Question 3

Data:
Selected values: $s_{2n|} = 43.7840$ $s_{2n|} = 105.2970$ $(1+i)^n = 2.0803$.
Question: In what range is $s_{n|}$?

(a) Less than 13.5

(b) 13.5 but not less than 14.0

(c) 14.0 but not less than 14.5

(d) 14.5 but not less than 15.0

(e) 15.0

Question 4

Data:
Initial deposit to guaranteed investment contract: $100,000
Purchase date: 1/1/88
Maturity date: 1/1/98
Interest credited on initial deposit: 8% per year, reinvested at the end of each year
Interest credited on addition: 6% per year, reinvested at the end of each year
Question: In what range is the accumulated value of the contract as of 1/1/98?

(a) Less than $180,000

(b) $180,000 but less than $195,000

(c) $195,000 but less than $210,000

(d) $210,000 but less than $225,000

(e) $225,000 or more

Question 5

Data:
Amount of mortgage: $100,000
Date of mortgage: 1/1/88
Date of first installment: 12/31/88
Number of equal annual installments: 30
Interest rate: 6%, compounded annually
On 12/31/94, an additional payment is made so that the mortgage will be paid off on 12/31/2010 without changing the amount of regular annual installments during the period of the mortgage.
Question: In what range is the additional payment?

(a) Less than $12,500

(b) $12,500 but less than $15,000

(c) $15,000 but less than $17,500

(d) $17,500 but less than $20,000

(e) $20,000 or more

Question 6

Data:
Face amount of bond: $100,000
Maturity value: $100,000
Maturity date: 12/31/97
Coupon rate: 8% per year, compounded semiannually
Coupon dates: 6/30 and 12/31
Purchase date: 1/1/88
Call date: At the option of the issuer, the bond is redeemable on 12/31/92 for $109,000
Minimum yield to purchaser: 6% per year, compounded semiannually

Question: In what range is the purchase price?

(a) Less than $110,000

(b) $110,000 but less than $112,500

(c) $112,500 but less than $115,000

(d) $115,000 but less than $117,500

(e) $117,500 or more

Question 7

Data:
Amount of loan: $100,000
Period of loan: 30 years
Payments: Level amounts at the end of each month
Interest rate: 6% per year, compounded monthly

Question: In which range is the interest paid during the first 20 years of the loan?

(a) Less than -0.70%

(b) -0.70% but less than -0.65%

(c) –0.65% but less than –0.60%

(d) –0.60% but less than –0.55%

(e) –0.55% or more

Question 8

	Date	Amount
Trust Market Value	1/1/88	75,000
	3/31/88	80,800
	6/30/88	93,700
	9/30/88	73,200
	1/1/89	77,600
Contributions Received	4/1/88	15,000
	12/31/88	2,700
Benefits Paid	7/1/88	12,200
	9/29/88	10,100

Question: In which range is the time-weighted rate of return of 1988?

(a) Less than 9.25%

(b) 9.25% but less than 9.50%

(c) 9.50% but less than 9.75%

(d) 9.75% but less than 10.00%

(e) 10.00% or more

Question 9

Data:
Amount of loan: $100,000
Date of loan: 1/1/89
Period of loan: 30 Years
Interest rate: 12% per year, compounded yearly
Payment schedule:

1989:	No payments
1990:	Level payment at the end of each month such that the balanace after each payment equals the balances of 12/31/89
1991 -2018:	Level payments at the end of each month such that the balance after the last payment equals zero.

Question: In which range is the total interest paid during the life of the loan?

(a) Less than $275,000

(b) $275,000 but less than $285,000

(c) $285,000 but less than $295,000

(d) $295,000 but less than $305,000

(e) $305,000 or more

Question 10

Data:
A fund consists of two accounts A and B:

Market value of Account A as of 1/1/89	$200,000
Interest on Account A	6% per year, credited on 12/31
Market value of Account B as of 1/1/89	$100,000
Interest on Account B:	9% per year, compounded semiannually, credited on 6/30 and 12/31

Each interest payment from Account A is immediately invested in Account B. There have been no contributions to or disbursements from the fund since 1/1/89.

Question: In which range is the market value of the fund as of 1/1/94?

(a) Less than 422,000

(b) 422,000 but less than 424,000

(c) 424,000 but less than 426,000

(d) 426,000 but less than 428,000

(e) 428,000 or more

Question 11.

