Institute of Actuaries of India

Subject SA5 – Finance

November 2013 Examinations

INDICATIVE SOLUTIONS

Solution 1 :

(i)

a) Insurance Risk: Refers to the risk that the value of the net insurance liabilities (technical reserves) is insufficient to cover associated net claim payments and associated claim expenses as they fall due .

(1 Mark)

b) Insurance Concentration Risk: Refers to the net financial impact from a single large event or a series of smaller events over a given time period (e.g.: within one year period).

(0.5 Mark)

c) Market Risk: Refers to the risk of adverse movements in the value of on-balance sheet and off-balance sheet exposures.

(1 Mark)

d) Asset Concentration Risk: Refers to the risk resulting from concentrations in individual assets, or large exposures to individual counterparties or group of related counterparties.

(0.5 Mark)

(ii)

Aggregation Benefit:

1. "Aggregation Benefit" is the explicit allowance for diversification between asset risk (comprising market risk and credit risk) and insurance risk(including insurance concentration risk)
2. Aggregation benefit is taken into account because the total capital requirement tends to be less than the sum of the capital required for individual risks (like insurance risk, market risk, etc) to the extent these risks are independent
3. Mathematical techniques like linear correlation and copulas can be used to analyse these risk dependencies

4. It needs to be noted that risk correlations can behave differently in extreme scenarios than they do under the normal ("business as usual") scenarios.

(2 Marks)

(iii) a.

Factors influencing the amount of capital will include:

A. The minimum regulatory capital requirement for the planned level of activity
B. The requirement of the credit rating agencies whose ratings may influence the third parties' assessments of the financial condition and performance of ABC General
C. ABC General's internal assessment of the riskiness of the activities to be undertaken
D. The desire to keep capital as low as possible (for a given level of return) so as to maximise the return on capital

(4 Marks)

b.

Tier 1 Capital:	Equity Share Capital, Disclosed Reserves, Eligible Hybrid Equity Instruments
Tier 2 Capital:	Hidden Reserves, Unrealized Gains on Investments, Medium to Long Term Subordinated Debt

The typical deductions from Tier 1 Capital will be items such as goodwill and any other intangible assets

Factors influencing the capital decision will include the following:

A. Debt that ranks alongside technical reserves will not count as part of regulatory capital requirements; and therefore cannot be used to increase the available regulatory capital.
B. Sub-ordinated long term debt will fall under tier 2 and will not help in increasing ABC General's tier 1 capital ratio

C. Also tier 2 capital will typically count only up to the level of tier 1 capital. Therefore the additional long term debt will not count at all if the existing tier 2 capital is already equal to the tier 1 capital
D. There may be covenants associated with existing debt issues that can restrict the amount of additional debt capital which ABC General can raise.

E. Equity Capital will enable ABC General to increase Tier 1 Capital and also increase the capacity to issue further Tier 2 Capital at a later stage.

F. It needs to be evaluated whether the equity shareholders are willing to accept an additional equity issue. If the existing shareholders are unwilling and the market conditions are unfavourable, then the additional equity issue can depress the market price of the share.

(5 Marks)

(iv)

Advantages and Challenges of Using Internal Models

(+) Internal models are developed by the company to assess the capital needs of their company. The advantage is that these models allow for the specific circumstances of the company and can therefore be more accurate in estimating the aggregate capital requirement

(+) Using an internal model enables the company to better understand the risk return profile and reserving requirements of the activities it plans to undertake e.g.: buying/selling business lines, writing new business, introducing new products etc.

(+) Internal models can also provide valuable inputs for decisions related to pricing, investment management and risk mitigation like use of reinsurance.

(+) Internal models can help in breaking up aggregate capital requirements across lines of business in order to improve the overall return on capital for the company.

(?) However consideration must be given to the size of the company, the lines of business and the complexity of the internal model

(?) The relative benefits of establishing and using an internal model to assess capital requirements more accurately needs to be assessed against the time, cost and expense needed to establish such a model.

(?) Different internal models may be needed for different parts of the company's business.

