15.   (1.75 points)

An actuarial consulting firm is reviewing the inflation assumption used by a large insurer that writes casualty excess of loss coverage. The consulting firm has made the following assumptions regarding the insurer's excess casualty book:

- Overall inflation is 8.0% and is assumed to have the same multiplicative effect on each size of loss.
- The unlimited, ground-up loss severity for the book of business follows a lognormal distribution with the expected loss equal to $5,890,000.
- The following limited average severities, based on a lognormal distribution, apply to the insurer's excess casualty book:

Per occurrence limit k	E[g(x;k)]	E[g(x;k/1.08)]
$1,000,000	715,812	675,097
$2,000,000	1,170,998	1,112,349
$3,000,000	1,513,415	1,444,181
$10,000,000	2,800,239	2,710,132
$20,000,000	3,613,385	3,524,644
$30,000,000	4,063,944	3,981,081
$40,000,000	4,359,735	4,282,929
$50,000,000	4,571,783	4,500,504

a.   (1 point)

Using the consulting firm's assumptions, calculate the average increase in excess losses due to inflation for a policy with a $10,000,000 limit attaching at $30,000,000.

b.   (0.75 point)

The insurer agrees with the consulting firm's overall trend assumption and general methodology, but believes that the average increase calculated in part a. above is too high. Describe any differences in assumptions the insurer may have with the consulting firm.

Question 15:

Part a
Model Solution 1

$$\frac{E(x';40M) - E(x';30M)}{E(x; 40M) - E(x;30M)} = \frac{1.08 [E(x;40M/1.08) - E(x;30M/1.08)]}{E(x;40M) - E(x;30M)}$$

$$= \frac{1.08 (4,282,929 - 3,981,081)}{(4,359,735 - 4,063,944)} = 1.102 => + 10.2\%$$

Examiner's Comments:
****

Most candidates had the correct overall thought process and formula. Some common errors were the use of the incorrect limits and omission of the overall trend factor. Some candidates chose a more complex formula using ILFs, but few made the appropriate adjustments to the base limit to achieve the correct answer.
****

Part b
Model Solution 1

Insurer may not agree with the lognormal dist. of losses.

If insurer assumes a heavier tail than lognormal dist., more loss would be in excess layer, lightening the impact of excess inflation.

Insurer must have assumed a heavier tail.

Model Solution 2

The insurer may have different assumptions regarding the average ground up severity or distribution that it follows. Say the average severity was higher, this would essentially act like an inflation factor shifting more of the excess to higher limits so the impact of trend on this particular layer would be lessened. The shape of the loss distribution could also affect trend in this layer.

Examiner's Comments:
****

Many candidates only listed one or more reasonable differences in assumption, but most candidates lacked a discussion or description of how the insurer's assumption would impact the average increase in the layer.

One alternative answer that some candidates provided was that the insurer assumed the inflation varied by size of loss but was still 8% in total. While this was

an acceptable difference in assumption, no candidate response provided enough detail to demonstrate sufficient comprehension of the learning objective. Therefore, no response related to varying inflation received full credit.

In situations where more than one assumption difference was provided, only the first response was taken into consideration for grading.
****