Data:

Face amount of bond: $10,000

Purchase Date: 1/1/80

Maturity Value: $10,000

Maturity Date: 12/31/94

Coupon rate: 8% per year, compounded semiannually

Coupon dates: 6/30 and 12/31

Purchaser's yield to maturity: 6% per year, compounded annually

Question: In what range is the amortized value of the bond as of 9/30/89?

(a) Less than $10,900

(b) $10,900 but less than $11,100

(c) $11,100 but less than $11,300

(d) $11,300 but less than $11,500

(e) $11,500 or more

Question 12

Data:

	Date	Amount
Trust market values:	1/1/89	$100,000
	4/1/89	130,000
	7/1/89	95,000
	10/1/89	130,000
	1/1/90	150,000
Contributions received	3/31/89	20,000
	6/30/89	10,000
	9/30/89	20,000
	12/31/89	10,000
Benefits paid	6/30/89	40,000
	12/31/89	5,000

Question: In what range is the time-weighted rate of return for 1989?

(a) Less than 34.0%

(b) 34.0% but less than 35.0%

(c) 35.0% but less than 36.0%

(d) 36.0% but less than 37.0%

(e) 37.0% or more

Question 13.

Data:

Amount of loan: $50,000

Date of loan: 1/1/89

Date of first payment: 3/30/89

Frequency of payments: Quarterly

Number of payments: 60

Amount of each of the first 29 payments: $1,300

Amount of each of the final 30 payments: $2,000

Interest rate: 9% per year, compounded monthly

Question: In what rang is the 30^{th} payment?

(a) Less than $650

(b) $650 but less than $800

(c) $800 but less than $950

(d) $950 but less than $1,100

(e) $1,100 or more

Question 14.

Data:

Amount of loan: $10,000

Date of loan: 1/1/89

Payment schedule:

8 quarterly payments of $Q beginning 3/31/89

11 monthly payments of $Q/3 beginning 1/31/91

Final payment of $850 on 12/31/91

Interest rate: 12% per year, compounded monthly

Question: In what range is Q?

(a) Less than $900

(b) $900 but less than $925

(c) $925 but less than $950

(d) $950 but less than $975

(e) $975 or more

Question 15.

Data:

Amount of loan: $3,000

Date of loan: 1/1/89

Date of first payment: 1/31/89

Frequency of payment: Monthly

Amount of each payment: 2% of monthly pay

Interest rate: 9% per year, compounded monthly

Pay increases: 4% per year, effective on January 1

1989 pay: $1,750 per month

Question: In what range is the outstanding balance of the loan as of 1/1/91?

(a) Less than $2,580

(b) $2,580 but less than $2,600

(c) $2,600 but less than $2,620

(d) $2,620 but less than $2,640

(e) $2,640 or more

Question 16.

Data:

Purchase price of bond: $18,666

Purchase date: 1/1/85

Maturity value: Par value

Maturity date: 12/31/89

Coupon rate: 7% per year, compounded semiannually

Coupon dates: 6/30 and 12/31

Purchaser's yield to maturity 6% per year, compounded semiannually

Question: In what range is the amortized value of the bond as of 1997?

(a) Less than $16,500

(b) $16,500 but less than $17,300

(c) $17,300 but less than $18,100

(d) $18,100 but less than $18,900

(e) $18,900 or more

Question 17.

Data:

Original provisions of loan:	$30,000
Date of loan	1/1/69
Date of first payment:	12/31/69
Frequency of payments:	Annual
Number of payments:	30
Interest rate:	8% per year, compounded annually

The loan was renegotiated on 1/1/89

Renegotiated provisions of loan:

Amount of loan:	Outstanding balance as of 1/1/89
Date of first payment:	12/31/89
Frequency of payments:	Annual
Number of payments:	5
Interest rate:	6% per year, compounded annually

Question: In what range is the payment due 12/31/89?

(a) Less than $4,100

(b) $4,100 but less than $4,200

(c) $4,200, but less than $4,300

(d) $4,300, but less than $4,400

(e) $4,400 or more

Question 18.

Data:

Face amount of bond: $10,000

Purchase date: 7/1/89

Maturity value: $11,000

Maturity date: 12/31/94

Coupon rate: 6% per year compounded semiannually

Coupon dates: 6/30 and 12/31

Purchaser's yield to maturity: 8% per year, compounded semiannually

Question: In what range is the purchase price of the bond?

(a) Less than $9,400

(b) $9,400 but less than $9,800

(c) $9,800 but less than $10,200

(d) $10,200 but less than $10,600

(e) $10,600 or more

Question 19.