(?) Consideration must be given as to whether the company has sufficient resources, expertise and data to develop robust internal models

(?) The internal models will need approval from PRA who will be keen to ensure that the results of the model are adequate and appropriate. There are also likely to be ongoing monitoring and disclosure requirements in connection with such internal models.

(6 Marks)

(v) a.

1. Value at Risk (VaR) is defined as the maximum fall in the value of a portfolio over a pre-specified time period at a pre specified confidence level. In other words, VaR is based on a specified percentile point on the loss distribution.
2. Tail Value at Risk (TVaR) calculates the expected value of losses, given that they have exceeded the specified percentile point on the loss distribution

(2 Marks)

b.

Skewed loss distributions are common place in the insurance industry because

- On the large number of policies under which no claim arises, the insurer will typically make a small profit
- On the small number of policies under which a claim does arise, the insurer will make a large loss

(2 Marks)

(vi) a.

- All the three derivatives have zero market value and therefore zero current credit risk
- A credit exposure is generated only when the derivative becomes an asset to ABC General i.e., when the market value of the derivative is significantly greater than zero.
- The potential to generate credit exposure over time depends on changes in market levels, in particular the three year swap rates and the USD/GBP exchange rate.
- The three year interest rate swap is likely to expose the company to far less credit risk than the currency swap. This is because the nominal amounts are exchanged under a currency swap but are not exchanged under an interest rate swap. Not exchanging nominal amounts reduces the potential credit exposure and the likely volatility in market values over a three year period
- The longer the time to maturity, the greater the potential for future changes in the value for swaps and forwards
- The currency forward has a maturity of only one year and therefore has much less scope for volatility than the three year currency swap.
- However the currency forward is linked to exchange rates which are more volatile than the interest rates. Therefore the future volatility (and hence credit exposure) will be greater than for the three year interest rate swap, despite its shorter term
- For all the three derivative products, as the remaining time to maturity declines, the scope for volatility will also reduce.

- As maturity approaches, credit exposure will tend towards the market value of the derivative if the market value is positive for ABC General. On the other hand, if the market value for ABC General is negative, the credit exposure will tend to zero.
- The credit exposure of all the three products will be impacted by any collateral or third party guarantee provided by the counterparty

(6 Marks)

b.

Use of Credit Default Swaps and Total Rate of Return Swaps in Managing Credit Risk:

1. Credit Default Swap(CDS)
   - The party buying the CDS pays a fee to obtain protection against the effect of a particular credit event occurring e.g.: default by the counterparty
   - If the credit event occurs within the term of the contract, a payment is made from the seller to the buyer. If the credit event does not occur within the term of the contract the buyer receives no monetary payment
   - The claim under CDS can be settled through

     - Either a pure cash payment representing the fall in the market price of the defaulted security, although the market price may be difficult to determine
     - Through physical settlement whereby the protection seller pays the buyer the full notional amount and receives, in return, the defaulted security

2. Total Return Swaps (TRS)

   - A TRS is an agreement to exchange the total return on a bond (or any portfolio of assets) for LIBOR plus a spread The total return on bond includes coupon interest and the gain/loss on the asset over the life of the swap

- If the total return payer under this arrangement owns the corporate bond or the asset which is subject to credit risk, the TRS allows the payer to transfer the credit risk to the receiver

- The spread over LIBOR received by the payer is the compensation for bearing the risk that the receiver will default. The payer will lose money particularly if the receiver defaults at a time when the reference bond's price has declined. The spread therefore depends on the credit quality of the receiver, the credit quality of the bond issuer and the correlation between the two.
- A TRS can also have a physical settlement where the payer exchanges the underlying asset for the notional principal at the end of the life of the swap

(6 Marks)

(vii)

Managing Currency Risk

The different ways to limit exchange rate risk include:

1. Netting: This involves using revenue in a particular currency to settle amounts being owed in the same currency. Since a company's cash flows in a given currency are unlikely to net off exactly, any residual amount may be hedged using alternative techniques
2. Currency Forward: agreeing in advance to buy/sell foreign currency at an agreed rate on an agreed future date
   Under the currency forward, the exchange rate on its cash flows will be known. Hence the company will not suffer from adverse movement in exchange rates and at the same time not benefit from favourable exchange rate movements
3. Currency Future: Involves buying/selling a standardised currency forward contract through a futures exchange. As with a currency forward, the exchange rate is fixed under a currency futures contract
4. Currency Swaps: Involves swapping future foreign currency cash flows using a series of currency forwards

5. Currency Options: Involves buying the right but not the obligation to buy /sell foreign currency on an agreed date for an agreed rate (price). To buy option, the option buyer needs to pay a premium to the option seller (writer).

