ACTUARIAL SCIENCE EXAMINATION

FOUNDATIONS OF CASUALTY ACTUARIAL SCIENCE – PART-I

Time : 3 Hours   Total Marks : 100

Multiple choice : (All Multipal Choice questions carry 2 marks each).

1. A non-life insurer is planning to develop a new product. To produce appropriate premium rates which of the following method is likely to be used?

    A   Pure premium method
    B   Paid or incurred loss development method
    C   Loss ratio method
    D   None of the above

2. Which of the following is not an allocated Loss Adjustment Expenses

    A   Expenses in connection with appointment of an investigator for a particular large claim
    B   Rent for the office space used by claim department
    C   Court costs
    D   Outside legal counsel

3. In the context of reserving for allocated loss adjustment expenses (ALAE) Which of the following statements is incorrect?

    A   We may include ALAE with losses and estimate the total liability
    B   Combining ALAE with losses is similar to combining two non-homogeneous lines of business
    C   It is a statutory requirement to deal with ALAE and losses separately while determining the liability
    D   It is desirable to treat ALAE and losses separately for monitoring actual experience against projected experience for each component

4. An insurer has, in a certain class of business

Number of exposures	100
Premium Per policy	7500
Expenses per policy	400
Margin for profit + contingency	10%
Investment Income	45000

| No. of claims | 5 |
| Av claim size | 150000 |

underwriting profit/(loss) of the insurer for this class is :

A   5000
B   - 70000
C   - 40000
D   - 115000

5   If the above insurer (in Q1) had written 10000 policies and claim size was a uniform 120000. The insurer will not have underwriting loss so long as the number of claims does not exceed underwriting profit/(loss) of the insurer for this class is :

A   21
B   18
C   19
D   20

6   Which of the following statements is incorrect?
Large insurance companies require reinsurance because

A   They may write very large or unusual risks
B   They may be prone to significant accumulations
C   They have a diversified portfolio
D·   They may have very volatile claim experience

7   Which of the following statements is incorrect ?

A   Unexpired risk reserve (URR) is the name given for prospective assessment of reserve needed to cover unexpired risks
B   URR is effectively the same as unearned premium reserve (UPR)
C   If URR differs from UPR, reserve to be set up is the higher of the two
D   If URR differs from UPR, reserve to be set up is the smaller of the two

8   Which Line of business, (below), can be expected to show lower variability of pure premium ?

A   A line of business characterized by low frequency-high severity
B   A line of business characterized by high frequency-low severity
C   A line of business characterized by high deductibles
D   A line of business characterized by low commission rates

9   Given the following information :

Written premium	11540000
Earned Premium	10832000
Incurred Losses & ALAE	7538000
Incurred ULAE	484000
Commissions	1731000
Tax on premiums	260000
Acquisition costs	646000
General expenses	737000

The target Loss ratio is given by (1-V-Q)/(1+G) where

V = premium related expense factor
Q = profit & contingencies factor
G = ratio of non-premium related expenses to Losses
The calculated target loss ratio is :

A   66.5%
B   67.5%
C   61.4%
D   58.0%

10 Which of the following is (are) example(s) of retrospective experience-rating?

A   Profit sharing, where the insurer charges a higher initial premium, and returns some profit to policyholders whose claims are lower than expected.
B   The policyholder pays an end of year adjustment premium to reflect the amount of exposure during the year (e.g. as in employer's liability).
C   As for 1, but the adjustment is based on the insurer's overall experience for all policies of this type.
D   A system where a policyholder's next premium is the average of the insurer's book rates and the policyholder's average claims cost over the last year.

11 Which of the following statements is incorrect ?

A   Loss Development method is not suitable for a new line of business
B   Loss Development method produce unreliable results for a volatile line of business
C   Loss Development method produce results which are stable from year to year
D   Loss Development method produce results which are not stable from year to year

12 One practical consideration in selecting rating variable is the avoidance of extreme discontinuities. In this context which of the following statements is incorrect?

A   Wide discontinuities act as incentive for the insured to cheat the insurer
B   Cost of verification will be very high with fewer classes
C   Insurer must construct gradual changes in rates
D   For credibility purposes there may be fewer classes worth widely varying rates

13 The correlation coefficient between two variables x and y is r. Which of the following statements is true?

A $0 < r < 1$
B $0 <= r <= 1$
C $-1 < r < 1$
D $-1 <= r <= 1$

14 Which of the following statements is incorrect?

A   "Casuality" implies an intuitive relationship to insurance costs
B   "Casuality" implies a closer relationship to costs than correlation
C   From an actuarial point of view correlated variables provide more accurate premiums
D   Eliminating correlated non-casual variables may produce a more accurate rating system.

15 Which of the following statements is incorrect?
Some attributes of a good Individual rating system are:

A   They serve the needs of the organization
B   They appropriately balance risk sharing and risk bearing
C   They are capable of internal manipulation
D   They are easy to understand

ESSAY-TYPE QUESTIONS   (All questions carry 10 marks each)

16 Write short notes on :
    (i)   Poisson distribution
    (ii)   Credibility of data in the context of risk classification
    (iii) Experience rating (credit)/debit
    (iv)   Reserve discounting

17 Explain how to measure the variations in the costs among the insured population

18 Describe the various prospective rating systems?

19 Explain the terms "Paid Loss Development Factors", "tail-factor" and their application in loss reserving.

20 The Pure premium method provides rates which are expected to provide for the expected losses, expenses and expected profit based on the formula

$$R = \frac{P+F}{1-V-Q}$$

    (i)   What do each of the symbols in the above formula represent?
    (ii)   Write down the corresponding formula for Loss ratio method and establish the equivalence between the two under consistent assumptions?

21 Explain in detail the different items of "Loss components" and how they make up the ultimate loss?

22 Classify rating variables in automobile insurance into broad categories and explain how they contribute to cost differences?

………. The End ………