Data:

Amount of loan: $12,450

Date of loan: 1/1/89

Date of first payment: 1/31/89

Frequency of payments: Monthly

Number of payments 192

Amount of each of the first 191 payments: $100

Interest rate: 6% per year, compounded annually

Question: In what range is the final payment?

(a) Less than $40

(b) $40 but less than $70

(c) $70 but less than $100

(d) $100 but less than $130

(e) $130 or more

Question 20.

Data:

Value of assets:	1/1/90	100,000
	4/1/90	160,000
	10/1/90	130,000
	12/31/90	130,000
Contribution on	3/31/90	50,000
Payments on	9/30/90	30,000

Consider the following methods for determining the fund's rate of return:

I. Time-weighted method

II. Uniform distribution throughout the year of all contributions and payments is assumed; simple interest is used

III. Dollar-weighted method; simple interest is used.

Which, if any, of the following rankings reflect the relative magnitude of the calculated rate of return under each method?

(a) I > II > III

(b) I > III > II

(c) II > I > III

(d) II > III > I

(e) The correct answer is not given above

Actuarial Training Course 1
Fundamentals of Actuarial Techniques
– August, 2007

Test 1

Name: _____

Time allowed: 1-1/2 hours

There are ten questions in this test, each worth 1 point.

Question 1

Two accounts, designated "Fund X" and "Fund Y", are set up now to receive future contributions. Money in either account will be credited with simple interest at the annual rate *r*.

Only one contribution will be made to Fund X. That will be in the amount of $14,000 and will be made 2½ years from now.

A series of three contributions will be made to Fund Y. The first contribution will be in the amount of $4,500 and will be made 1 year from now. The second contribution will be in the amount of $4,000 and will be made 2 years from now. The third contribution will be in the amount of $5,000 and will be made 3 year from now.

At the end of 3 years (just after the third contribution to Fund Y will have been made), the accumulated values in the two accounts will be identical.

In which of the following ranges does *r* lie?

(a) Less than 7.5%

(b) 7.5% but less than 8.0%

(c) 8.0% but less than 8.5%

(d) 8.5% but less than 9.0%

(e) 9.0% or more

Question 2

The nominal annual interest rate compounded monthly is 8%.

It is desired to find the equivalent nominal annual discount rate compounded eight times per year.

In which of the following ranges does this rate lie?

(a) Less than 7.70%

(b) 7.70% but less than 7.80%

(c) 7.80% but less than 7.90%

(d) 7.90% but less than 8.00%

(e) 8.00% or more

Question 3

Smith and Jones will each give $6,000 to University X.

Smith is to make four payments of $1,500 each. The first payment will be made on January 1, 2001, and the others will be made annually on January 1 thereafter.

Jones will make only one payment of $6,000.

Assuming an effective monthly interest rate of 1%, and the present values of the gifts are equal as of January 1, 2001, in which of the following months should Jones make his payment?

(a) May 2002

(b) June 2002

(c) July 2002

(d) August 2002

(e) September 2002

Question 4

Smith is to receive monthly payments of $400 on the first day of each month for 4 years beginning January 1, 2001. The effective annual interest rate is 5%.

In which of the following ranges is the present value of these payments on July 1, 2000?

(a) Less than $17,100

(b) $17,100 but less than $17,200

(c) $17,200 but less than $17,300

(d) $17,300 but less than $17,400

(e) $17,400 or more

Question 5

On January 1, 2001, Jones deposited $10,000 into an account earning a nominal annual interest rate of 8%, compounded monthly. He will withdraw $2,000 semi-annually, commencing July 1, 2001, with a smaller final payment.

In what range is the final payment?

(a) Less than $1,300

(b) $1,300 but less than $1,350

(c) $1,350 but less than $1,400

(d) $1,400 but less than $1,450

(e) $1,450 or more

Question 6

The Bank of Newfoundland offers an 8% mortgage convertible monthly.

In which of the following ranges does the difference between $d^{(4)}$ and $i^{(2)}$ lie?

(a) Less than -0.25%

(b) -0.25% but less than -0.20%

(c) -0.20% but less than -0.15%

(d) -0.15% but less than -0.10%

(e) -0.10% or more

Question 7

Fund X has a nominal interest rate 12% compounded semiannually. Fund Y has a nominal discount rate of 12% convertible quarterly. Find the difference in the forces of interest for the funds.

In which of the following ranges does the difference lie?