   Buying Currency options will allow the company to lock into a particular exchange rate but benefit from any favourable exchange rate movements
6. Leading and Lagging: Trying to bring forward (lead) or delay (lag) foreign currency flows in order to benefit from the expected movements in exchange rates.

(6 Marks)

(viii)

Managing/Limiting Concentration Risk

Concentration Risk can be managed by

- Setting exposure limits for single counterparties, connected counterparties and other groupings (e.g.: by geographic regions or by major industrial sectors)
- Ensuring that the exposure limits reflect the company's capacity to bear the risk
- Ensuring that the exposure limits reflect management's assessment of risk/return trade offs
- Monitoring actual credit exposure against these limits
- Ensuring that periodical review of concentration risk is within the remit of the credit risk review committee/group
- Reporting existing and emerging concentration of risk in an effective and timely manner

(4 Marks)

(ix)

The regulator needs to consider the following before granting the approval:

Restriction of consumer choice in terms of market player?

Does the joint entity have enough economic and regulatory capital that reflects the nature, scale and complexity of the new business?

What are the reasons for merger –Improve return, enter new product line or use free cash reserves?

What are the terms of merger?

Are the shareholders of both companies treated fairly

Will the new entity be 'a systematically large insurer' and will it threaten the stability and soundness of the overall financial system due to their size.

How is the company funding the acquisition? Is the company increasing leverage?

Additional areas that may require additional reporting are as follows:

Business plan for next three years – Is their rate of growth projected greater than the growth of Industry?

Capital reporting including the quality of capital – Is their capital sufficiently liquid?

Options and guarantees written –How are they reserving for that? Are they writing more option and guarantee to capture more business?

Stress and Scenario testing – Will they be able to stand the crisis?

Reserve Adequacy Testing – Do they have enough margins in their reserves?

Minutes of Board risk committees and Board meetings – What are the risk reported to Board and what is the strategy that Board wants to take for future years

Customer Suitability **(7 Marks)**

(x)

Key value Drivers and Metrics: Immediate Future

Employee Related:

Retention of key personnel who will play key role in integration of two entities and maximizing synergies

Consistent HR policies for staff of the combined entity

Operations Related:

Streamlined and single process maps for each activity of operations including policy servicing , claims and actuarial valuations

Integration of their IT systems and distribution channels

Defining the right target operating model targeted at to achieve faster and efficient integration of two entities

Marketing and Communication Related:

Identifying as a single Brand to market and to customer

Building consumer confidence using various modes of communication including personal mailer and calls

Customer suitability and Product suitability

Communication plan for the market and investors establishing the credibility of the new management of the new entity

Business Related:

Persistency - Dedicated team to maintain renewals and persistency of older policies as old consumers may surrender or no renew their policies in short term

Product suitability – Building a robust product portfolio with attractive proposition for the consumer and shareholders

Consumer Suitability – Designing and launching/re-launching products which meets client needs

Key value Drivers and Metrics: Long Term

Customer satisfaction and retention: Overall experience measured at – Purchase, Claims, renewal and other touch points

Marketing – Brand recall and image. Product Suitability and Customer suitability

Sales – Persistency, renewal and customer suitability. Cross Selling rate

Shareholders: Return on Equity & Return on Capital

Expense ratio

Cost of acquisition

Product and segment wise profitability

Reserve Adequacy Test

Usage of IBNR

Return on Reinsurance purchased

Return on Investments

Claims ratio

Diversification benefit in expanding in commercial lines of business

Strategy :

Uplift in ROE on expanding business by writing commercial line of business

How does Capital required changes in Commercial line of business

Do we have the right UW, Actuarial, Claims skills to enter into other market segments including WC and liability insurance?

