2012 PART III EXAMINATIONS

Subject Title: **C2A Life Insurance**

Date: **Tuesday 24 April 2012**

Time: **9:15 am – 12:30 pm**

Time allowed: Three (3) hours plus fifteen (15) minutes of reading time

Instructions: Each new question (but not each section of a question) must be commenced in a new answer book.

Number of Questions: **Five** (5)

Question	**Marks**
1	20
2	23
3	23
4	14
5	20
Total	**100**

Candidates are required to answer **ALL** questions.
This paper has **five (5) pages** (excluding this page).

COURSE 2A LIFE INSURANCE **APRIL 2012 EXAMINATIONS**

Answer all 5 questions

QUESTION 1 **(20 Marks)**

As a newly qualified actuary you have recently been given responsibility for the pricing of group life insurance for an Australian life insurance company. The group life business offers a death benefit to which additional TPD benefits can be added. No death benefit is payable once a TPD benefit has been paid and the TPD benefit is equal to the death benefit. TPD is defined as "unable to perform at least one of the major duties of your job". The underwriting policy includes automatic acceptance and underwriting for benefits in excess of the automatic acceptance limit.

After reviewing the numbers provided by the finance department, the Head of Group Business (who has a sales background and is not an actuary) has written to you noting that the following numbers suggest pricing problems for TPD business. The Head of Group Business is concerned that Death insurance is subsidising TPD insurance and has suggested that premiums for TPD be increased and those for Death be reduced.

Group Life Portfolio	Premiums	Claims	Ratio
Death	2,000,000	1,400,000	70%
TPD	1,000,000	1,150,000	115%
Total	3,000,000	2,550,000	85%

Note: In the above table, premiums are on an "earned" basis, claims are on an "incurred" basis and there is no reinsurance. You can assume that there are no problems with the calculation of earned premiums or incurred claims.

a) Draft a reply to the Head of Group Business. (7 Marks)

b) The Head of Group business has been negotiating with a newly established mining company which is interested in providing group insurance benefits for its workforce. The Head of Group Benefits is proposing to offer a small amount of TPD as compulsory cover for all members in the base product, and allowing individual members the option to increase their TPD cover for an extra premium. Discuss the issues you need to consider for this proposal, including (but not limited to) automatic acceptance, underwriting and the TPD definition. (7 Marks)

c) Outline how you would implement an Enterprise Risk Management (ERM) framework for managing the risks of the current group life portfolio. (6 Marks)

COURSE 2A LIFE INSURANCE **APRIL 2012 EXAMINATIONS**

QUESTION 2 **(23 Marks)**

You have been provided with the following profit test results for a single premium term insurance contract which covers risk for a period of three years. There is no tax payable, transfers are made at the end of each year and are equal to the value of assets in excess of the valuation liability.

Year	Policies at Start	Premium	Reserve BOY	Initial Expenses BOY	Renewal Expenses EOY	Claims EOY	Reserve EOY	Transfer before Interest	Interest	Transfer
1	1,000	2,400,000	2,160,000	120,000	49,950	300,000	1,438,560	491,490		
2	999		1,438,560		49,850	600,000	717,840	70,870		
3	997		717,840		49,700	900,000	0	-231,860		
	994									

Note: "BOY" means beginning of year and "EOY" means end of year

a)

i) Calculate the transfer for each year, assuming investments earn a 5% per annum return. (3 Marks)

ii) Calculate the Profit Margin as a percentage of premium. (2 Marks)

iii) Calculate the Value of New Business transfers at issue using a 15% discount rate. (1 Mark)

iv) Comment on the internal rate of return. (2 Marks)

b) What adjustments would you make to the valuation liability and how would this impact the transfers, profit margin and the present value of transfers at issue? Confirm your comments by giving an alternative basis and calculating the profit margin on the alternative basis. (7 Marks)

c) Discuss the suitability of using the profit margin, internal rate of return and the present value of transfers at issue for determining the appropriate premium rate for this policy. (4 Marks)

d) Describe how you would determine a risk neutral price for this product. (4 Marks)

QUESTION 3 **(23 Marks)**

For a number of years you have been working in the retail pricing area of an Australian bank, pricing home loans and banking deposit products. The bank you work for has recently purchased a smaller Australian bank which has an Australian life insurance company which only writes non superannuation risk insurance related to credit life and mortgages. Premiums are charged on a monthly basis according to the amount of loan outstanding at the start of the month.

The "One Bank" project team is looking at how to integrate the acquisition into the new structure. In particular the project team has asked for your opinion on the restructure proposals as you have previous experience working in an Australian life insurance company.

a) The "One Bank" project team has asked you to identify three advantages and three disadvantages for each of the following two proposals

Option 1 – Product Actuary: The Appointed Actuary works for the CFO, with the pricing of life insurance products being delegated to a Product Actuary in the Product Division.

