

# INSTITUTE OF ACTUARIES OF INDIA

## EXAMINATIONS

28<sup>th</sup> May 2009

### Subject CA1 – Core Application Concept (Paper II)

Time allowed: 3 Hours (14.15\* - 17.30Hrs)

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.*

#### AT THE END OF THE EXAMINATION

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

- Q 1)** Define, giving formulae where appropriate,
- a) Duration
  - b) Volatility
  - c) Embedded Value
  - d) Waiting period (in sickness benefits)
- [6]
- Q 2)** Outline the main factors in managing a successful project. [7]
- Q 3)** A general insurance company has been selling private motor insurance for many years. The marketing manager has suggested we should start selling insurance policies to vintage car owners. Comment on the factors that should be considered in developing this proposal. [10]
- Q 4)** A recent change in regulations has allowed life insurance companies to sell stand-alone health products. You are product actuary for a medium sized life insurance company selling primarily unit linked savings product.
- Explain how you would determine the following factors for a stand-alone unit linked critical illness product that your company would like to introduce.
- (i) critical illness rates (5)
  - (ii) expense assumptions (5)
  - (iii) investment assumptions (4)
- [14]
- Q 5)**
- (i) Describe the requirements of a good model (4)
  - (ii) Reason whether a deterministic or stochastic model would be best suited for the following investigations:
    - (a) pricing a 3% guaranteed growth at maturity on a product
    - (b) reprising term assurance rates due to mortality improvement trends. (5)
- [9]
- Q 6)** You are a consulting actuary advising pension fund trustees. One of your clients who has a defined contribution scheme has asked you to estimate the expected pension that members will get at their respective normal retirement age.
- Outline the information that you would need in order to provide the estimates. [7]

- Q 7)** (i) What are the various purposes for allocating expenses? (4)
- (ii) Explain the nature of each and appropriate approaches to allocating the following expenses across different business lines.
- a) computer costs
  - b) investment costs
  - c) property costs.

(9)  
[13]

- Q 8)** Outline why a general insurance company might want to undertake an investigation of its premium rates.

[5]

- Q 9)** An occupational pension scheme is offering members an option to forego part of their pension to purchase a spouse’s pension. The spouse’s pension will be payable for the life of the spouse, commencing after the death of the member.

The trustees wish a full report on the issues that need to be considered in determining the factor or factors for converting part of a member’s pension into a spouse’s pension. Draft the report.

[13]

- Q 10)** Explain the ways in which a company might internally improve its regulatory capital position, detailing any restrictions that might apply.

[8]

- Q 11)** In a certain country the economy has grown consistently at 5% nominal per annum. Expected inflation in that country is 2.5% per annum. The table below gives information about various investments available to an institutional investor.

Investment	Price	Coupon	Term
Index Linked Government Bond	100.00	1.5%	10
Government Bond	104.11	4.25%	10
Company X Corporate Bond	89.70	6.00%	10
Equity	Price	Dividend	Dividend Cover
Company X Ordinary Shares	50.00	3.00	2.0

- (i) Analyse the expected returns from the different assets.
- (ii) Comment on the relative attractiveness of each

[8]

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