

## Question #8

**Key: C**

Let  $N$  be the Poisson claim count variable, let  $X$  be the claim size variable, and let  $S$  be the aggregate loss variable.

$$\mu(\theta) = E(S | \theta) = E(N | \theta)E(X | \theta) = \theta 10\theta = 10\theta^2$$

$$v(\theta) = \text{Var}(S | \theta) = E(N | \theta)E(X^2 | \theta) = \theta 200\theta^2 = 200\theta^3$$

$$\mu = E(10\theta^2) = \int_1^{\infty} 10\theta^2 (5\theta^{-6}) d\theta = 50/3$$

$$EPV = E(200\theta^3) = \int_1^{\infty} 200\theta^3 (5\theta^{-6}) d\theta = 500$$

$$VHM = \text{Var}(10\theta^2) = \int_1^{\infty} (10\theta^2)^2 (5\theta^{-6}) d\theta - (50/3)^2 = 222.22$$

$$k = 500 / 222.22 = 2.25.$$