QUESTION 1 **(18 Marks)**

As a consulting actuary, you have been employed to assist in the due diligence review of a recently purchased life insurance company. The company only writes retail risk business and retail unit linked policies which are distributed through independent financial advisers.

The company is small and has not conducted an expense analysis. However, you are required to produce the actual unit costs to be used in the projection model being used to confirm the embedded value and the value of the new business within the next 2 days. You have been provided with the following information:

- Expenses, extracted from the company accounts and divided into the following categories
  - Salaries
  - Rent
  - Advertising
  - IT
  - Depreciation
  - Medical Fees
  - Other
- Salaries, divided into the following departments:
  - Administration - Initial Processing
  - Administration - Regular Processing and Client Service (including claims and unit pricing)
  - Underwriting
  - Finance, Actuarial
  - Investment
  - Sales
  - Marketing (including Actuarial Pricing)
  - IT
  - Human Resources
  - CEO and support services (e.g. legal, audit)

a) Assuming no further information is available, describe how you would allocate the salary expenses for the departments listed above to the following expense functions
   - acquisition processing
   - acquisition other
   - investment
   - maintenance
   - overhead

(5 Marks)

b) Describe how you would allocate the remaining expense categories in preparation for calculating unit costs. (6 Marks)

c) You have completed the expense analysis from a) and b) above and are now working on pricing new products for the same client. The expense analysis resulted in acquisition expenses of $100 per policy and 30% of premium, and maintenance expenses of $20 per policy and 5% of premium. Understandably, your profit tests have shown that small policies are unprofitable (small policies can be defined as policies with an annual premium of $150 or less, including a $20 policy fee). The minimum annual premium for retail risk products is $120 and for retail unit linked policies is $600.

Your client has asked you for your assessment of the impact of the following options for addressing this problem.

- Increasing the minimum premium
- Increasing the policy fee
- Changing expense loadings into % of premium based on average policy size
- Using marginal pricing to determine the minimum premium, assuming that average costs remain the same

Draft a memo to the client discussing the impact of the 4 options and which option you would recommend. (7 Marks)

QUESTION 2 **(15 Marks)**

You are the Chief Actuary for a large, well established, Australian financial services group. Your department is responsible for preparing the five year business plan projections using a best estimate basis.

a) List the experience assumptions (apart from the investment return assumption) needed to project the asset fee income for a closed block of existing single premium unit linked superannuation business where the policy owners are now aged 50 to 59. Explain how each assumption affects the fee income and how each assumption varies with age and duration. You should consider each cause of decrement from the policyholder's perspective. (For example, just specifying discontinuances is too broad). You can ignore the interaction between assumptions but be specific about each different mode of decrement.

(8 Marks)

b) The fee income from the unit linked portfolio over the previous year was less than forecast even though sales and investment returns were above target. List two possible causes of this and give, with reasons, two recommendations to restore profitability without increasing fees. (4 Marks)

c) One of the top selling units is a Capital Stable Unit which provides a guaranteed return of the single premium paid at the end of seven years. The investment policy is at the discretion of the company. However, at least 35% of assets will be invested in equity investments with the balance invested in government bonds. Explain why this is an example of asymmetric returns and discuss the alternative methods you would use to reflect this asymmetry in your investment return assumptions. (3 Marks)

QUESTION 3 (17 Marks)

You are an actuary working in the Marketing Department of a large Australian life insurance company which has a significant volume of trauma insurance (also called dread disease insurance or critical illness insurance) in force. You are responsible for determining the price for new products. This price will be used for focus group research and, subject to Marketing Department approval, will then be forwarded to the Chief Actuary for final approval.

Your marketing colleague wants to add a new disease to the current list of trauma conditions covered under the product. The new disease has had a lot of media attention lately, due to celebrity involvement in fund raising for research. The disease is an untreatable progressive disease with a delay between diagnosis and disability but the disease eventually results in total disability and then death. However, as your colleague points out, published statistics show that the disease is diagnosed in less than 0.2% of population under age 70. Published statistics are subdivided into 10 year age bands as well as by sex.

The trauma benefits offered by your company expire at age 70, are issued on a yearly renewable basis with premium rates varying by age, sex and smoking status and the trauma benefit is paid in addition to any death benefit.

a) List four qualitative factors which you would consider when adding a new trauma condition to a trauma product. How do these factors apply in the case of the new disease? (4 Marks)

b) List four issues you would consider when determining the appropriate evidence required for assessing claims. How would each of these issues apply to the new disease? (4 Marks)

c) List four non actuarial resources you would consult when determining the benefit wording for the policy and explain why you would consult them. (4 Marks)

d) Describe how you would derive the final claim rate assumption for the new disease, assuming the benefit is paid on diagnosis of the disease. Your description should include the adjustment to the base incidence rates and the formula you would use, as well as the other factors. The Chief Actuary requires a specific claim rate for each trauma condition, not just a percentage increase in assumptions. Profit testing covers the period from sale of the benefit to benefit expiry. (5 Marks)

QUESTION 4 **(17 Marks)**

The Head of Wealth Management of an Australian bank has approached you, as the Head of Products, with the results of recent marketing research. The research shows that the bank's customers, particularly those with high net worth, are interested in wealth management products that will provide a guarantee over a longer term than existing term deposits and provide some potential for capital gains.