(a) Less than -0.70%

(b) -0.70% but less than -0.65%

(c) –0.65% but less than –0.60%

(d) –0.60% but less than –0.55%

(e) –0.55% or more

Question 8

Fund X of 100 grows to 107 in one year at a nominal discount rate of d compounded monthly.

Fund Y of 200 grows to 220 in two years at a nominal interest rate of i compounded quarterly. Find $d - i$.

In which of the following ranges does the difference lie?

(a) Less than 1.90%

(b) 1.95% but less than 2.00%

(c) 2.05% but less than 2.10%

(d) 2.10% but less than 2.15%

(e) 2.15% or more

Question 9

Find n such that $1 + i^{(n)}/n = (1 + i^{(2)}/2) / (1 + i^{(4)}/4)$.

In which of the following ranges does n lie?

(a) Less than 2

(b) 2 but less than 3

(c) 3 but less than 4

(d) 4 but less than 5

(e) 5 or more

Question 10

Find $\lim_{i \to 0} [(i - \delta) / \delta^2]$

In which of the following ranges does the limit lie?

(a) Less than 0.5

(b) 0.5 but less than 0.6

(c) 0.6 but less than 0.7

(d) 0.7 but less than 0.8

(e) 0.8 or more

Actuarial Training Course 1
Fundamentals of Actuarial Techniques
– August, 2007

Test 2

Name: _____

Time allowed: 1-1/2 hours

There are ten questions in this test, each worth 1 point.

Question 1

Three contributions are made into a savings account with fixed interest rate of 6% per year. The contributions are $10,000 at the beginning of year 1, $20,000 at the end of year 2, and $25,000 at the end of the year 3. What should the account balance be at the end of year 5?

(a) Less than 65000

(b) Greater than or equal to 65000, but less than 65100

(c) Greater than or equal to 65100, but less than 65200

(d) Greater than or equal to 65200, but less than 65300

(e) Greater than or equal to 65300

Question 2

What is the present value of the stream of cash flow in Question 1?

(a) Less than 48500

(b) Greater than or equal to 48500, but less than 48600

(c) Greater than or equal to 48600, but less than 48700

(d) Greater than or equal to 49700, but less than 48800

(e) Greater than or equal to 48800

Question 3

Smith borrowed $100,000 on 1/1/2004 at a fixed interest rate of 7% per year, and have paid back $25,000 on 12/31/2004, and $30,000 on 12/31/2005, and $35,000 on 12/31/2006. What is his loan balance on 1/1/2007?

(a) Less than 26500

(b) Greater than or equal to 26500, but less than 26600

(c) Greater than or equal to 26600, but less than 26700

(d) Greater than or equal to 26700, but less than 26800

(e) Greater than or equal to 26800

Question 4

Jones borrowed $120,000 on 1/1/2003. He paid back $35,000 on 12/31/2003, $20,000 on 12/31/2004, $40,000 on 12/31/2005, and paid of the balance of the loan amounting to $49,493.80 on 12/31/2006.

In which of the following ranges is the fixed annual interest rate he is being charged?

(a) Less than 7.0%

(b) Greater than or equal to 7.0%, but less than 7.1%

(c) Greater than or equal to 7.1%, but less than 7.2%

(d) Greater than or equal to 7.2%, but less than 7.3%

(e) Greater than or equal to 7.3%

Use the following data for Question 5 and 6

A person borrowed $10,000 and can choose between two payback schemes A and B. The payback patterns at end of years are as follows:

	Year 1	Year 2	Year 3	Year 4
Payments from A	2,000	3,000	4,000	4,000
Payments from B	4,000	3,000	3,000	2,500

Question 5.

The internal rate of interest for scheme A exceeds that for scheme B by

(a) Less than – 0.400%
(b) Greater than or equal to – 0.400%, but less than – 0.200%
(c) Greater than or equal to – 0.200%, but less than 0.000%
(d) Greater than or equal to 0.000%, but less than 0.200%
(e) Greater than or equal to 0.200%

Question 6.

