Practice Education Course – Group Benefits Practice Area
Exam – June 8, 2016

This exam consists of fifteen (15) multiple choice questions worth 12 points and six (6) written answer questions worth 32 points for a total of 44 points.

Table of Contents

Multiple Choice Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>2</td>
</tr>
<tr>
<td>Question 2</td>
<td>2</td>
</tr>
<tr>
<td>Question 3</td>
<td>3</td>
</tr>
<tr>
<td>Question 4</td>
<td>3</td>
</tr>
<tr>
<td>Question 5</td>
<td>4</td>
</tr>
<tr>
<td>Question 6</td>
<td>4</td>
</tr>
<tr>
<td>Question 7</td>
<td>5</td>
</tr>
<tr>
<td>Question 8</td>
<td>5</td>
</tr>
<tr>
<td>Question 9</td>
<td>6</td>
</tr>
<tr>
<td>Question 10</td>
<td>6</td>
</tr>
<tr>
<td>Question 11</td>
<td>7</td>
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<tr>
<td>Question 12</td>
<td>7</td>
</tr>
<tr>
<td>Question 13</td>
<td>8</td>
</tr>
<tr>
<td>Question 14</td>
<td>8</td>
</tr>
<tr>
<td>Question 15</td>
<td>9</td>
</tr>
</tbody>
</table>

Written Answer Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 16</td>
<td>11</td>
</tr>
<tr>
<td>Question 17</td>
<td>12</td>
</tr>
<tr>
<td>Question 18</td>
<td>13</td>
</tr>
<tr>
<td>Question 19</td>
<td>14</td>
</tr>
<tr>
<td>Question 20</td>
<td>16</td>
</tr>
<tr>
<td>Question 21</td>
<td>19</td>
</tr>
<tr>
<td>Question 22</td>
<td>21</td>
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</tbody>
</table>
SECTION 1: MULTIPLE CHOICE/GRID QUESTIONS

Each of the 15 multiple choice questions are worth 0.8 points for a total of 12 points. Circle the right answer on the multiple-choice question answer sheet.

Question 1 Which of the following are **false** with regards to calculating a postretirement obligation?

I. The steps are to determine the present value of the projected benefits stream at the time of retirement and further discount the present value from the date of retirement to the valuation date for the group as a whole.

II. The amount of the obligation that is accumulated to date is determined as the total projected benefit obligation multiplied by the rate of service to date divided by the total service.

III. The full eligibility date is the date where the employees post-retirement benefit vest and the full obligation is accounted for.

IV. Claim cost projections are based on the current average cost per member and can be adjusted for health and dental inflation, the impact of the increase in age of members, the discount rate and probability that members will survive.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All of the above

Question 2 Which of the following statements are **true** about Employee Future Benefits, Section 3462 in Part II of the CPA Canada Handbook?

I. Section 3462 permits the choice between the immediate recognition approach and the deferral and amortization approach in accounting for defined benefit plans.

II. The Section uses terminology such as “defined benefit liability (asset)” and “defined benefit obligation”.

III. The effects of remeasurements are referred to “Remeasurement and other items”. “Other items” include past service costs, and gains and losses arising from settlements and curtailments.

IV. Section 3462 is effective for fiscal years beginning on January 1, 2014.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All of the above
Question 3  Regarding the coverage provided by the Quebec Parental Insurance Plan to non-traditional couples, which of the following statements are true?

I. If both parents are male and jointly adopt a child, the adoption benefit can be shared between both parents.

II. If both parents are female and the child is born to one of the two mothers, the other mother normally qualifies for the paternity benefit.

III. If both parents are male and have a child with the assistance of a surrogate mother, only the biological father is entitled to the parental benefit.

A. I and II
B. I and III
C. II and III
D. I, II and III
E. None of a), b), c), or d) is correct

Question 4  Regarding the coverage provided under Workers’ Compensation in most provinces, which of the following statements are true?

I. Workers’ Compensation is 1st payor if a person is injured while driving a vehicle in the course of employment (e.g., a person delivering pizza who has a traffic accident)

II. If the employer has a pay-direct drug plan, there is a risk that claims that should be directed to Workers’ Compensation would be directed to the insurer because the pay-direct system is more convenient.