The bank distributes a range of single premium life insurance and unit trust products to its customers. The Head of Wealth Management has asked for your help in reviewing the existing product range and examining how a new guaranteed product can be developed.

a) Evaluate, from the customer's perspective, the differences in legal structure and capital requirements between life insurance companies and unit trusts as it relates to the security of benefits. (4 Marks)

b) As part of the product review process, the Manager, Product Training wants to understand how tax (personal income tax, company tax and superannuation fund tax) impacts the final benefit received by the customer and has asked for you to present a training session on this topic. In particular, the presentation should cover how tax is reflected in the unit price as well as any additional tax paid by the customer when the benefit is received. Describe, in general terms, how income tax affects the total after tax benefit received by a purchaser of the following products:

- Non Superannuation unit linked life insurance
- Superannuation unit linked life insurance, purchased as an employee using after tax contributions
- Non Superannuation unit trusts
- Pooled Superannuation unit trusts, purchased using after tax employee contributions

For the purpose of your training presentation, assume the products were purchased on 30 June 2000 on the purchaser's 55th birthday. The products were terminated by the purchaser on 30 June 2011 and all benefits were paid in cash. Assume that the unit charges and fees are the same for all products. (7 Marks)

c) It has been decided to introduce a single premium superannuation unit linked life insurance product which has a guaranteed value after 10 years. The unit has an ongoing charge of 2% per annum, no initial charge but an early termination fee of 4% of the account value in year 1, 3% in year 2, 2% in year 3 and 1% in year 4. The guaranteed value is the original premium, less any withdrawals made.

Investments are limited to Australian government guaranteed instruments and shares listed on the ASX. The company expects that as a result of the investment policy, it will not be expected to meet the cost of the guarantee. Discuss the advantages and disadvantages of managing this guarantee using a fixed asset mix and a variable asset mix (with a minimum allocation to listed shares). How would your answer change if the product was issued as a unit trust? (6 Marks)

QUESTION 5 (18 Marks)

You are a consulting actuary who has received an assignment from a medium size Australian life office, BestPrice Life. BestPrice Life only sells risk business and only distributes through independent financial advisers. The life office is currently undertaking a major strategic review and as part of that review is considering the outsourcing of major functions. In particular you have been asked to review a proposal to outsource the actuarial functions to a third party provider located overseas. The actuarial function has two areas.

- The Financial Reporting Department which includes the role of Appointed Actuary and reports to the Chief Financial Officer
- The Pricing Department which reports to the Head of Sales and Marketing who is responsible for the sales budget

The overseas provider is situated in a time zone which is 3 hours behind the head office of BestPrice Life, conducts all business dealings in English and has qualified and experienced staff members who are Fellows of the Institute of Actuaries of Australia as well as many actuarial students studying actuarial exams with the major actuarial bodies in the UK and US.

a) Prepare bullet points covering what the company needs to do to meet minimum APRA standards under LPS231, LPS510 and LPS520 which cover outsourcing, governance and fit and proper persons. The bullet points will be used as a discussion document in a "breakout group" for a strategic planning day which will consider the outsourcing proposal along with other strategic issues. For each standard you also need a single bullet point to identify the "Implications for Outsourcing the Actuarial Function". (8 Marks)

b) Evaluate the likely impact that outsourcing will have on each step of the product development process once the proposal to develop a new product has been approved. You can assume that there will be a small Appointed Actuary function reporting to the Chief Financial Officer and located in the head office in Australia. The Appointed Actuary will review the final product and provide experience assumptions. (10 Marks)

QUESTION 6 **(15 Marks)**

A life insurance company has been very successful in writing two products, regular premium yearly renewable term insurance and single premium unit linked investment business.

The sales executive responsible for the regular premium yearly renewable term insurance product has commented that the minimum profit margin required by the company is much stronger than that required for single premium investment linked business and consequently does not enable the company to maximise the value of new business. The CEO of the life insurance company has asked for you, in your role of Chief Actuary, to advise on this comment. Whilst the Actuarial Pricing Department does not report to you, company policy is that the final premium rates cannot be issued without your approval.

Both products are in position number 3 in their market segment with a market share of around 10%. The top selling product in each market segment has a market share of around 11%. The minimum profit requirements for both products are:

Profit Requirements	Regular Premium	Single Premium
Minimum After Tax Profit Margin	10%	2.00%
Maximum Strain as % Premium	100%	0.50%
Maximum Breakeven Period with Target Surplus	8	2
Minimum IRR on after Tax Profits	12%	12%

The actual profit results are:

Actual Profit Results	Regular Premium	Single Premium
Sales $M	60	1000
Number of Policies	100,000	50,000
Value of New Business (VNB) $M	35	17.5
Premium Per Sale	600	20,000
VNB per Sale	350	350
After Tax Profit Margin	10.0%	2.1%
Strain as % Premium	80%	0.50%
Breakeven Period with Target Surplus	8.0	2
IRR on after Tax Profits	16%	85%

a) Draft your reply to the CEO covering your advice on the sales executive's comment. (6 Marks)

b) For many years the company's vision has been to be the market leader for risk products. The product team that works for the sales executive has developed a new series of risk premium rates with premiums that are an average of 5% lower than the current premium rates. The sales executive expects a 15% increase in sales which will make the company the market leader. As the proposal increases the value of new business and still meets minimum return on capital requirements, the board should be willing to approve the proposal. The new business profitability results (shown below) have been calculated on existing assumptions but with higher sums insured and lower premium rates.

Actual and Forecast Profit Results	Regular Premium	New Regular Premium
Sales $M	60	69
Number of Policies	100,000	115,000
Value of New Business (VNB) $M	35	35.9
Premium Per Sale	600	600
VNB per Sale	350	312.2
After Tax Profit Margin	10.0%	8.9%
Strain as % Premium	80%	82%
Breakeven Period with Target Surplus	8.0	9.2
IRR on after Tax Profits	16%	12%

Critically evaluate the above results and the likely impact of the proposal on the profitability of new business and the profitability of in force business. Identify any further information you would request before making your final decision. (9 Marks)

END OF PAPER