If the market interest rate is 10.00%, the NAV of excess payments under Scheme B exceeds that for Scheme A by:

(a) Less than 30.00
(b) Greater than or equal to 30.00, but less than 35.00
(c) Greater than or equal to 35.00, but less than 40.00
(d) Greater than or equal to 40.00, but less than 45.00
(e) Greater than or equal to 45.00

Question 7.
Quick Passer is an actuarial student who expects to pass all the actuarial examinations in four years. He has two job offers A and B. Offer A pays starting pay of $50,000 with an expected pay increase of 4% per year. Offer B pays starting pay of $45,000, with a regular pay increase of 3% per year, plus additional pay raises of 6% each year for passing examinations. Quick Passer fully expects to earn the additional examination raises every year, and intents to make his decision based on the present value of total pay in the next 4 years. Assuming pays are received at the beginning each year, and if the market interest rate is 10% per year, the present value of total salary from offer A exceeds that for offer B by:

(a) Less than - $2,000
(b) Greater than or equal to - $2,000, but less than - $1,000
(c) Greater than or equal to - $1,000, but less than $0,000
(d) Greater than or equal to $0,000, but less than $1,000
(e) Greater than or equal to $1,000

Question 8.
In Question 7, if Company A wants to provide competitive pay offer, what additional pay increase must it offer?

(a) Less than 0.50%

(b) Greater than or equal to 0.50%, but less than 1.00%

(c) Greater than or equal to 1.00%, but less than 1.50%

(d) Greater than or equal to 1.50%, but less than 2.00%

(e) Greater than or equal to 2.00%

Use the data in the following table for Questions 9 and 10.

	Date	Market Value
Asset value	**1/1/06**	**20,000**
	4/1/06	**19,600**
	7/1/06	**19,800**
	10/1/06	**20,100**
	1/1/07	**20,200**
Contributions	**1/1/06**	**200**
	4/1/06	**300**
	7/1/06	**300**
	10/1/06	**300**
Payments	**3/31/06**	**500**
	6/30/06	**400**
	9/30'06	**500**
	12/31/06	**600**

Question 9

What is the time-weighted return?

(a) Less than 5.50%

(b) Greater than or equal to 5.50%, but less than 5.52%

(c) Greater than or equal to 5.52%, but less than 5.54%

(d) Greater than or equal to 5.54%, but less than 5.56%

(e) Greater than or equal to 5.56%

Question 10.

What is the dollar weighted simple interest return?

(a) Less than 5.50%

(b) Greater than or equal to 5.50%, but less than 5.52%

(c) Greater than or equal to 5.52%, but less than 5.54%

(d) Greater than or equal to 5.54%, but less than 5.56%

(e) Greater than or equal to 5.56%

Actuarial Training Course 1
Fundamentals of Actuarial Techniques
– August, 2007

Test 3

Name: _____

Time allowed: 1-1/2 hours

There are ten questions in this test, each worth 1 point.

QUESTION 1

Consider the following data:

Date of loan:	1/1/91
Amount of loan:	10,000
Date of first payment:	12/31/91
Frequency of payment:	Annual
Number of payments:	10
Amount of each payment:	Increase 5% each year
Interest rate:	7% per year, compounded annually

In what range is the first payment?

A. Less than 1,100
B. 1100 but less than 1150
C. 1150 but less than 1200
D. 1200 but less than 1250
E. 1250 or more

QUESTION 2

Consider the following data:
Provisions of loan:

Amount of loan:	25,000
Interest rate:	10% per year, compounded annually
Repayment period:	10 years
Repayment amount:	Payment of P at the end of each year, plus an additional 5000 at the end of 10 years

In what range is the total interest paid?

A. Less than 19,000
B. 19,000 but less than 19,500
C. 19,500 but less than 20,000
D. 20,000 but less than 20,500
E. 20,500 or more

QUESTION 3

Consider the following data:

Date of loan:	1/1/91
Amount of loan:	5000
Date of first payment:	1/31/91
Frequency of payments:	Monthly
Amount of each payment:	Level
Length of loan:	5 years
Interest rate:	12% per year, compounded annually

In what range is total interest paid during the fourth year of the loan?

A. Less than 150
B. 150 but less than 220
C. 220 but less than 290
D. 290 but less than 360
E. 360 or more

QUESTION 4

Consider the following data:

Date of loan:	1/1/90
Amount of loan:	20,000
Date of first payment:	1/31/90
Frequency of payments:	Monthly
Number of payments:	60
Interest rate:	9% per year, compounded monthly

On 1/1/91, the amount of monthly payment was renegotiated using an interest rate of 12% per year, compounded monthly.

In what range is the outstanding balance of the loan as of 4/1/91?