III. When designing a group insurance plan, the death benefits provided by Workers’ Compensation must be considered.

A. I and II
B. I and III
C. II and III
D. I, II and III
E. None of a), b), c), or d) is correct
Question 5  With respect to Dynamic Capital Adequacy Testing (DCAT), which of the following statements are true?

I. DCAT is one of a number of stress-testing processes that would fit within the insurer’s overall risk management process.

II. To perform the DCAT, it is necessary to have an understanding of the minimum regulatory and supervisory target capital requirements.

III. The DCAT report must include details on at least two adverse scenarios showing the greatest surplus sensitivity.

IV. Plausible adverse scenarios for Group Insurance include an increase in incidence rates for disability or a decrease in the rate of claim termination.

V. The base scenario would typically be consistent with the insurer’s business plan.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All

Question 6  The CIA believes adequate protection of LTD income benefits in the event of plan sponsor bankruptcy is in the public’s best interest. Which of the following is considered a viable option to the currently self-insured model?

I. Require pre-funding through a separate vehicle, such as a trust, for self-insured LTD income benefits.

II. Increase CPP coverage to fully replace private LTD income benefits.

III. Increase priority status for disabled employees in bankruptcy proceedings and require disclosure to employees of financial metrics and impacts of sponsor bankruptcy on benefits.

IV. Mandate insurance for long-term disability income benefits.

A. I, II and III
B. I, II and IV
C. I, III and IV
D. I and III
E. III and IV
Question 7    The Patented Medicine Prices Review Board (PMPRB) has a dual role: to ensure that prices at which patentees sell their patented medicines in Canada are not excessive; and to report on pharmaceutical trends of all medicines and R&D spending by patentees.

The PMPRB uses different criteria for selecting drugs in the pipeline. Which one of the following statements is not one of the criteria?

I. Only drugs in Phase III clinical trials or under the review by the U.S. Food and Drug Administration are considered a valid candidate.

II. Drugs must demonstrate the potential to have a significant clinical impact or a significant impact on other sectors of the health care system.

III. PMPRB will only consider a drug as a valid candidate if the cost is reasonable and acceptable to more than 75% of Canadian (based on last year’s yearly maximum pensionable earning).

IV. Drug description keywords that flag that a new drug could potentially change clinical practice include: first drug in a class, different mechanism of action, novel technology, add-on therapy, targeted niche, or an existing drug with a new indication.

V. Drugs are considered to be potential candidates if they could be used to treat life-threatening conditions, conditions with unmet needs or rare diseases, or if they could potentially change clinical practice in a therapeutic area.

A. I and III
B. III and IV
C. III only
D. I, III and IV
E. V only

Question 8   Business Enterprises, with offices in Québec, offers a dental ASO plan to all of their employees. Which of the following statements are true?

I. The special sales tax (9%) applies to the claims paid under the plan while the regular sales tax (9.975%) applies to the administration expenses only.

II. The taxable benefit to each employee for year 2015 will be the amount claimed by the particular employee and his/her dependents.

III. The tax on Capital of Insurance Corporation is charged on both the claims paid under the plan and the administration expenses.

A. All are true
B. All but I
C. All but II
D. All but III
E. None are true
Question 9  Melissa Nguyen started working at ColorfulHolidays on May 15, 2016. She has two children, Adam and Rosie, from a previous marriage. She has just moved in with her boyfriend of six months, Matthew, and she has just learned that they are expecting. Melissa still hasn’t told ColorfulHolidays of this pregnancy because she had just started working there and is worried of their reaction. Upon hire, Melissa enrolled her family under ColorfulHolidays group health plan.

Which of the following statements are false?

I. As ColorfulHolidays’ group insurance health plan is considered a Private Health Service Plan, Matthew is considered Melissa’s spouse.

II. After Matthew needs to buy glasses, which aren’t covered by the plan, Melissa can claim the amount from her Health Care Spending Account and can be used to calculate the non-refundable tax credit.

III. The birth of her new child is not considered a life event because she has already two children enrolled under her family coverage.

A. All are false
B. All but I
C. All but II
D. All but III
E. None are false

Question 10  Regarding the calculation of a group life insurance waiver of premium reserve, which of the following statements are true?

I. An increase in the interest rate will produce an increase in the reserve.

II. An increase in the recovery rates of disabled employees will produce an increase in the reserve.

III. An increase in the mortality rates of disabled employees will produce an increase in the reserve.

A. I only
B. II only
C. III only
D. None
E. None of a), b) c) or d) is correct
Question 11  In selecting an actuarial table, which of the following must be considered?

