INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 60 points.

   This exam consists of 8 questions, numbered 1 through 8.

   The points for each question are indicated at the beginning of the question.

2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.

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.

Written-Answer Instructions

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

2. Write on only 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.

5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because 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 box to indicate Exam GHDPA.

6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Recognized by the Canadian Institute of Actuaries.

Tournez le cahier d’examen pour la version française.
**BEGINNING OF EXAMINATION**

1. (5 points)
   
   (a) (2 points) Describe contracting considerations for the following types of physicians:
       
       (i) Primary and specialty care
       (ii) Hospital-based
       (iii) Non-physician practitioners of primary care

   (b) (1 point) Compare and contrast financial considerations of salaried versus self-employed physicians.

   You are given the following contract terms for an independent specialty care physician:

   | Reimbursement rate | 102% of original Medicare fee schedule; placement on tier 2 of 3 for member cost sharing |
   | Managed care fee   | $10 per patient per year for access to medical records |
   | Access             | Referrals from PCP required for in-network access |
   | New patient bonus  | $100 per patient bonus if the patient is new to both the insurer and the physician |
   | Renewal            | Review for renewal every 3 years |

   (c) (2 points) Critique the contract terms from the perspective of the:
       
       (i) Physician
       (ii) Insurer
2. (5 points)

(a) (1 point) Describe four risk classification schemes and the circumstances when each is used.

You are evaluating an additive risk adjustment model in a market with two insurers. The insurer with a lower average risk profile will have to pay out money to the other insurer to compensate it for enrolling higher risk members.

Each insurer has been given the choice of using one of two methods to determine the payout:

- Method 1 uses only the risk score model
- Method 2 uses the expected claims costs by risk category, where the risk classification is assigned using the risk score model

### Risk Score Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Risk Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>0 - 34 Years</td>
<td>0.500</td>
</tr>
<tr>
<td>35 - 44 Years</td>
<td>0.590</td>
</tr>
<tr>
<td>45 - 54 Years</td>
<td>0.650</td>
</tr>
<tr>
<td>55 - 64 Years</td>
<td>0.700</td>
</tr>
<tr>
<td>65 Years or Over</td>
<td>0.750</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.950</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>0.430</td>
</tr>
<tr>
<td>Immune Disorders</td>
<td>0.610</td>
</tr>
<tr>
<td>Hypertension</td>
<td>0.200</td>
</tr>
</tbody>
</table>

### Insurer Demographics

<table>
<thead>
<tr>
<th>Insurer A</th>
<th>Insurer B</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 females aged between 35 and 39 years with no conditions</td>
<td>100 females aged between 46 and 50 years with no conditions</td>
</tr>
<tr>
<td>200 males between 46 and 52 years with diabetes and hypertension</td>
<td>50 males between 31 and 33 years with congestive heart failure</td>
</tr>
<tr>
<td>100 females aged 56 to 63 years with diabetes and immune disorders</td>
<td>50 males aged 66 to 71 years with diabetes and congestive heart failure</td>
</tr>
</tbody>
</table>
2. Continued

### Expected Claims Costs by Risk Category

<table>
<thead>
<tr>
<th>Risk Classification</th>
<th>Risk Weight</th>
<th>Expected Claim Costs Per Member Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Equal to or less than 0.500</td>
<td>$200</td>
</tr>
<tr>
<td>Average</td>
<td>Greater than 0.500 but less than 1.500</td>
<td>$500</td>
</tr>
<tr>
<td>High</td>
<td>Greater than or equal to 1.500</td>
<td>$1,000</td>
</tr>
</tbody>
</table>

(b) *(3 points)* Calculate the relative risk factor for each insurer using:

(i) Method 1

(ii) Method 2

Show your work.

(c) *(1 point)* Evaluate the challenges of allowing each insurer to choose its own approach. Justify your response.
3. (7 points)

(a) (2 points) List the data sources available for estimating medical claim costs in each category:

(i) federal government publications

(ii) actuarial publications

(iii) other external sources

You are a health benefits actuary at a large employer. Your CEO has asked you to evaluate the following flexible option plan:

<table>
<thead>
<tr>
<th>Actual Plan</th>
<th>Proposed Flexible Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comprehensive Major Medical (MCC)</td>
</tr>
<tr>
<td></td>
<td>In-Network</td>
</tr>
<tr>
<td>Relative Benefit Value</td>
<td>1.00</td>
</tr>
<tr>
<td>Provider Discount Savings</td>
<td>1.00</td>
</tr>
<tr>
<td>Utilization Savings</td>
<td>1.00</td>
</tr>
<tr>
<td>Trend</td>
<td>1.15</td>
</tr>
<tr>
<td>Selection and Antiselection</td>
<td>1.00</td>
</tr>
</tbody>
</table>

You are also given:

- Prior year claims per employee: $9,500
- Projected network usage for POS option:
  - In network: 80%
  - Out-of-Network: 20%
- Projected enrollment:
  - HMO: 35%
  - POS: 60%
  - High Deductible Indemnity: 5%

(b) (2 points) Assess the impact on the claims cost of introducing the proposed flexible plan. Show your work.