A. Less than 14,400
B. 14,400 but less than 14,900
C. 14,900 but less than 15,400
D. 15,400 but less than 15,900
E. 15, 900 or more

QUESTION 5

Consider the following data:

Effective date of annuity:	1/1/92
Date of first payment:	3/31/92
Frequency of payments:	Quarterly
Number of payments:	40
Schedule of payments:	100 on 3/31/92, increasing by 100 each quarter
Interest rate:	8% per year, compounded quarterly

In what range is the present value of the annuity as of 1/1/92?

A. Less than 49,000
B. 49,000 but less than 50,000
C. 50,000 but less than 51,000
D. 51,000 but less than 52,000
E. 52,000 or more

QUESTION 6

Consider the following data:

Market value of fund:	Date	Amount
	1/1/91	200,000
	4/1/91	200,000
	7/1/91	286,000
	10/1/91	276,000
	1/1/92	260,000
Contributions to fund:	6/30/91	80,000
Benefit payments from fund	3/31/91	10,000

The time weighted rate of return for 1991 is in the range:

A. Less than – 2%
B. –2% but less than –1%
C. –1% but less than 0%
D. 0% but less than 1%
E. 1% but less than 2%

QUESTION 7

Consider the following data:

Effective date of perpetuity:	1/1/92	
Interest rate:	8% per year, compounded annually	
Payment schedule:	Date	Amount
	1/1/92	10
	1/1/93	20
	1/1/94	30
	1/1/95	40
	1/1/96	50
1/1/97 and each 1/1 thereafter		60

In what range is the present value of the perpetuity as of 1/1/92?

A. Less than 600
B. 600 but less than 650
C. 650 but less than 700
D. 700 but less than 750
E. 750 or more

QUESTION 8

Consider the following data:

Date of loan:	1/1/92
Amount of loan:	20,000
Date of first payment:	1/31/92
Frequency of payments:	Monthly
Amount of each payment:	Level
Number of payments:	36
Interest rate:	18% per year, compounded monthly

On 1/1/93, the loan is renegotiated, and the interest rate is reduced to 12% per year, compounded monthly. All of the other terms of the original loan remain the same.

In what range are the new payments?

A. Less than 600
B. 600 but less than 650
C. 650 but less than 700
D. 700 but less than 750
E. 750 or more

QUESTION 9

Consider the following data:

Effective date of an annuity certain:	1/1/93
Date of first payment:	1/1/93
Frequency of payments:	Annual
Amount of each payment:	$ 50,000
Number of payments:	20
Effective date of perpetuity:	1/1/93
Date of first payment:	1/1/93
Frequency of payments:	Monthly
Amount of each payment:	$X
Interest rate:	8% per year, compounded semiannually

The perpetuity is equal in value to the annuity certain.
In what range is $X?

(A) Less than $3,380
(B) $3,380 but less than $3,430
(C) $3,430 but less than $3,480
(D) $3,480 but less than $3,530
(E) $3,530 or more

QUESTION 10

Consider the following data:

Date of loan:	1/1/93
Amount of loan:	$100,000
Date of first payment:	6/30/93
Frequency of payments:	Semiannual
Number of payments:	60
Interest rate:	8% per year, compounded semiannually

Payments increase by 2% each six months.
In what range is the first payment?

(A) Less than $90
(B) $90 but less than $100
(C) $100 but less than $110
(D) $110 but less than $120
(E) $120 or more

Actuarial Training Course 1
Fundamentals of Actuarial Techniques
– August, 2007

Test 4

Name: _____

Time allowed: 1-1/2 hours

There are ten questions in this test, each worth 1 point.

QUESTION 1

Consider the following data:

Date of loan:	1/1/91
Amount of loan:	10,000
Date of first payment:	12/31/91
Frequency of payment:	Annual
Number of payments:	10
Amount of each payment:	Increase 5% each year
Interest rate:	7% per year, compounded annually

In what range is the first payment?

A. Less than 1,100
B. 1100 but less than 1150
C. 1150 but less than 1200
D. 1200 but less than 1250
E. 1250 or more

QUESTION 2

Consider the following data:
Provisions of loan:

Amount of loan:	25,000
Interest rate:	10% per year, compounded annually
Repayment period:	10 years
Repayment amount:	Payment of P at the end of each year, plus an additional 5000 at the end of 10 years

In what range is the total interest paid?

A. Less than 19,000
B. 19,000 but less than 19,500
C. 19,500 but less than 20,000
D. 20,000 but less than 20,500
E. 20,500 or more

QUESTION 3

Consider the following data:

Date of loan:	1/1/91
Amount of loan:	5000
Date of first payment:	1/31/91
Frequency of payments:	Monthly
Amount of each payment:	Level
Length of loan:	5 years
Interest rate:	12% per year, compounded annually

In what range is total interest paid during the fourth year of the loan?