(7 Marks)

(xi) a.

Definition of Corporate Governance

- Corporate Governance refers to the managerial decisions made in the company in relation to its stakeholders. The stakeholders are any group that has a relationship with the company; and is affected by its actions

- Key stakeholders are the shareholders, employees (and pensioners), customer, suppliers and the state

(1 Mark)

b.

Roles and Responsibilities of Mandatory Committees

Note to Examiners: Although the question asks for the roles and responsibilities of any two mandatory committees, the roles and responsibilities of all the four mandatory committees are provided here. This answer draws on the IRDA Guidelines related to Corporate Governance. Credit can be given for other valid points.

1. Audit Committee
   - Review the financial statements, financial reporting and disclosure processes on a periodical basis
   - Address all concerns related to adequacy of checks and control mechanisms
   - Oversee the efficient functioning of the internal audit function, review the internal audit reports and monitor the follow up actions taken on the basis of the internal audit findings
   - Recommend appointment of the auditors – internal and statutory and ensure the independence of the statutory auditors
   - Provide oversight of the work of the auditors
   - Discuss with statutory auditors about the nature and scope of audit and have post audit discussions to address areas of concern

The Chairperson of the Audit Committee shall be an independent director of the Board and shall have a strong accounting and financial analysis background. Also the CEO's involvement in the Audit Committee is limited to eliciting any specific information concerning audit findings

2. Investment Committee

- Lay down an overall investment policy and define the operational framework for the investment operations of the insurer. The investment policy together with the operational framework must focus on aspects concerning
  - Protection of policyholder funds
  - Prudential Asset Liability Management
  - Compliance with regulatory norms on investments
  - Risk management/mitigation strategies
  - Robust internal control systems
- Review the investment policy periodically based on the performance of the investments and dynamic market conditions
- Independently review the investment decisions made by the investment team
- Put in place an effective reporting system to ensure compliance with the Investment Policy
- Provide a report to the Board periodically which contains an analysis of the current investment portfolio and a commentary on the future outlook in order to enable the Board to evaluate possible policy changes and strategies

3. Risk Committee

- Assist the Board in operationalising an effective risk management system by performing specialised analyses and quality reviews

- Maintain both an aggregated and dis aggregated view of the risk profile of the insurer

- Report to the Board on risk exposures and the actions taken to manage these exposures
- Advise the Board on risk management aspects to strategic matters such as corporate strategy, corporate restructuring, etc.

4. Policy holder Protection Committee

- Put in place appropriate procedures and effective mechanisms to address complaints and grievances of policy holders including mis-selling by intermediaries
- Ensure compliance with the statutory requirements in this regard
- Periodically review adequacy of grievance redressal and compliance mechanisms
- Ensure adequate disclosure of "material information" to the policyholders. These disclosures should comply with the statutory disclosure requirements both at the point of sale and at periodic intervals during the policy term
- Ensure timely and proper reporting of matters related concerning policy holder protection to the Regulator
  - Provide details of Insurance Ombudsmen to the policyholders

(6 Marks)

c.

"Comply or Explain" Regime

- The "Comply or Explain" Regime provides guidance on what constitutes an appropriate corporate governance structure. At the same time, this regime allows the company to choose the most suitable corporate governance structure keeping in view factors like
  - The size of the company
  - The complexity of its operations
  - Competition
  - Regulatory oversight
  - International spread of business

- Where the company adopts a corporate governance regime which is materially different from the recommended regime, the company is required to explain why the proposed regime is better so that the stakeholders have additional information to decide whether the company's proposed regime must be adopted.

- The "Comply or Explain" regime recognises the fact that there is no perfect "one size fits all" solutions
  Drawback of the "Comply or Explain" Regime Vis a Vis a Prescriptive Regime:
- Can lead to companies adopting poor corporate governance policies which in turn can result in

    - Inefficient or inaccurate shareholder communication
    - Inefficient control over the executives of the company
    - Inadequate risk control (and audit control) systems

- Can lead to a non-level playing field on matters related to corporate governance
- Can weaken public confidence in the system which can lead to lower public participation in the stock market

(6 Marks)
[Total Marks-73]

Solution 2 :

i)
The Chicago Board of Trade (CBOT) is the world's oldest and largest futures exchange.

