Instructions to candidates

General Instructions

1. This Examination has a total of 50 points. The points for each question are indicated on the exam.

2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action as per Rule 12 of the Exam Rules and Regulations.

3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet, as per Rule 14 of the Exam Rules and Regulations.

4. After the examination, place this booklet and your answer sheets in the exam envelope. Be sure to hand in all your answer sheets since they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate boxes to indicate the language in which you wrote your answers. ALL BOOKS AND ANSWER SHEETS MUST BE RETURNED. THE QUESTIONS ARE CONFIDENTIAL AND MAY NOT BE TAKEN FROM THE EXAMINATION ROOM.

5. When the supervisor tells you to do so, break the seal and remove the exam booklet.
**Written-Answer Instructions**

1. Write your candidate number at the top of each sheet. Your name must not appear.

2. Write only on one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.

3. The answer should be confined to the question as set.

4. When you are asked to calculate, show all your work including any applicable formulas.

**Multiple-Choice Instructions**

1. Your score will be based on the number of questions which you answer correctly. No credit will be given for omitted answers and no credit will be lost for wrong answers; hence, you should answer all questions even those for which you have to guess.

2. Do not spend too much time on any one question. If a question seems too difficult, leave it and go on.

3. Clearly indicate answer choices on the answer sheet provided. If your answer is not clearly indicated, you will not receive credit for the question.

**Candidate Acknowledgement**

✓ I confirm that I have read the Exam Rules and Regulations / Instructions to candidates.
✓ I confirm that I have received instructions from the Exam Supervisor.

_X_

Candidate Signature
Group Benefits Exam
February 2020

This exam consists of sixteen (16) multiple choice questions worth 16 points and five (5) written answer questions worth 34 points for a total of 50 points.

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SECTION 1: MULTIPLE CHOICE QUESTIONS

Each of the 16 multiple choice questions is worth 1.0 point for a total of 16 points. Circle the right answer on the multiple-choice question answer sheet.

Question 1
Which of the following statements are TRUE?

I. Paid-up life insurance involves a single premium payment for permanent life insurance coverage on a member.

II. Association groups generally have a lower level of risk than employee groups because of anti-selection.

III. Under prospectively rated arrangements, the group policyholder’s premium rates are a weighted average of the insurer’s manual rates and rates based on the group’s own experience.

IV. To help stabilize future premium rates, it is common for insurers to hold back some or all of the surplus up to a limit specified in the financial agreement.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All
Question 2

Regarding the application of credibility to Group Long-Term Disability Insurance, which of the following are TRUE?

I. Credibility formulas used for experience rating in LTD vary significantly among insurers.

II. Most traditional credibility models, including limited fluctuation and least-squares models, operate under an assumption that exposures used to calculate the experience are independent random variables.

III. Historical LTD claims are often used to estimate future claims by assuming the experience is heterogeneous.

A. I and II only
B. I and III only
C. II and III only
D. I, II, and III
E. The correct answer is not given by A, B, C, or D.
Question 3

Which of the following statement(s) is (are) TRUE?

I. LTD benefits under an employee-pay-all plan are taxable if the employer makes up any funding shortfall.

II. Employer contributions to group health and dental plans are not taxable to employees in any province.

III. Administration fees under an ASO contract are subject to GST, regardless of any pooling or stop loss arrangement.

IV. Group life insurance premiums paid by the employer are taxable to the employee.

A. Statements I and II
B. Statements I and III
C. Statements I and IV
D. Statements II and III
E. The correct answer is not given by A, B, C or D.
Question 4

In this situation where a Covered Individual can submit a claim to two Group Plans, using proration, establish the payment of benefits under each plan for the following:

- Eligible expense of $75
- Plans and coverage details:

<table>
<thead>
<tr>
<th>Group Insurer</th>
<th>Coinsurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salamanca</td>
<td>80%</td>
</tr>
<tr>
<td>Beneke</td>
<td>90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer</th>
<th>Salamanca pays</th>
<th>Beneke pays</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$60.00</td>
<td>$67.50</td>
</tr>
<tr>
<td>B</td>
<td>$67.50</td>
<td>$60.00</td>
</tr>
<tr>
<td>C</td>
<td>$35.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>D</td>
<td>$39.71</td>
<td>$35.29</td>
</tr>
<tr>
<td>E</td>
<td>$35.29</td>
<td>$39.71</td>
</tr>
</tbody>
</table>
Question 5

Which of the following are TRUE in relation to flexible benefit programs?