(c) (1 point) Recommend whether or not the proposed Flexible Plan should be implemented. Justify your answer.
3. Continued

Your CEO challenges your recommendation as being overly simplistic.

(d) (2 points) Describe:

(i) the four major ways this situation is simplistic.

(ii) ways you can improve your evaluation.
4. (7 points)

(a) (2 points) Describe selection risks to the insurer for:

(i) multi-choice employer group environment

(ii) the individual market

(b) (2 points) Describe antiselection models in the individual market.

An employer offers three health plans A, B, and C to its employees.

You are given:

<table>
<thead>
<tr>
<th>Plan</th>
<th>Description</th>
<th>Number of Employees</th>
<th>Relative Morbidity</th>
<th>Monthly Premium Rate</th>
<th>Employer Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>High deductible HSA plan / full network plan</td>
<td>40</td>
<td>40%</td>
<td>$400</td>
<td>$400</td>
</tr>
<tr>
<td>B</td>
<td>Medium deductible / limited network plan</td>
<td>35</td>
<td>100%</td>
<td>$500</td>
<td>$400</td>
</tr>
<tr>
<td>C</td>
<td>Low deductible / full network plan</td>
<td>25</td>
<td>250%</td>
<td>$600</td>
<td>$400</td>
</tr>
</tbody>
</table>

(c) (2 points) Calculate the antiselection risk. Show your work.

(d) (1 point) Propose employer contribution amounts to reduce the antiselection risk. Justify your answer.
5. (9 points) You are an actuary for an HMO investigating ways to reduce plan premiums. You are considering Tiered Network Health Plans (TNHPs) as a tool to achieve this objective.

(a) (1 point) Define TNHP.

(b) (1 point) Describe the process of designing a TNHP.

You are given historical data for Providers A, B, C, D, and E for the most recent calendar year:

<table>
<thead>
<tr>
<th>Rating Area</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Utilization</td>
<td>4,800</td>
<td>3,600</td>
<td>1,200</td>
<td>4,800</td>
<td>3,600</td>
</tr>
<tr>
<td>Allowed Claims</td>
<td>$960,000</td>
<td>$900,000</td>
<td>$240,000</td>
<td>$1,200,000</td>
<td>$900,000</td>
</tr>
<tr>
<td>Member Months</td>
<td>2,400</td>
<td>1,800</td>
<td>600</td>
<td>2,400</td>
<td>1,800</td>
</tr>
</tbody>
</table>

You are given:

- Providers B, D, and E have been designated as non-preferred providers.
- 50% of members utilizing non-preferred providers will shift to utilizing a preferred provider in their rating area.
- Members currently pay 25% coinsurance.
- Under the proposed TNHP design, members will pay the following coinsurance:
  - 25% for preferred providers
  - 40% for non-preferred providers

(c) (5 points) Calculate the savings resulting from implementing the TNHP. State your assumptions. Show your work.

(d) (2 points) Critique the proposed TNHP design.
6. (10 points) Insurer ABC provides Health, Specific Stop Loss, and Long Term Disability (LTD) coverage for the individual and employer group markets.

(a) (2 points) Describe considerations for determining credibility levels for:

(i) Health Insurance

(ii) Specific Stop Loss

(iii) LTD

(b) (1 point) Describe considerations in establishing selected variance factors for LTD claim credibility.

You are given the following for a small employer group health insurance benefit:

<table>
<thead>
<tr>
<th>Employee</th>
<th>Gender</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>27</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>59</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>66</td>
</tr>
</tbody>
</table>

Age-Sex factors for the group:

<table>
<thead>
<tr>
<th>Age Band</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 25</td>
<td>0.80</td>
<td>0.70</td>
</tr>
<tr>
<td>26 - 35</td>
<td>0.90</td>
<td>0.80</td>
</tr>
<tr>
<td>36 - 45</td>
<td>1.00</td>
<td>0.90</td>
</tr>
<tr>
<td>46 - 65</td>
<td>1.25</td>
<td>1.10</td>
</tr>
<tr>
<td>65+</td>
<td>1.50</td>
<td>1.40</td>
</tr>
</tbody>
</table>