Founded in 1848 to provide an orderly marketing system for farm products and to help producers and users protect themselves against adverse price changes.

The Exchange is now an international market place offering futures contracts based on agricultural products, financial instruments, precious metals and stock indices.

Trading is by the open outcry method

A joint venture company between CBOT and Eurex has provided a platform for electronic trading since 1999.

All contracts are cleared through the Board of Trade Clearing Corporation which, with an AAA rating, means that the products have practically no counterparty credit risk.

A joint venture – One Chicago – with the Chicago Mercantile Exchange and the Chicago Board Options Exchange, introduced single-stock futures in 2002.

(4 Marks)

ii)

Typically for gold:

Contract Size : eg: 100 gms

Unit of price quotation : (eg: INR)

Minimum Price fluctuation : eg: Rs.1 per gram

Grade : The quality of gold (for example 22 carat/24 carat etc) and any kind of variations in the quality and how the price will be adjusted based on the quality of the metal

Delivery type : Physical or cash settlement

Margin Requirements : As specified by the exchange
Trading times: As specified by the exchange

All the trades have to conducted electronically through the Commodities exchange

(4 Marks)

iii)

The key risk is the credit risk from the counter party.

The counterparty to all deals in futures and traded options is the clearing house itself as it stands as a counter party to seller and buyer in the trade.

Futures positions can be either an asset or a liability to the fund depending on the
price at which the fund bought or sold the contract and how prices have moved since that
time. In general, the fund is only at risk on those positions that have moved in favour of the fund

The exchange in order to protect its position imposes an initial margin and variation margin.

Initial Margin:

The exchange specifies an initial margin from the traders who trade in futures based on the underlying asset .

The exchange typically determines the initial margin based on various scenarios and how the asset behaves under those scenarios and specifies the initial margin based on the estimated maximum loss.

The initial margin determined as set out above can be reduced or increased in four sets of circumstances namely:
inter-month spread charge
delivery month charge
inter-commodity spreads
Inter-commodity spread credit

In addition to the initial margin, variation margin is collected/paid daily based on the difference between the day's closing price and the previous day's closing price or the trade price if the trade was executed on the same day.

The exchange also looks for unusually large positions, high percentage of open interest, concentration in one contract etc. to see if any rogue trades are happening.
The exchange also will have access to the customers' funds in the event of requirement of additional margins

Delivery and default management – this is particularly important in the options market. If the counterparty to a trade has problems in delivery of the underlying asset, the clearing house will step in and close the deal itself, using the trader's margin account to fund the transaction.

The exchange can have a security fund, which stands ready to take any losses that do occur

The exchange can take out insurance to cover any losses that might occur and that cannot be covered by the security fund

The exchange can have the authority to revoke any trader's license in case of dubious deal.

A centralised settlement process, netting payments and receipts within each currency block across contracts which will reduces settlement costs for members and systemic risk (the risk that one default by one member could cause the default of other members).

Thus dealing with the clearing house as counterparty is generally considered a virtually risk-free method of trading.

(12 Marks)

iv)

Failure of margining system
Failure on the part of the exchange authorities in controlling the trade limits of various traders and not triggering or notifying the traders in case of rogue traders
Fraudulent intents of some of the employees of the exchange
Failure of counter party in delivering the physical commodity

In order to protect the reputation of the exchange, the exchange may have to dig into its reserve funds to make good part payments either by cash or by delivering the available commodities

To suspend the trades temporarily to fully assess the impact of the crisis and devise measures to prevent reoccurrence of the same

Book criminal cases on involved employees and traders as a deterrence

Taking legal course for freezing the assets of the traders and erring employees

To examine thoroughly the corporate governance of the exchange and implementation of risk control measures such as ERM etc.

(7 Marks)
[Total Marks-27]

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