A. Less than 150
B. 150 but less than 220
C. 220 but less than 290
D. 290 but less than 360
E. 360 or more

QUESTION 4

Consider the following data:

Date of loan:	1/1/90
Amount of loan:	20,000
Date of first payment:	1/31/90
Frequency of payments:	Monthly
Number of payments:	60
Interest rate:	9% per year, compounded monthly

On 1/1/91, the amount of monthly payment was renegotiated using an interest rate of 12% per year, compounded monthly.

In what range is the outstanding balance of the loan as of 4/1/91?

A. Less than 14,400
B. 14,400 but less than 14,900
C. 14,900 but less than 15,400
D. 15,400 but less than 15,900
E. 15, 900 or more

QUESTION 5

Consider the following data:

Effective date of annuity:	1/1/92
Date of first payment:	3/31/92
Frequency of payments:	Quarterly
Number of payments:	40
Schedule of payments:	100 on 3/31/92, increasing by 100 each quarter
Interest rate:	8% per year, compounded quarterly

In what range is the present value of the annuity as of 1/1/92?

A. Less than 49,000
B. 49,000 but less than 50,000
C. 50,000 but less than 51,000
D. 51,000 but less than 52,000
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QUESTION 6

Consider the following data:

Market value of fund:	Date	Amount
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The time weighted rate of return for 1991 is in the range:

A. Less than – 2%
B. –2% but less than –1%
C. –1% but less than 0%
D. 0% but less than 1%
E. 1% but less than 2%

QUESTION 7

Consider the following data:

Effective date of perpetuity:	1/1/92	
Interest rate:	8% per year, compounded annually	
Payment schedule:	Date	Amount
	1/1/92	10
	1/1/93	20
	1/1/94	30
	1/1/95	40
	1/1/96	50
1/1/97 and each 1/1 thereafter		60

In what range is the present value of the perpetuity as of 1/1/92?

A. Less than 600
B. 600 but less than 650
C. 650 but less than 700
D. 700 but less than 750
E. 750 or more

QUESTION 8

Consider the following data:

Date of loan:	1/1/92
Amount of loan:	20,000
Date of first payment:	1/31/92
Frequency of payments:	Monthly
Amount of each payment:	Level
Number of payments:	36
Interest rate:	18% per year, compounded monthly

On 1/1/93, the loan is renegotiated, and the interest rate is reduced to 12% per year, compounded monthly. All of the other terms of the original loan remain the same.

In what range are the new payments?

A. Less than 600
B. 600 but less than 650
C. 650 but less than 700
D. 700 but less than 750
E. 750 or more

QUESTION 9

Consider the following data:

Effective date of an annuity certain:	1/1/93
Date of first payment:	1/1/93
Frequency of payments:	Annual
Amount of each payment:	$ 50,000
Number of payments:	20
Effective date of perpetuity:	1/1/93
Date of first payment:	1/1/93
Frequency of payments:	Monthly
Amount of each payment:	$X
Interest rate:	8% per year, compounded semiannually

The perpetuity is equal in value to the annuity certain.
In what range is $X?

(A) Less than $3,380
(B) $3,380 but less than $3,430
(C) $3,430 but less than $3,480
(D) $3,480 but less than $3,530
(E) $3,530 or more

QUESTION 10

Consider the following data:

Date of loan:	1/1/93
Amount of loan:	$100,000
Date of first payment:	6/30/93
Frequency of payments:	Semiannual
Number of payments:	60
Interest rate:	8% per year, compounded semiannually

Payments increase by 2% each six months.
In what range is the first payment?

(A) Less than $90
(B) $90 but less than $100
(C) $100 but less than $110
(D) $110 but less than $120
(E) $120 or more

Actuarial Training Course 1
Fundamentals of Actuarial Techniques
– August, 2007

Test 5

Name: _____

Time allowed: 1-1/2 hours

There are ten questions in this test, each worth 1 point.