I. Modular plans have modules designed with different levels of coverage to appeal to specific employee groups.

II. Core + options plans provide employees with core coverage that can be supplemented. Core coverage is generally mandatory.

III. Outside Quebec, Cafeteria-style plans use a menu-driven approach that features some level of mandatory coverage.

IV. The level of choice to be provided in any flex plan is a key consideration. Limited choice means less risk of anti-selection.

A. All
B. All but I
C. All but II
D. All but III
E. All but IV
Question 6

With respect to financial arrangements of group insurance plans, which of the following statements are TRUE?

I. Under refund accounting arrangements, premiums for a coverage period are based solely on the experience of a pool of groups.

II. Under refund accounting arrangements, the policyholder may be eligible to receive a refund if experience is better than was assumed for that period.

III. Retrospective premium arrangements are ideal for small groups where the policyholder believes that claims will fall below those anticipated by the insurer.

A. I, II and III

B. I and III only

C. II and III only

D. I and II only

E. The correct answer is not given by A, B, C or D
Question 7

With respect to the taxation of employee benefits in Canada, which statements is are TRUE?

I. Under the Income Tax Act, individuals who have been cohabiting for at least 12 months are considered to be spouses.

II. Disability benefits received by an employee are taxable if any portion of the premium is paid by his/her employer.

III. Favourable federal income tax treatment is given to plans that qualify as a Private Health Services Plan.

IV. Life insurance benefits paid by an employer are always taxable to the recipient.

V. In some provinces group insurance premiums are subject to a form of sales tax.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All but V
A Group of participants to the Québec Public Prescription Drug Insurance Plan (the Plan) have the following claims for the month of June 2019:

<table>
<thead>
<tr>
<th>Participant</th>
<th>June 2019 Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gustavo</td>
<td>90</td>
</tr>
<tr>
<td>Pete</td>
<td>15</td>
</tr>
<tr>
<td>Jane</td>
<td>60</td>
</tr>
</tbody>
</table>

You are given:

- The Public plan’s deductible for the month of June 2019 is $19.90;
- The Public plan’s deductible for the month of July 2019 is $21.75;
- The Public Plan’s co-insurance is 35% in June 2019;
- The Public Plan’s co-insurance is 37% in July 2019;
- Claims for each participant increase by 6% in July 2019.

What is the percentage increase in the total amount paid by the Provincial Plan for the Group between June and July 2019?

A. 2.0%  
B. 3.0%  
C. 4.0%  
D. 5.0%  
E. 6.0%
Question 9

Which of the following would constitute non-compliance to the Insurance Companies Act?

I. Failure by the company to inform the Superintendent of Financial Institutions of the revocation of the Actuary.

II. Failure, by an actuary whose appointment is revoked, to submit to the directors of the company and to the Superintendent of Financial Institutions a written statement of the circumstances and reasons why, in his/her opinion, the actuary’s appointment was revoked.

III. Failure by the company to permit access to records, information and explanations requested by the Actuary and that the Actuary considers necessary to perform his/her duties.

IV. Failure by the Actuary to make a report on actuarial and other policy liabilities more than 20 days before the date of the annual meeting of the shareholders and policyholders of the company.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All
Question 10

With respect to Group Life Insurance coverage in Québec, which of the following statements are TRUE?

I. If a change of insurer occurs when an insured is within the elimination period for waiver of premium benefits and if this insured dies after the change of insurer but before the end of the elimination period from causes unrelated to the cause of disablement, the new insurer is responsible for the payment of the death benefit.

II. The fact that a group policy is replaced with another similar policy, with a different carrier, does not allow an insured to name a new beneficiary under the new policy if the beneficiary under the old policy was irrevocable.

III. A same-sex spouse having contracted a civil union with the insured is an irrevocable beneficiary unless the insured explicitly specified this person to be a revocable beneficiary.

A. I and II only
B. I and III only
C. II and III only
D. I, II and III
E. The correct answer is not given by any of A, B, C or D.
Question 11

Which of the following items could generate incurred but not reported reserves?

I. Claims that have been terminated but may be appealed.
II. Changes in the insurer’s claims practices.
III. A lag in the inclusion of reported claims until the end of the elimination period.
IV. Economic conditions.