I. The reason the table was developed.
II. The type of experience used in developing the table.
III. Experience studies subsequent to the publication of the table that compare with the table.

A. I and II
B. I and III
C. II and III
D. I, II and III
E. None of A, B, C or D is correct

Question 12  Regarding laws and regulations that apply to actuaries and Group insurance, which of the following statements are true?

I. The Rules of Professional Conduct of the Canadian Institute of Actuaries forbids an actuary to infringe on the law or to lead a client to infringe on the law.
II. In Québec, laws and regulations impacting Group insurance are dispersed among many legal texts.
III. «Common Law» is the basis for civil law in Québec.

A. I and II
B. I and III
C. II and III
D. I, II and III
E. None of a), b) c) or d) is correct
Question 13  Regarding the designation of a life insurance beneficiary in the Province of Quebec, which of the following statements are true?

I. The spouse married to the insured person is an irrevocable beneficiary, unless the insured stipulated otherwise.

II. The common-law spouse of the insured person is an irrevocable beneficiary, unless the insured stipulated otherwise.

III. The civil union spouse of the insured person is an irrevocable beneficiary, unless the insured stipulated otherwise.

A. I and II
B. I and III
C. II and III
D. I, II and III
E. None of a), b), c), or d) is correct

Question 14  Which of the following elements must be used to calculate premium rates for group LTD?

I. Employer’s contribution

II. Elimination period

III. Disability incidence rates

IV. Disability termination rates

A. All but I
B. All but II
C. All but III
D. All but IV
E. None of A, B, C or D is correct
Question 15  With respect to Sources of Earnings analysis, which of the following statements are true?

I. Expected profit on in-force business includes the release of provisions for adverse deviations from long term disability claims reserves.

II. The experience gains and losses for group life and health business are the differences between the actual experience during the reporting period and the best estimate assumptions used in the most recent business plan or pricing.

III. A change to the level of margins for adverse deviations should be reported under “Management actions and Changes in assumptions”

IV. Understanding of changes in group earnings is greatly enhanced by an analysis of earnings in the first policy period separately from second and/or later policy periods.

V. The net income earned on the company’s surplus funds is separated from other investment income.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All
SECTION 2: WRITTEN ANSWER QUESTIONS

Answer 6 questions:

Each of the mandatory questions (Total of 20 Points)

- 16  5 points
- 17  5 points
- 18  5 points
- 19  5 points

plus

Two of the optional questions (Total of 12 Points)

- 20  6 points
- 21  6 points
- 22  6 points

Only the first two optional questions answered will be graded.
Question 16

You have just been hired as a consulting actuary for Southern Networks, a large manufacturer of electronic communication material.

The company operates in Ontario, Québec and New Brunswick.

Here are some statistics regarding the group insurance plan:

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Annual Gross Premiums</th>
<th>Insurer’s risk and profit charge (% of premiums)</th>
<th>Other expenses (% of premiums)</th>
<th>Employee Share of Premiums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life</td>
<td>$400,000</td>
<td>5.0%</td>
<td>10%</td>
<td>50%</td>
</tr>
<tr>
<td>Acc. Death &amp; Dismemberment</td>
<td>$60,000</td>
<td>unknown</td>
<td>unknown</td>
<td>unknown</td>
</tr>
<tr>
<td>Long Term Disability</td>
<td>$600,000</td>
<td>5.0%</td>
<td>10%</td>
<td>100%</td>
</tr>
<tr>
<td>Short Term Disability</td>
<td>$800,000</td>
<td>2.0%</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>Health</td>
<td>$1,400,000</td>
<td>2.5%</td>
<td>12%</td>
<td>50%</td>
</tr>
<tr>
<td>Dental</td>
<td>$1,000,000</td>
<td>2.0%</td>
<td>12%</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>$5,260,000</td>
<td>2.0%</td>
<td>12%</td>
<td>50%</td>
</tr>
</tbody>
</table>

IBNR Reserves are:

- $70,000 for life insurance
- $350,000 for LTD
- $350,000 for STD
- $500,000 for Health
- $230,000 for Dental

If the reserves were invested in Southern’s business, the rate of return on these reserves would be 7%. The insurer currently credits 2% on these reserves.

