14. (3.5 points)

a. (1 point)

Identify four reasons why offering flood insurance may be beneficial as part of the typical Canadian homeowner's policy.

b. (2 points)

An actuary has been hired to design a residential flood insurance program for the Canadian market. Describe four considerations of the actuary's proposed program.

c. (0.5 point)

Briefly explain how flood insurance could increase the risk of moral hazard on the part of:

i. The insured.
ii. The government.

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## Question 14

**Answer key:**

a)

- Increase confidence & satisfaction of consumers
- Policyholders expect to be insured for floods (Reputation risk)
- Flood insurance coverage would avoid having to differentiate between an actual event and sewer backup (clean and odour-free water vs. dirty and foul)
- Canadian insurance market is mature so could be an area of growth/profit for insurance companies
- Government programs serve to reinforce vulnerabilities and provide little incentive for those receive it to reduce risky behavior
- Price is risk-based
- Encourage risk mitigation
- Bundled coverage to reduce adverse selection

b)

- Bundled approach: In an effort to reduce adverse-selection
- Risk based pricing: Prices should reflect actuarial rates and higher risk areas should have to include risk based deductible
- Involvement of individuals insured's in their own flood management: carrying a portion of flood damages through deductibles and premiums and by becoming involved in risk mitigation on their own properties
- Government involvement in the program: Measures carried out by Canadian governments, and include land use planning to reduce flood risk, investment in structural flood controls and production of flood maps which identify flood return periods that are relevant for the industry
- Option of excluding highest risk individuals: Reduces adverse selection or keeps prices lower by not having to cover claims areas certain to eventually get flooded
- Partnership between insurance industry, governments and private individuals: Specific responsibilities of each entity should be defined through an agreement

c)

- Those who purchase insurance may feel that this action precludes further action to reduce flood risk, as there is an expectation of receiving financial assistance. So insured may choose to not to take action to mitigate flood risk on their own property, or perhaps purposely take action during flood events to increase damages with the expectation of receiving higher insurance payments.
- Provision of insurance for exposed members of the public may reduce government's incentives to reductive flood risk through adequate investment in structural and non-structural flood management measures.

**Actual candidate answer for full marks:**

a)

- Would improve customer satisfaction with insurers, since many believe flood is covered and are upset when they find out is isn't
- Provides a way for insurance market to grow in the mature Canadian market
- Flood insurance will provide deterrent to building in high risk areas through higher premiums and deductible and encourage risk mitigation through lowered rates & deductibles

- Eliminate the issue of determining what exactly caused water damage (sewer back-up vs. flooding) to determine if coverage exists

b)

- Rates – Should be based on risk level and actuarially sound (may allow minimal subsidization to maintain affordability)
- Deductibles – Should be higher for high risk individuals to encourage risk mitigation and make insurer more willing to accept risk
- Bundled – Should be bundled and not optional to increase market penetration and reduce adverse selection which could threaten economic viability of program
- Exclusions – Should excluded highest risk individuals to avoid affordability issues

c)

i. Since flood damage is covered, may do less to mitigate damages and may even move unwanted items to basement to get damaged and receive more compensation.
ii. With citizens having flood insurance, may see less incentive to prevent building in risk areas

**Examiner's report:**
Given the focus on flood coverage in the Canadian market in recent years candidates were well prepared and often had good answer for why it would be beneficial and ideas on how to design a plan. For part c) many candidates who lost points seemed to have trouble understanding the meaning of moral hazard.

## Question 15

**Answer key:**

a)

- Insured property and casualty losses must exceed $100 Million
- Event must be dangerous to human life, property or infrastructure
- Damage must occur inside the United States, or if outside the United States at the premises of a United States mission or to certain US flagged vessels and air carries
- Event must be committed by an individual or individuals as part of an effort coerce the civilian population of the United States or influence the policy or conduct of the United States government (Note do not give points if candidate states foreign individual without also stating that domestic is included)

b)

- Capital market financing (Catastrophe bonds)
- Risk pools
- Reinsurance

c)

- Insurers do not pay premiums prior to incurring losses
- Government may recoup some of the losses that it pays, but otherwise, insurers are simply reimbursed for a portion of their costs
- Offered to any insurer universally rather than through a risk selective process

**Actual candidate answer for full marks:**

a)

- Damages from the event must exceed $100 million
- Must present a danger to human life, property or infrastructure