A. All
B. All but I
C. All but II
D. All but III
E. All but IV
Question 12

The following table shows cumulative dental claims for a small insurer:

<table>
<thead>
<tr>
<th>Claim Quarter</th>
<th>Development Quarters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>140</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
</tr>
<tr>
<td>3</td>
<td>110</td>
</tr>
<tr>
<td>4</td>
<td>130</td>
</tr>
</tbody>
</table>

Calculate the IBNR at the end of the 4th quarter using the chain-ladder method.

A. 600
B. 650
C. 700
D. 750
E. 800
**Question 13**

Which of the following dynamic capital adequacy testing (DCAT) scenarios would have the most severe impact on the surplus of the group insurance line of business? Assume the products in this line of business are all yearly renewable term insurance (YRT). Volume of group life premium is $20 M/year, reserves for long-term disability (LTD) benefits are $70 M, and reserves for waiver of premiums are $25 M.

A. A 20% permanent increase in the active life mortality rates.
B. A 20% permanent decrease in Group disability termination rates.
C. A 20% permanent increase in administration expenses.
D. A 1.5% increase in the inflation rate.
E. A 1.5 % increase in long-term interest rates.
Question 14

Which of the following statements are TRUE regarding reinsurance as a risk management tool for insurers?

I. Reinsurance contracts can contain other types of terms or conditions that may limit a troubled or insolvent cedant’s ability to enforce the contractual obligations of a reinsurer.

II. Generally, a reinsurance contract should stand on its own, providing the necessary clarity and legal certainty on reinsurance cover.

III. The Office of the Superintendent of Financial Institutions (OSFI) expects a higher level of due diligence by a federally regulated insurer in respect of any current or prospective reinsurance arrangement with an unregistered reinsurer or with a cedant that is not regulated by the OSFI.

IV. Reinsurance does not protect an insurer from other risks, including operational, legal, counterparty, and liquidity risks.

A. All but I
B. All but II
C. All but III
D. All but IV
E. All
Question 15

Regarding the application of credibility to Long Term Disability (LTD) experience rating, which of the following are TRUE?

I. There are differences in the shapes of the credibility curves used by different LTD insurers.

II. For assessing credibility, some credibility formulas use expected claims whereas others use actual claims.

III. Based on limited fluctuation credibility theory, the minimum number of claims required for full credibility increases as the ratio \( \frac{\sigma}{\mu} \) increases, where \( \mu \) and \( \sigma \) are the mean and standard deviation of the claim amounts.

A. I and II only
B. I and III only
C. II and III only
D. I, II, and III.
E. The correct answer is not given by A, B, C, or D.
Question 16

Tuco, who just became disabled, owns a $10,000 waiver of premium life insurance policy. He has the following probabilities of death and recovery:

<table>
<thead>
<tr>
<th>Year following disablement</th>
<th>Probability of death ( (q_x^{\text{death}}) )</th>
<th>Probability of recovery ( (q_x^{\text{recovery}}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>0.25</td>
<td>0.40</td>
</tr>
<tr>
<td>2nd</td>
<td>0.15</td>
<td>0.35</td>
</tr>
<tr>
<td>3rd</td>
<td>0.10</td>
<td>0.20</td>
</tr>
<tr>
<td>4th</td>
<td>0.05</td>
<td>0.20</td>
</tr>
<tr>
<td>5th</td>
<td>0.05</td>
<td>0.90</td>
</tr>
</tbody>
</table>

Calculate the reserve for Tuco’s death benefit, assuming:

- The probabilities of death and recovery are mutually exclusive, hence \( p_x = 1 - q_x^{\text{death}} - q_x^{\text{recovery}} \)
- The discount rate is 3%
- Deaths occur at mid-year

A. Below $2,500
B. Between $2,501 and $3,000
C. Between $3,001 and $3,500
D. Between $3,501 and $4,000
E. More than $4,000
SECTION 2: WRITTEN ANSWER QUESTIONS

Answer all five questions:

(Total of 34 points)

Mandatory Questions:

- Question 17  6 points
- Question 18  7 points
- Question 19  7 points
- Question 20  8 points
- Question 21  6 points
Question 17 (6 points)

Mr. White and Mr. Pinkman, two actuaries with annual salaries of $90,000, both become disabled pursuant to being in the same car accident.

