

**225.** You are given:

- (i) Fifty claims have been observed from a lognormal distribution with unknown parameters  $\mu$  and  $\sigma$ .
- (ii) The maximum likelihood estimates are  $\hat{\mu} = 6.84$  and  $\hat{\sigma} = 1.49$ .
- (iii) The covariance matrix of  $\hat{\mu}$  and  $\hat{\sigma}$  is:

$$\begin{bmatrix} 0.0444 & 0 \\ 0 & 0.0222 \end{bmatrix}$$

- (iv) The partial derivatives of the lognormal cumulative distribution function are:

$$\frac{\partial F}{\partial \mu} = \frac{-\phi(z)}{\sigma} \quad \text{and} \quad \frac{\partial F}{\partial \sigma} = \frac{-z \times \phi(z)}{\sigma}$$

- (v) An approximate 95% confidence interval for the probability that the next claim will be less than or equal to 5000 is:

$$[P_L, P_H]$$

Determine  $P_L$ .

- (A) 0.73
- (B) 0.76
- (C) 0.79
- (D) 0.82
- (E) 0.85