

INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

11th November 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)** List six examples of options and guarantees that might be offered to members of a defined benefit pension scheme. [3]
- Q. 2)** A large IT company has been operating in a developing country for many years. The company provides IT solutions to banks and other financial institution within the country and abroad. [7]
- i)** Explain in detail the term ‘risk appetite’ of a company. (3)
 - ii)** Outline the factors that will influence the IT Company’s risk appetite. (4)
- Q. 3)** Your friend has asked for your advice in deciding whether to invest his lump sum inheritance in a single premium unit linked insurance plan offering 100% equity fund as a fund option or to invest directly in the equity market. [8]
- Discuss the factors that your friend should consider in arriving at a decision.
- Q. 4)** A life insurance company has received an application from a female applicant for purchase of a standalone critical illness policy. The applicant has family history of breast cancer. One of the critical illnesses covered in the policy is cancer. (3)
- i)** Suggest, with reasons, the options available to the company in considering the application
- To differentiate its standalone critical illness product from products offered by other companies in the market, the life insurance company is looking at an option to amend some of the definitions of the critical illnesses covered as well as introducing new illnesses under the scope of its critical illness policy.
- ii)** Outline the issues that the company needs to consider before making this change. (5)
- Q. 5)** A small rapidly expanding general insurance company is considering writing property damage insurance cover. The company is finalizing its reinsurance program for this line of business. [8]
- i)** State the main types of properties that may be insured. (3)
 - ii)** Discuss the factors that the company should consider in finalizing an appropriate reinsurance program for this line of business. (8)
- Q. 6)** The government of a country has invited bids for a capital project of constructing an underwater tunnel across a river to improve connectivity and reduce travel time. [11]
- Project ONE is an established construction company in this country. The company is conducting an analysis of the capital project in order to decide whether to bid for the same or not. To do so, it needs to determine the expected Net Present Value (NPV) of this project.

The project has the estimated initial construction cost of Rs. 1,00,00,00,000. The following information is available about the project.

- The construction could be completed in one year, if the weather condition is good. It will take another one year if the weather is bad and the cost of construction in second year will be 10% of the first year cost. The probability of good weather in first year is 1/2.
- The construction cost will increase by 20% each year if the workforce goes on strike during the construction period. The probability of a strike is 1/2 if weather condition is good, but only 1/4 if the weather is bad.
- The company will earn revenues of Rs. 60,00,00,000 each year if the tunnel route is popular. The revenue will reduce to 50% each year if the project is not popular. The probability that the project is popular is 2/3.
- The revenue generating period is only for three years from third year onwards irrespective of the completion of tunnel within one year or two years.
- All cash flows are assumed to arise at the start of each year. The discount rate is assumed at 12% p.a.

i) State what do you mean by a capital project? (1)

ii) Suggest whether Project ONE should bid or not for the capital project by determining the expected NPV of this project. (6)

Project ONE is considering insuring the risk that the project is not popular. If the insurance premium of Rs. 10,00,00,000, is paid immediately at inception, the cover provides a payment equal to 90% of the shortfall in revenue income below Rs. 60,00,00,000 in any year, during the revenue generating period.

iii) Will your suggestion be changed on the basis of revised expected NPV if the company opts for insurance? (4)

iv) What factors other than the financial criteria should be taken into account when deciding whether or not to proceed with the capital project? (3)

[14]

Q. 7) i) Describe the benefits provided by employers' liability insurance. (3)

ii) Describe briefly the distinct groups of insured perils for such business. (3)

iii) List the main rating factors that can be used to set premium rates for employers' liability insurance. (3)

iv) Discuss the assumptions that will be financially significant in setting premium rates for this business. (5)

[14]

Q. 8) An employer sponsors a large defined benefit scheme managed by trustees. The employer is analyzing discontinuance terms currently available to individual members of the scheme.

i) In the context of a benefit scheme, define the term “discontinuance”. (2)

ii) Describe with reasons why an individual member would want to discontinue from a defined benefit scheme. (3)

iii) State the key principles that need to be followed when setting discontinuance terms. (2)

Due to financial constraints, the employer has decided to close the scheme to new members and cease further accrual of benefits for all existing members in the scheme. As a consequence, all the existing active members will become deferred pensioners i.e., will be entitled to a pension based on benefits accrued till current date on attaining normal retirement age.

iv) Discuss options available to the trustees of the scheme to meet the benefits payable to deferred pensioners, stating the risks under each option from the trustees’ perspective. (8)

[15]

Q. 9) A commercial bank has a loan portfolio comprising short and medium term loans given to individuals, small and medium sized enterprises.

i) Outline the major sources of risk to the bank. (8)

ii) Till recently the regulatory capital requirement for banks in the country followed Basel 1. Explain in brief, capital regime under Basel 1, stating its limitations. (4)

iii) The capital regime in the country has now changed to Basel II. Outline the three Pillars and the main rationale of the Basel II Accord (4)

The bank has an insurance subsidiary operating in the same country. The Group Chief Financial Officer has recommended that the subsidiary should use Solvency II standard capital model to calculate its risk based capital requirement.

iv) Outline the advantages and disadvantages of using the Solvency II standard model to calculate capital requirement. (4)

[20]