As a result, they each receive monthly disability benefits of $3,500 from The Société de l’assurance automobile du Québec (SAAQ).

Both White and Pinkman are also covered by private disability plan as follows:

Mr. White is covered by a disability insurance plan providing a taxable benefit of 66 2/3% of his pre-disability salary. In addition, the benefit is limited by a coordination clause, ensuring that his monthly income from all sources does not exceed 80% of his monthly pre-disability salary.

Mr. Pinkman is also covered by a disability insurance plan. His plan provides a non-taxable benefit equal to 60% of salary up to $45,000, plus 40% of salary in excess of $45,000. In addition, the benefit is limited by a coordination clause, ensuring that his all-source monthly income does not exceed 90% of his monthly pre-disability after-tax income.

Combined tax rates (Federal and Provincial) by earnings brackets are as follows:

<table>
<thead>
<tr>
<th>Earnings Brackets</th>
<th>Combined Income Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>First $12,000</td>
<td>0%</td>
</tr>
<tr>
<td>Between $12,001 and $24,000</td>
<td>25%</td>
</tr>
<tr>
<td>Between $24,001 and $40,000</td>
<td>40%</td>
</tr>
<tr>
<td>Above $40,000</td>
<td>50%</td>
</tr>
</tbody>
</table>

Calculate the amount of the monthly benefit received by Mr. White and Mr. Pinkman from their respective disability insurance plan.
Question 18 (7 points)

BlueSky is a manufacturing company based and operating in Québec. You are the Benefit Consultant for BlueSky, which provides the following Group Insurance coverage for its employees with the Ozymandias Insurance Company:

1. Basic life and accidental death and dismemberment (ADD)
   - 2 times Annual Earnings, up to a maximum of $300,000
   - Coverage terminates at age 65
   - No waiting period.

2. Long-Term Disability (LTD) Contract

<table>
<thead>
<tr>
<th>Insurance company</th>
<th>The Ozymandias Insurance company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy number</td>
<td>BS2020-001</td>
</tr>
<tr>
<td>Effective date</td>
<td>3 months after hire</td>
</tr>
<tr>
<td>Benefit</td>
<td>Long Term Disability</td>
</tr>
<tr>
<td>Benefit formula</td>
<td>70% of monthly salary</td>
</tr>
<tr>
<td>Maximum</td>
<td>$4,000 per month</td>
</tr>
<tr>
<td>Elimination period</td>
<td>13 weeks</td>
</tr>
<tr>
<td>All source maximum</td>
<td>85% of net income</td>
</tr>
<tr>
<td>Termination age</td>
<td>Coverage terminates at the earlier of recovery, death, retirement, or attainment of age 65.</td>
</tr>
<tr>
<td>Definition of disability</td>
<td>1-year own occupation, any occupation thereafter</td>
</tr>
<tr>
<td>Tax Status</td>
<td>Not mentioned in contract.</td>
</tr>
</tbody>
</table>

For the above benefits, premiums are fully paid by BlueSky. Future salary increases will be 2.0% per year.

These are three recent hires at BlueSky:

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Annual Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walter</td>
<td>45</td>
<td>$70,000</td>
</tr>
<tr>
<td>Jesse</td>
<td>60</td>
<td>$60,000</td>
</tr>
<tr>
<td>Lidia</td>
<td>62</td>
<td>$110,000</td>
</tr>
</tbody>
</table>

(a) (1 point)

(i) As per the Québec Civil Code, define contract of adhesion.

(ii) Describe the main consequences when an insurance contract is considered a contract of adhesion.
Question 18 (continued)

(b) (2 points)
Provide comments on BlueSky's LTD contract, as per the table above.

(c) (2 points)
Calculate the amount of ADD and Group Life benefits payable in situations described in (i) and (ii) below and justify your answer.

(i) (1 point) Walter is in a fatal accident shortly after being hired. When pronounced dead, Walter’s Group Benefits application was accepted without modification by Ozymandias. As the first premium is still outstanding, the accepted policy has not been delivered back to BlueSky.

(ii) (1 point) Sadly, Lidia is found to have committed suicide 33 months after her Group coverage became effective. It is also discovered at the time that she was really age 63 (not 62) at the time of hire due to a clerical mistake.

(d) (2 points)
One year after his coverage became effective, Jesse retires from BlueSky and would like to convert his group life coverage into individual life coverage.