QUESTION 1

1. Data:

Age of the person:	40
Face value of life insurance:	100,000
Interest rate:	9%, compounded annually
p_x:	.96 for all x

Question: In what range is the present value of the life insurance?

a) Less than 30,000
b) 30,000 but less than 30,500
c) 30,500 but less than 31,000
d) 31,000 but less than 31,500
e) 31,500 or more

QUESTION 2

2. Data:

Payment of life annuity:	100,000 each year
Current age	40
Date of first payment	At the end of age 40
Interest rate	9% each year
p_x:	.96 for all x

Question: In what range is the present value of the life annuity?

a) Less than 600,000 b) 600,000 but less than 650,000
c) 650,000 but less than 700,000 d) 700,000 but less than 750,000
e) 750,000 or more

QUESTION 3

3. Data:

Payment of life annuity:	500 every two years
Current age	40
Date of first payment	At the end of age 41
Interest rate	13% each year
p_x:	.96 for all x

Question: In what range is the present value of the life annuity?

a) Less than 1,200
b) 1,200 but less than 1,300
c) 1,300 but less than 1,400
d) 1,400 but less than 1,500
e) 1,500 or more

QUESTION 4

4. Given the following survival probabilities:
   (1) Two persons age 35 and 45 will both live for 10 years is .8
   (2) A person age 60 will die in the next 5 years, while the other age 55 will live for 5 years is .6
   (3) A person age 35 will live for 30 years is .6

Question: In what range is the probability that a person age 35 will die between ages 55 and 60?

a) Less than .15
b) .15 but less than .16
c) .16 but less than .17
d) .17 but less than .18
e) .18 or more

QUESTION 5

5. Give that p_x is .95 for all ages x.

Question: In what range is the probability that a 20-year-old dies between ages 50 and 55:

a) .Less than 03
b) .03 but less than .035
c) .035 but less than .04
d) .04 but less than .045
e) .045 or more

QUESTION 6

6. Given:

Risk free interest rate	9% per year
Loan amount	5000
Period	20 years
Payments	At the end of each year
Default risk of the borrower	5% each year
Chance of renewed payments After default	0

Question: In what range is the additional payment amount required to cover the default risk?

a) Less than 240
b) 240 but less than 250
c) 250 but less than 260
d) 260 but less than 270
e) 270 or more

QUESTION 7

7. Given:

Risk free interest rate	9% per year
Loan amount	5000
Period	20 years
Payments	At the end of each year
Additional payment to cover	
The chance of default	250
Chance of renewed payments	
After default	0

Question: In what range is the default risk?

a) Less than 3%
b) 3% but less than 4%
c) 4% but less than 5%
d) 5% but less than 6%
e) 6% or more

QUESTION 8

QUESTION 9

QUESTION 10

Actuarial Training Course 1
Fundamentals of Actuarial Techniques
– August, 2007

Test 6

Name: _____

Time allowed: 1-1/2 hour

There are ten questions in this test, each worth 1 point.

QUESTION 1

Assume that the probability of death at each age between 40 and 65 is 1%, what is the chance that a person of age 40, dying during the year of age 65?

A. Less than 1.0%
B. 1.0% but less than 2.0%
C. 2.0% but less than 3.0%
D. 3.0% but less than 4.0%
E. 4.0% or more

Question 2.

A lends 1000 to B, who promises to pay him x at the end of each of the next 5 years as long as he is alive. If the probability of death is 2%, and the interest rate is 7%. How much must x be?

Question 3.

A 5-year bond with an annual coupon rate of 12% has a face value of 1000, has a default probability of 2%. If it is purchased to yield 7% return, what must the purchase price be?

Question 4.

Given the following life table

Age x	l_x
40	1,000,000
41	999,950
42	999,890
43	999,790
44	999,650
45	999,500

What should be the cost of a death benefit of 10,000, which will payable to the beneficiary of a person currently age 40 if the person dies at age 45?

Question 5.

Assuming the probability of death at each age on or after age 45 is 1.5%, and the interest rate is 6.0%, what is the value of a life annuity which pays 1000 each year starting at age 45?

Question 6.

A junk bond with a default probability of x% per year has a face value of 1000, a maturity date of 10 years, and a coupon rate of 6% payable semiannually. If the bond is sold for 940 when the market yield is 8%, what is the value of x?

Question 7.

Given that the probability of death in the next five years are as follows:

Year	0	1	2	3	4
Probability of death	8%	9%	10%	11%	12%

Find the value of a 5-year life annuity with annual payments of $1,000, payable at the beginning of each year.

Question 8.

What is the value of the life annuity in Question 7, if there is a 3-year guarantee payment period?

Question 9.

A 10-year bond has a face value of $1000 and a semi-annual payment of $40, and a 2% default probability. What is the market value of the bond when the market yield is 6%?

Question 10.

What is the modified duration of the bond in Question 9?