- Turnover rate = 20%
- k1 = 0.25
- k2 = k3 = 0.01

(c) (3 points) Calculate the credibility factor for this group. Show your work.
6. Continued

You are given the following information for a LTD product:

<table>
<thead>
<tr>
<th>LTD Claim Duration</th>
<th>Selected Variance Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 24 Months</td>
<td>4.0</td>
</tr>
<tr>
<td>25 to 60 Months</td>
<td>3.0</td>
</tr>
<tr>
<td>61 to 120 Months</td>
<td>2.5</td>
</tr>
<tr>
<td>Greater Than 120 Months</td>
<td>2.0</td>
</tr>
</tbody>
</table>

- 750 terminations expected with maximum of 2 years benefit period
- The average expected claim is $50,000
- The standard deviation is $25,000

(d) (1 point) Describe reasons why LTD claim experience tends to be more volatile in early durations.

(e) (1 point) Determine if this block of business is fully credible for valuation purposes. Show your work.

(f) (1 point) Calculate the minimum number of claims needed to be considered fully credible for manual ratemaking. Show your work.

(g) (1 point) Explain why the credibility level is different in (e) versus (f).
7. **(10 points)** You are the actuary on the network contracting team for a health insurer.

(a) **(1 point)** Describe the importance of network access.

(b) **(2 points)** Describe various provider payment models.

You have been asked to address concerns regarding the cost volatility of certain procedures in the insurer’s network of three hospitals. Your first focus is cardiac stent procedures.

You are given for cardiac stent procedures:

<table>
<thead>
<tr>
<th></th>
<th>Hospital A</th>
<th>Hospital B</th>
<th>Hospital C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admits</td>
<td>20</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Average Length of Stay (Days)</td>
<td>3.5</td>
<td>2.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Allowed Cost per Day</td>
<td>$4,000</td>
<td>$4,500</td>
<td>$6,000</td>
</tr>
<tr>
<td>Paid Cost per Day</td>
<td>$3,400</td>
<td>$3,825</td>
<td>$5,100</td>
</tr>
</tbody>
</table>

(c) **(3 points)**

(i) Calculate a bundled payment. State your assumptions. Show your work.

(ii) Recommend which hospital(s), if any, should be re-contracted for this procedure. Justify your answer.

Company leadership elected to present bundled payment proposals to all three hospitals. The CEO of Hospital C is a renowned cardiologist and has threatened to terminate their contract with the insurer over this proposal. The insurer’s compliance department expressed network adequacy concerns regarding several specialties.

You have been asked to consider alternative strategies to remediate the issue with Hospital C.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rental Network</td>
<td>105% of Hospital C Allowed</td>
</tr>
<tr>
<td>Tiered Payment System</td>
<td>10% Member Coinsurance for Hospital C</td>
</tr>
<tr>
<td>Shared Savings Arrangement</td>
<td>Set the benchmark equal to the originally proposed bundled rate. Share 50% of savings or deficit.</td>
</tr>
</tbody>
</table>

(d) **(2 points)** Describe how each strategy could remediate the issue, including pros and cons.

(e) **(2 points)** Calculate the per member per admit financial impact to the insurer of each alternative relative to the bundled payment proposal. Show your work.
8. (7 points) XYZ is a provider group that will be establishing an Accountable Care Organization (ACO) under the Medicare Shared Savings Program (MSSP) beginning on January 1, 2020.

(a) (1 point) Describe the legal requirements for an ACO to be established.

(b) (1 point) Explain differences between one-sided and two-sided ACO shared savings models.

(c) (2 points) Describe strategies for an ACO to optimize its financial outcomes when entering the MSSP.

(d) (1 point) Describe strategies the government could employ to reduce unintended incentives in the MSSP.

You are given the following regarding XYZ’s Medicare claims history:

- The annual claims trend is 0%.
- There are no changes in demographics or case-mix within each cohort.
- XYZ’s claims history by cohort:

<table>
<thead>
<tr>
<th>Cohort</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of beneficiaries</td>
<td>500</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>Effective Start Date</td>
<td>1/1/2017</td>
<td>1/1/2018</td>
<td>1/1/2019</td>
</tr>
<tr>
<td>Year 1 PMPM Claims</td>
<td>$900</td>
<td>$1,050</td>
<td>$1,200</td>
</tr>
<tr>
<td>Year 2 PMPM Claims</td>
<td>$1,000</td>
<td>$1,100</td>
<td></td>
</tr>
<tr>
<td>Year 3 PMPM Claims</td>
<td>$1,100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(e) (2 points) Calculate the ACO benchmark for 2020. Show your work.

**END OF EXAMINATION**
USE THIS PAGE FOR YOUR SCRATCH WORK