(i) (1 point) Describe Jesse’s rights on conversion of the life benefit.

(ii) (1 point) Calculate the minimum and the maximum of Jesse’s conversion amount. Show all your work and outline any assumptions.
Question 19 (7 points)

Skylar is a resident of Alberta earning $100,000 a year. Her employer does not offer a maternity leave benefit plan. She is covered by a short-term disability insurance plan that pays 80% of her weekly salary for as long as the disability lasts, with a maximum of 52 weeks, with no waiting period. She delivered by caesarean section in January 2019 and returned to work in December 2019.

Her cousin Gretchen is a Quebec professional who earns $85,000 a year. Her employer does not offer a maternity leave benefit plan. She is covered by a short-term disability insurance plan that pays 80% of her weekly salary for as long as the disability lasts, with a maximum of 52 weeks, with no waiting period. Gretchen gives birth naturally in January 2019. She plans to return to work in November 2019.

In both cases, the deliveries went well and did not cause any unusual disability.

(a) (2 points) How much will Skylar receive in Maternity benefits from Employment Insurance, given that the maximum insurable earnings under Employment Insurance is $53,100 per year? Assume that a year has exactly 52 weeks.

(b) (1.5 point) Will Skylar be eligible for a benefit from her short-term disability plan? If so, how much will she receive?

c) (2 points) How much will Gretchen receive from the Quebec Parental Insurance Plan (QPIP) as maternity benefits, given that the maximum salary eligible for the QPIP is $76,500 per year and that Gretchen has chosen the provision that pays 70% for 18 weeks? Assume that a year has exactly 52 weeks.

d) (1.5 points) Will Gretchen be eligible for a benefit from her Short-Term Disability Insurance Plan? If so, how much will she receive?
Question 20 (8 points)

(a) (2 points) Name and describe the purposes of stress testing as described by the Office of the Superintendent for Financial Institutions Canada (OSFI).

(b) (1 point) Name 5 types of institutions where Canadian Asset Liability Method (CALM) stress testing should be applied.

(c) (2 points) Name the types of risks that a comprehensive stress testing program should address.

(d) (3 points) As a recently minted FCIA, you are to perform the CALM calculation for a closed block of group long term disability business. You are provided with the following information:

- Reserve cash flow is $630,000 per year for the next three years
- Invested asset cash flow is $600,000 per year for the next three years
- Short-term interest is 1.5% per annum
- Balance Sheet items:

<table>
<thead>
<tr>
<th>Assets supporting the reserves</th>
<th>$1,800,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$150,000</td>
</tr>
<tr>
<td>Reserves</td>
<td>$1,870,000</td>
</tr>
</tbody>
</table>

(i) (2 points) Calculate the net cash flow at the end of year 3.

(ii) (1 point) Calculate the change in net cash flow if the short-term interest rate drops to 0.5% per annum in each of the 3 years.
**Question 21 (6 points)**

As a new FCIA, you are the actuary of an insurance company and you are preparing renewal pricing for group medical coverage (in Canada only) for a group for which you have the following information:

<table>
<thead>
<tr>
<th></th>
<th>From 1 April 2017 to 31 March 2018</th>
<th>From 1 April 2018 to 31 March 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross Premium</strong></td>
<td>$800,000</td>
<td>$900,000</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>$70,000</td>
<td>$85,000</td>
</tr>
<tr>
<td><strong>Net Premium</strong></td>
<td>$730,000</td>
<td>$815,000</td>
</tr>
<tr>
<td><strong>Benefits paid</strong></td>
<td>$625,000</td>
<td>$750,000</td>
</tr>
<tr>
<td><strong>Reserve for incurred but not reported claims</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Beginning of period</td>
<td>$40,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>- End of period</td>
<td>$50,000</td>
<td>$65,000</td>
</tr>
<tr>
<td><strong>Monthly premium</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Individual coverage</td>
<td>$30.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>- Family coverage</td>
<td>$75.00</td>
<td>$87.50</td>
</tr>
</tbody>
</table>

The trend factor is 12% per year.

Calculate the renewal rates required for the period from July 1, 2019 to June 30, 2020, assuming that three (3) times more credibility is given to the experience of the last period (most recent period) than to that of the previous period.

Apply the trend factor to the reserve change.

Show all work.