All Question are compulsory.

Multiple - Choice Questions (All Multiple-Choice Questions carries Two marks each)

Q.1 Effective convexity is:
   a) \( \frac{P_+ + P_- - 2P_0}{P_0} (\Delta r^2) \)
   b) \( \frac{(P_+ + P_- - 2P_0)}{(P_0)} (\Delta r)^2 \)
   c) \( \frac{(P_+ + P_- - 2P_0)}{(P_0)} (\Delta r)^2 \)
   d) \( \frac{(P_+ + P_- + 2P_0)}{(P_0)} (\Delta r)^2 \)

Q.2 Reinsurer’s margin depends upon:
   a) Degree of risk transfer
   b) Magnitude of capacity provided
   c) Both ‘a’ and ‘b’
   d) Profit of the contract

Q.3 Quota share treaty can be described as:
   a) Same percentage of premiums & claims above the retention
   b) One percentage for claims & one percentage for premiums
   c) Different percentage of each & every risk
   d) Same percentage of claims and premiums for all risks

Q.4 Given: \( P = 95\% \) and \( k = 5\% \)
What is the number of claims required for full credibility of poisson frequency?
[ \( \phi(1.645) = 0.95, \phi(1.96) = 0.975, \phi(1.282) = 0.90 \)]
   a) 657
   b) 1082
   c) 1537
   d) 1687

Q.5 Merits of purchasing facultative reinsurance are:
   a) Provides additional capacity
   b) Enables insurer to write large risks
   c) Both ‘a’ and ‘b’
   d) Ease of understanding

Q.6 Sliding scale commission means:
   a) The commission always slides to zero
   b) Commission can be changed by cedant
   c) Commission increases at a fixed rate
   d) Commission varies with the loss ratios
Q.7 Full form of GAAP is:
   a) Generally accepted accounting principles
   b) Generally accepted actuarial principles
   c) Generally amounted actual premiums
   d) General accounts and audit practices

Q.8 Pdf of Weibull distribution is:
   a) \( CTX^{-1} \exp(-CX^T) \)
   b) \( (\alpha \lambda_X) (\lambda+X)^{-(\alpha+1)} \)
   c) \( \left( X+K-1 \right)^{k} \frac{X}{X} ^{q} \)
   d) \( \lambda_X \alpha^{\alpha-1} \cdot \lambda X / T(\alpha) \)

Q.9 State whether following statements are true or false:
   a) Bonds with call features generally command higher rate of interest than bonds on similar risk but without calls.
   b) Dividends on common stock are subject to less volatility than those of preferred stocks.

Q.10 What does MPL stands for -
   a) Minimum possible loss   b) Maximum possible loss
   c) Mean probable loss    d) Minimum profit level

Q.11 Basic concepts from credibility are as follows:
   a) How to determine the criterion for full credibility while estimating frequencies.
   b) How to determine the criterion for full credibility when estimating severities.
   c) How to determine the criterion for full credibility when estimating pure premiums.
   d) How to determine the amount of partial credibility when one has more data than is needed for full credibility.
   Which of the above four, if any, is wrong?

Q.12 In order to cede reinsurance, the cedant may be required to assume some reinsurance from the reinsurer. What type of reinsurance ceding company is taking in above situation?
   a) Quota share reinsurance
   b) Surplus reinsurance
   c) Reciprocal reinsurance
   d) Facultative reinsurance

Q.13 As per the statutory valuation rules:
   a) Bonds are values at "book value"
   b) Loss reserves are generally not discounted to reflect the time value of money.
   c) Expenses are recognized on cash basis.
   d) Common stock values are based on "book value"
Q.14  IRIS stands for
   a)    Indian Research Information System
   b)    Indian Regulatory Information System
   c)    Insurance Research Information System
   d)    Insurance Regulatory Information System

Q.15  Which of the below financial statements if any, is not relevant in the
evaluation of a insurance company :
   a)    Letter to shareholders in the annual report
   b)    Details of shareholding
   c)    Statement of cash flows
   d)    Balance sheet & income statement

(Essay type questions : All essay type questions carries Ten marks each.)

Q.16  What are the reinsurance categories that are usually :
   a)    short tailed
   b)    medium tailed
   c)    long tailed,
       with respect to claim reporting and development?

Q.17  Write a short note on :
   a)    CAPM
   b)    Total rate of return
   c)    Discounted cashflow analysis

Q.18  a)    Explain briefly what are catastrophe models and what its three major
        components are?
   b)    Outline the four types of accounting ratios, giving one example of each.

Q.19  Briefly explain Ground-Up Method and Aggregate Loss Development Method
       used in estimation of environmental losses.

Q.20  Write short notes on :
   a)    Cash treaty
   b)    Insurance securitization

Q.21  Briefly discuss different sources of data available (both internal & external) to
       the insurance industry for performing analysis.

Q.22  Number of claims follows a Poisson distribution with parameter $\mu$.
   - Prior to the first year of coverage, $\mu$ is assumed to have the Gamma distribution
     \[ f(\mu) = 1000 \frac{\mu^{149} e^{-1000\mu}}{T(150)}, \mu > 0 \]
   - In the first year, 300 claims are observed on 1500 exposures.
   - In the second year, 525 claims are observed on 2500 exposures.
   a)    After two years, what is Bulhmann probability estimate of $E(\mu)$?
   b)    What is the expected value of the Process Variance?
   c)    What is the variance of the Hypothetical Means?

END