Option 2 – No Product Actuary: The Appointed Actuary works in the product area and is responsible for pricing life insurance products as well as the statutory responsibilities. There is no Product Actuary role.

Draft your response and give, with reasons, your preferred approach. (8 Marks)

b) The life insurance company has previously paid a commission to the bank but the bank is adopting a relationship manager role. The bank has suggested that the insurance company should pay a share of the salary for each relationship manager in addition to the usual commission. Commission rates will remain the same at 40% of first year premium as there are significant sales volumes expected from the new model. Projections using these sales volumes show that the overall commission plus expense ratio as a percentage of premiums is forecast to remain steady over the 3 year projection period. Discuss this proposal and its financial impact on the life insurance company as well as any further investigations you would like to make. You can ignore any taxation issues. (8 Marks)

c) The "One Bank" project team has asked you to briefly outline the product development process assuming Option 1 was selected. The outline should identify each step, give a brief description of what is involved in each step and indicate whether the bank or the life insurance company is responsible for the delivery of each step. You can ignore the existing product development process for bank products and you can assume that marketing and product design will be handled in the Product Division of the bank and that distribution will be handled in the Retail Network division of the bank. You can also assume that administration and actuarial work will be carried out in the life insurance company. (7 Marks)

QUESTION 4 **(14 Marks)**

You are a Product Actuary who is calculating the Value of New Business for the non-participating product portfolio of an Australian life insurance company.

a) Describe how you would determine the gross best estimate investment return assumption to be used for the profit testing of non-participating products. (3 Marks)

b) Give a set of individual asset return assumptions which you believe are currently appropriate. Return assumptions are needed for inflation, cash, government fixed interest, commercial fixed interest, commercial property and listed equity asset classes. (3 Marks)

c) One of the products you are reviewing is directly linked to the All Ords accumulation index of the ASX (Australian Stock Exchange) and the unit price is determined as the index value divided by 1000. In the normal course of events, premiums and claims notified today have units allocated using the price calculated from the index value for the close of business today, but funds are not invested until the following business day. Transaction costs are 0.1% of actual trades. Daily unit fees (paid by deducting units) are .005% of the number of units multiplied by the unit price. Units deducted for fees are held in the shareholders account and redeemed at the end of the month at which time they are transferred out of the unit fund.

   Discuss the risks for this product and unit price design. (5 Marks)

d) The Marketing Department has suggested extending this index concept to overseas markets and the Appointed Actuary has asked for your advice on this proposal. Discuss the extra risks for overseas markets. Give, with reasons, your advice to the Appointed Actuary on whether or not you would accept or reject the recommendation. (3 Marks)

QUESTION 5 **(20 Marks)**

You are a qualified Actuary working for an overseas life insurance company which commenced writing regular premium participating whole of life policies 10 years ago. The participating fund is open to new business. For many years the company has been paying bonuses which are the same as included in policy illustrations and which assumed a 6% return on investment.

Under local regulations, participating business is written in a separate fund and premiums are calculated using a traditional formula approach. The interest rate used in the formulae must be 3% per annum and companies must use the same interest rate for premiums and cash values, both of which are guaranteed. Bonuses are all declared as cash payments. Shareholders receive a distribution of 25% of the cash bonus declared.

Regulations also state that policy funds for participating policies must be invested in special government bonds which are only available to financial institutions. The special government bonds are only sold for a ten year term and historically have been issued at par with a coupon of 6% per annum. The special bonds can be sold in an active listed market but only to other financial institutions. However, in the past year new special government bonds have been issued at par with a 2.5% coupon per annum and future issues seem likely to stay at this level.

The regulator is still considering lowering the rate of interest used to calculate the premium rate but regulations are expected to take some time to finalise.

The Chief Actuary has asked you to prepare some written comments on some specific areas that they need addressed for a report they are preparing. Your comments should include recommendations for further investigations and cover the following areas:

a) The impact that the current investment climate has on the ability of the invested assets to cover the product guarantees, both now and in the future. (Note: You do not need to discuss valuation regulations) (7 Marks)

b) Ceasing to write new participating business until the regulations are changed. (4 Marks)

c) The factors you would consider when determining a suitable basis for offering conversion from a regular premium participating whole life product to the company's existing regular premium unit linked product. These factors should include, but not be limited to, consideration of the impact on the customer, the participating fund and the shareholders (2 marks for each of these factors). The existing unit linked product has a premium charge of 5% of all premiums and a management charge of 2% of assets. There are no other charges or penalties and the full value of units is payable on surrender or maturity. (9 Marks)

END OF PAPER