Due to some bad business decisions, the company is in dire need for cash to increase its working capital.

The Chief Financial Officer, after discussing with the Human Resources Vice President is recommending self-insuring all benefits except Accidental Death and Dismemberment in order to save on taxes, on the insurer’s risk and profit charges and on the insurer’s other expenses.

They have found a TPA (third party administrator) who would charge 8% of premiums to administer any coverage.

They have asked for your advice.

A. Calculate the potential savings on all taxes if they self-insure (pure self-insurance) all benefits except AD&D.

B. Calculate all other potential savings resulting from switching to self-insurance (assume that the IBNR reserves are transferred to the ASO plan at the beginning of the year).

C. Analyse the issues with the CFO’s proposals.
**Question 17**

A federal-provincial conference is currently underway, focusing on preparations for the upcoming federal and provincial budgets. The two levels of government agree on the need for an ambitious federal-provincial infrastructure spending plan, but they need to find the money to implement this plan and manage its budget. Much attention is being paid to potential cuts to various social programs. The changes being considered are listed below. Please indicate which changes would be of concern to the various stakeholder groups, and why. These groups are private plan sponsors, pensioners, insurance companies and the general public.

Possible changes:

1. Push back the CPP and OAS benefit start date to age 69.
2. Reduce the hospital ward co-payment by 50%.
3. Do not cover prescription dispensing fees for the elderly, and reduce co-insurance for the cost of prescription drugs by 50%.
4. Reduce employment insurance coverage by 25% and extend the waiting period by six weeks.
Question 18

Fortune City is a company in Alberta manufacturing fortune cookies. Due to the recent drop in oil prices, Fortune City reduced its employee count from 500 to 200. Their current program design is as follows:

Basic Life – 100% of salary; fully insured
AD&D – 100% of salary; fully insured
STD – 85% of salary, benefits up to 26 weeks; self-insured
LTD – 66.6% of salary, waiting period of 26 weeks, 2-year own occupation definition, fully insured
EHC – 5 options including opt out
Dental – 6 options including opt out

As the consultant for Fortune City, you were asked to comment on the following scenarios:

A. One way to reduce the Basic Life insurance premium is to remove the Waiver of Premium provision. What are some of the concerns if the Waiver of Premium provision is removed from the Basic Life insurance?

B. LTD is one of the most expensive benefits paid by Fortune City. Provide three possible plan design alternatives that will reduce LTD premium.

C. Fortune City is currently using the flexible benefit plan as a cost sharing mechanism. Fortune City would like to keep the cost sharing mechanism. What are the potential issues with offering a flexible benefit plan with five (5) EHC choices and six (6) Dental choices to a group of 200 employees?

D. To maintain flexibility but reduce cost, Fortune City would like to consider replacing both EHC and Dental choices by a Health Care Spending Account. Outline some concerns with this approach.
Question 19

Tatooine Enterprise has been your client for five years now. They have always operated in the province of Québec and pay 100% of the benefits for their employees. Here is a summary of its current monthly carrier invoice:

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Volume</th>
<th>Monthly Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Insurance</td>
<td>$3,580,000</td>
<td>0.18</td>
</tr>
<tr>
<td>Long-term Disability</td>
<td>$179,568</td>
<td>1.22</td>
</tr>
<tr>
<td>Health Care</td>
<td>Single 34</td>
<td>$78</td>
</tr>
<tr>
<td></td>
<td>Family 61</td>
<td>$219</td>
</tr>
<tr>
<td>Dental Care</td>
<td>Single 31</td>
<td>$39</td>
</tr>
<tr>
<td></td>
<td>Family 62</td>
<td>$109</td>
</tr>
<tr>
<td>EAP</td>
<td>97</td>
<td>$2.39</td>
</tr>
</tbody>
</table>

A. What is the annual amount of money Tatooine is paying to the carrier? There is no turnover at Tatooine and salary increases occur on January 1st.

