INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

20th May 2013

Subject CA1 – Actuarial Risk Management (Paper I)

Time allowed: 3 Hours (14.45* - 18.00 Hrs)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions on the front page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception*
2. *Attempt all questions, beginning your answer to each question on a separate sheet.*
3. **You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have 3 hours to complete the paper.*
4. *You must not start writing your answers until instructed to do so by the Supervisor.*
5. *Mark allocations are shown in brackets.*
6. *Please check if you have received complete Question Paper and no page is missing. If so kindly get new set of Question Paper from the Invigilator*

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately.

Q. 1) The local actuarial body of a developing country plans to conduct a mortality investigation, based on data received from insurance companies and publish a standard industry mortality table. Last such standard table was published in the country 15 years ago

i) What are the potential benefits to a life insurance company of participating in such a study? (2)

ii) Explain the factors that the local actuarial body needs to consider while interpreting the industry-wide data. (5)

[7]

Q. 2) A company plans to transfer some of its employees to an off-shore location to work on a new project. The company will send three batches of 196, 189 and 200 employees in 1 year, 2 years and 3 years' time from now. The Company decides to pay, relocation allowance equal to a lump sum of Rs 3,00,000, Rs 4,00,000 and Rs 4,48, 000 to each of the employee transferred in the 1^{st} year, 2^{nd} year and 3^{rd} year respectively .

The Chief Financial Officer of the company has decided to buy some stocks to match these liabilities. The following government annual coupon fixed-interest securities are available:

Stock 1: 8% coupon, 1 year until redemption at par, market price INR 102.857

Stock 2: 10% coupon, 2 years until redemption at par, market price INR 108.356

Stock 3: 12% coupon, 3 years until redemption at par, market price INR 116.256

i) Find the nominal amount of each stock the company must purchase to exactly match its liability outgo. (3)

ii) Calculate the forward rate term structure of interest rates from the given data. (2)

iii) Show that total purchase price and the present value, at market rates of interest, of the liability cash flows are equal. (2)

[7]

Q. 3) A public sector company runs an employee benefit scheme which provides lump sum benefit equal to 10 times last drawn basic salary. The scheme provides these benefits when an employee leaves employment for any reason other than death, after completion of 10 years service or reaches retirement age. The benefit amount is doubled when a member completes 20 years of service. The scheme is wholly funded by regular employer contributions. Death in service benefits are provided under a separate group term insurance arrangement.

The company assesses the funding level of the scheme by comparing the accrued liabilities with the market value of the assets. This assessment is done once every three years.

i) List eight experience items which could be analysed during a triennial assessment. (4)

ii) For each item in [i], state how the differences between actual and expected experience might affect the change in the funding level. (4)

[8]

Q. 4) A general insurance company has been investing assets backing its liabilities in fixed interest government and corporate bonds for many years. A month ago, the insurer invested in a 10 year corporate bond at a gross redemption yield to maturity of 10% per annum. The current yield on the bond has reduced to 9% per annum.

i) Explain what could be the possible reasons for the variation in yield over a month.

After recent review of its investment strategy, the Company decides to invest up to 20% of its assets in domestic and overseas equities. (5)

ii) Discuss the factors the Company would have considered before taking this decision. (7)

[12]

Q. 5) A new construction company wants to provide insurance cover to its employees for death due to accident. To provide these benefits, the company is considering the following two options:

A: Buy a group regular premium term insurance contract offered by a life insurance company which provides double the life cover for death due to accident.

B: Buy a yearly renewable group personal accident insurance plan from a general insurance company which provides fixed benefit for temporary total disability, total and permanent disability or death due to accident.

i) Give reasons why the company would want to provide this benefit to its employees? (3)

ii) Distinguish between the key features of insurance contracts being offered by the life insurance and the general insurance company.

The HR Manager suggests that instead of buying the insurance cover, the company should pay cash benefit to the employees at the beginning of each year, which can be used by the employee for purchasing suitable protection product. (5)

iii) Discuss the factors that the construction company needs to consider before taking a decision. (6)

[14]

Q. 6) A large benefit scheme provides pension benefits linked to the final salary of the members. The scheme is managed by an irrevocable trust. Local legislation requires that actuarial valuations of the scheme be carried out every five years on an ongoing basis.

i) State the main purpose of the actuarial valuation of a benefit scheme. (1)

ii) Describe how you would analyse the scheme's withdrawal experience over the five year period. (3)

iii) Describe how you might use the analysis in part [ii] in management of the scheme. (4)

The trustees feel that the cost of administration of the scheme has become very high.

iv) Describe the main factors that contribute to the administrative expenses of running this scheme. (4)

v) Describe the options that could be considered to reduce these expenses. (3)

[15]

Q. 7) A small life insurance company sells only with profit endowment insurance. Till now, the bonus policy of the company is to declare annual reversionary bonuses and no terminal bonus on the with profit policies.

The company is assessing the capital requirements for transacting this line of business.

i) Outline the reasons why the company will require capital to support with profit business. (5)

The company is re-examining its bonus policy and is looking at an option whereby it defers the distribution of surplus by reducing current scale of reversionary bonuses on all policies and introducing terminal bonus on death, surrender or maturity.

ii) Discuss, with reasons, the parties the company should consider while finalizing its new bonus policy. (7)

iii) Discuss the other factors the Company needs to consider for using the deferral of distribution of surplus as a source of capital. (5)

[17]

Q. 8) In a country there are several general insurance companies operating for the last few years. The insurance regulator of the country, though not much concerned about the insolvency of the insurers, still wants to create a Statutory Fund for Insolvency (SFI) in case an insurer becomes insolvent and any other option is not available. The SFI will be financed by all the general insurers. In case of insolvency of an insurer, the benefits required to be paid to policyholders of the insolvent insurer, will be paid from the SFI's accumulated assets and the assets of the insurer that becomes insolvent.

i) What do you mean by the insolvency of a general insurance company? (1)

ii) Why the regulator is not much concerned about the insolvency of insurers? (3)

iii) Suggest some actions that can be put in place by the insurer to reduce the risk of insolvency (8)

iv) What is the "other Option" available to an insurer in case of insolvency before using the SFI. (2)

v) Outline the factors required to be considered for creation of SFI. (6)

[20]

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