B. What are the total taxable benefits at the Federal and Provincial levels?

As of January 1, 2017, Tatooine will acquire Alderaan Co. which is located in Ontario. Coincidentally, Alderaan offers the same plan as Tatooine except for life insurance, where the first $10,000 of life insurance is a self-insured death benefit.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death Benefit</td>
<td>$2,560,000</td>
</tr>
<tr>
<td>Long-term Disability</td>
<td>$106,400</td>
</tr>
<tr>
<td>Health Care</td>
<td>Single 27</td>
</tr>
<tr>
<td></td>
<td>Family 29</td>
</tr>
<tr>
<td>Dental Care</td>
<td>Single 27</td>
</tr>
<tr>
<td></td>
<td>Family 29</td>
</tr>
<tr>
<td>EAP</td>
<td>56</td>
</tr>
</tbody>
</table>

C. Should Tatooine add Alderaan’s employees to their plan or should the Tatooine employees be transferred to Alderaan’s plan?

D. The average fee for health care is currently 15.6% at Tatooine. How will the fees be impacted with the acquisition of Alderaan?

E. With this acquisition, Tatooine will not be able to pay for 100% of costs anymore. What are different ways Tatooine can share the premium costs with the employees, if Tatooine wants to pay 80% of the total pre-tax premiums? Which option would you recommend?

(Continued on following page)
F. Tatooine has decided to keep the Alderaan plan with the taxable LTD benefit and add a $500 health care spending account for all employees. What is the new annual amount paid to the carrier, by benefit?

- As the demographics for Alderaan are identical to Tatooine, the rates for the new plan are the same as the previous Tatooine rates.
- Assume use of 85% of HCSA and fees similar to the health care benefit.
Question 20
Maste Inc. currently offers 100% employer-paid post-retirement health and dental benefits.

Health Care:
- 80% coinsurance
- $100 per year per family deductible
- Includes: Rx, Paramedical, Vision and Hospital

Dental care:
- 80% basic services
- 60% major services
- Combined annual maximum of $2,000 per person per year

Maste Inc. is concerned about the ever increasing liability associated with the post-retirement benefits and would like to consider changing the plan designs for the future retirees to better manage costs in the long term.

You work for a consulting firm and need to help the consultant with a few tasks.

A. The consultant is thinking of proposing two alternatives:
   1. Replace the current health and dental with a Consumer Driven Health Plan where retirees will be provided with a Health Spending Account of $3,000 per year and a catastrophic coverage of $10,000 per year deductible, 100% coinsurance on Rx and Hospital at no cost to the retiree.
   2. Replace the current health and dental with a Flexible Benefit program where each retiree receives a flex credit of $1,500 and has the choice of three health designs (opt out, basic, enhanced) and three dental designs (opt out, basic, enhanced).

You are asked to comment on the comparison of the current design and the two alternatives from employee risk exposure, employee cost, and employer cost control perspectives.

B. In order to address employer’s concerns regarding long term financial control, identify the features in each of the alternatives that will help the employer to control long term cost.

(Continued on following page)
C. To prepare for the client meeting, the consultant has asked you to calculate liability associated with both of these options. Here are the results that you obtained from your valuation program:

Current Plan DBO (projected to May 31, 2016): $6,458,000

<table>
<thead>
<tr>
<th></th>
<th>Current Plan</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBO (May 31, 2016)</td>
<td>$6,734,000</td>
<td>$4,895,000</td>
<td>$1,110,000</td>
</tr>
<tr>
<td>SC</td>
<td>$178,000</td>
<td>$64,000</td>
<td>$30,000</td>
</tr>
</tbody>
</table>

Are the calculations appropriate? (Hint: Would you be able to justify the gain and losses?)

D. During the meeting Maste Inc. has asked why you were only targeting the future retirees. Also, discuss the challenges in changing post-retirement benefits, and the steps that an employer must follow.

E. Finally, Maste Inc. had decided to go ahead and implement Alternative 1 on June 1, 2016. Please complete the accounting template under IAS19 for their financial year end on May 31, 2016.

(Continued on following page)
Other Assumptions:
- The discount rate has changed from 5% to 4% on May 31, 2016
- The duration for the current plan is 14 and 10 for Alternate 1

**Reconciliation of the DBO**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBO (June 1, 2015)</td>
<td>$6,364,000</td>
</tr>
<tr>
<td>Service Cost</td>
<td></td>
</tr>
<tr>
<td>Interest Cost</td>
<td></td>
</tr>
<tr>
<td>Estimated Benefit Payments</td>
<td>($123,000)</td>
</tr>
<tr>
<td>Past Service Cost</td>
<td></td>
</tr>
<tr>
<td>Actuarial (Gains)/Losses</td>
<td></td>
</tr>
<tr>
<td>- From changes in experience</td>
<td></td>
</tr>
<tr>
<td>- From changes in demographic assumptions</td>
<td></td>
</tr>
<tr>
<td>- From changes in financial assumptions</td>
<td></td>
</tr>
</tbody>
</table>

**DBO (May 31, 2015)**

**Current Expense for the Year**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Service Cost</td>
<td></td>
</tr>
<tr>
<td>Past Service Cost</td>
<td></td>
</tr>
<tr>
<td>Interest Cost</td>
<td></td>
</tr>
<tr>
<td>Total Current Expense</td>
<td></td>
</tr>
</tbody>
</table>

**Recognition through Other Comprehensive Income**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial (Gains)/Losses on Obligation</td>
<td></td>
</tr>
<tr>
<td>Past Service Cost</td>
<td></td>
</tr>
<tr>
<td>Amount Recognized in OCI</td>
<td></td>
</tr>
</tbody>
</table>
Question 21

You have just been hired as a valuation actuary for the DI2B Insurance Company. Your company only sells a group long term disability product to mid-sized clients in Canada with the following features:

- 4 month elimination period
- 70% replacement ratio, non-indexed (85% all source maximum)
- Benefits payable to age 65
- 2 year own occupation definition

Claims management is outsourced to an external provider and their charge is equal to 8% of paid claims. Expenses are negotiated every year.

DI2B’s annual premium is $120,000,000.

Long Term Disability Claims Liability Assumptions:

<table>
<thead>
<tr>
<th>Interest:</th>
<th>3.1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disability termination rates:</td>
<td>100% of the 1987 Basic GLTD table</td>
</tr>
<tr>
<td>Expenses:</td>
<td>8% of paid claims</td>
</tr>
</tbody>
</table>

Incurred but not reported claims liability: 100% of the last four months of premium

Asset mix supporting the liabilities

Corporate A Bonds: 60%
Residential Mortgages: 40%

CALM Results

<table>
<thead>
<tr>
<th>Base Scenario</th>
<th>Liabilities ($ '000)</th>
<th>Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Liabilities</td>
<td>568,080</td>
<td>578,550</td>
</tr>
<tr>
<td>Equivalent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest rate</td>
<td>3.12%</td>
<td>2.93%</td>
</tr>
</tbody>
</table>

A. Comment on the current valuation assumptions and recommend changes if necessary.

(Continued on following page)
B. Calculate the current required capital for this block of business assuming the following distribution of the LTD Claims liability:

<table>
<thead>
<tr>
<th>Length of Benefit Period Remaining</th>
<th>Duration of Disability</th>
<th>&lt;1 year</th>
<th>1-2 years</th>
<th>2-5 years</th>
<th>&gt; 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>1-2 years</td>
<td>0%</td>
<td>0%</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>2+ years</td>
<td>25%</td>
<td>30%</td>
<td>20%</td>
<td>15%</td>
<td></td>
</tr>
</tbody>
</table>

C. Assuming a target MCCSR ratio of 175%, ROE objective of 13%, after-tax return on surplus of 2.5% and tax rate of 25%, what profit margin should be included in next year’s premium?
Question 22
You are the pricing actuary for a small insurance company offering one-year guarantee health insurance on a non-refund basis, with $5,000,000 of inforce premium and $1,000,000 of capital at December 31, 2015. Management has provided the business plan for 2016 which shows a 5% increase in embedded value and a new sales objective of $500,000 increasing by 10% per year. You are asked to revise your pricing model to achieve the embedded value target.

a) Describe the difficulties in determining embedded value for group insurance business in general.

b) Describe the key insights that embedded value offers compared to traditional reporting.

c) Calculate the companies embedded value at December 31, 2015 given the following assumptions:
   • current profit margin of 5% (including investment income on liabilities and capital
   • 7.5% lapse rate per year
   • Lapses and new business come on the books on the first day of the year; renewals occur on the first day of the year
   • Corporate tax rate is 25%
   • MCCSR target ratio is 150%; the statistical fluctuation factor for morbidity is 100%.
   • All profits are retained by the company.
   • The embedded value discount rate is 0%.
   • Assume all groups terminate at the end of 2018

d) Calculate your revised profit margin (including investment income on liabilities and capital) that should be included in your new sales and renewal premiums to achieve the target embedded value increase.