

INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

02nd November 2007

Subject ST4 — Pensions and Other Employee Benefits

Time allowed: Three hours (14.15* pm – 17.30 Hours)

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer sheet.*
2. ** 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 three hours to complete the paper.*
3. *The answers are not expected to be any country or jurisdiction specific. However, if Examples/illustrations are required for any answer, the country or jurisdiction from which they are drawn should be mentioned.*
4. *You must not start writing your answers in the answer sheet until instructed to do so by the supervisor.*
5. *Mark allocations are shown in brackets.*
6. *Attempt all questions, beginning your answer to each question on a separate sheet.*
7. *Candidates should show calculations where this is appropriate.*
8. *Fasten your answer sheets together in numerical order of questions. This, you may complete immediately after expiry of the examination time.*

Professional Conduct:

It is brought to your notice that in accordance with provisions contained in the Professional Conduct Standards, If any candidate is found copying or involved in any other form of malpractice, during or in connection with the examination, disciplinary action will be taken against the candidate which may include expulsion or suspension from the membership of IAI.

Candidates are advised that a reasonable standard of handwriting legibility is expected by the examiners and that candidates may be penalized if undue effort is required by the examiners to interpret scripts.

AT THE END OF THE EXAMINATION

Please return your answer sheet/s and this question paper to the supervisor separately.

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.

- Q. 1)** In a developing country, pensions are primarily funded through occupational pension schemes funded by the employers. There are currently no regulations in place and the government is intending to introduce legislations to provide additional security for the pension scheme members. You are an actuary appointed by the government to advise them on this matter.
- a) **List** all possible forms of regulation that the government can put in place to ensure security of the pension scheme members. (6)
- b) In particular the government is interested in requiring all pension schemes to disclose relevant information to the scheme members.
- a) **Discuss** how disclosure of information can improve security. (3)
- b) Prepare a **list** of information that might be useful to a scheme member before joining a pension scheme, during scheme membership and on leaving the scheme. (10)
- [19]

- Q. 2)** A medium-sized manufacturing company runs two pension schemes for its employees. For the managers and directors it runs a defined benefit pension scheme, while for the other employees it runs a defined contribution pension scheme. As part of a restructuring process, the company has just decided to close its defined benefit pension scheme to new members. So the existing managers and directors will continue to accrue benefits from the defined benefit scheme, while all new staff will join the defined contribution scheme.

You have been appointed as an actuary to advise on the contribution rate for the closed defined benefit scheme. The results from the recently concluded actuarial valuation, using the Projected Unit method, are as follows (in local currency):

Value of benefits accrued at valuation date is 2,941.

Value of assets at valuation date is 3,125.

You have also obtained the following figures from the valuation results:

Year (t)	Present value (at time 0) of the benefits accrued over the year t	Present value (at time 0) of the pensionable payroll earned over the year t
1	238	1,720
2	232	1,657
3	228	1,614

Pension liabilities are bought out at retirement so there are no pensioner liabilities. You can assume that all members of the defined benefit scheme retire at the end of 3 years from now.

- a) **Define**, using formula, the Standard Contribution Rate for each of the following valuation methods. Define all notations you use in the formula.
- (i) Projected Unit Method, with a control period of n years.
 - (ii) Attained Age Method. (2)
- b) **Discuss** the different funding objectives of the Projected Unit method and the Attained Age method. (2)
- c) **Calculate** the Standard Contribution Rate for the defined benefit scheme based on the following methods:
- (i) Projected Unit method, using control periods of 1 year, 2 years and 3 years. (3)
 - (ii) Attained Age method. (1)
- d) Given that there is currently a certain amount of actuarial surplus available, **calculate** the Modified Contribution Rate you would recommend under each method. You can assume that the surplus can be spread over the next 3 years. (2)
- e) **Discuss** the relative advantages and disadvantages of the Projected Unit method and the Attained Age method for this scheme. (6)
- [16]**

Q.3) A large multinational company ABC has recently bought a small manufacturing company XYZ. XYZ does not have a pension scheme in place for its employees. The multinational company intends to enhance the benefit package of the employees of the newly acquired firm.

As part of the package, ABC is planning to provide defined benefit pensions, and other associated benefits, based on annual salary up to a certain specified maximum limit. Although the level of the limit is yet to be decided it has been agreed that this will increase in future in line with inflation. On pay up to the maximum limit, a standard benefit formula will be applied based on the employee's salary and also his or her employment grade.

If an employee earns more than the set maximum limit in any year, ABC will make a one-off taxable cash payment to the employee that year in lieu of the benefits foregone. The employees will have complete freedom to spend the cash sum as they see fit.

- a) **Discuss** the pros and cons of this approach to both the employer and the employees. (8)
- b) **Outline** the issues to be considered regarding the principles behind the calculation of the one-off cash payments. (3)
- c) **Discuss** the main elements of the basis that would be used for the one-off cash payment calculations. (4)

[15]

- Q. 4)** In the context of design of a benefit scheme for the employees of an employer, answer the following;
- a) Within the constraints of Law and/or Corporate ethics, an employer (sponsor) may discriminate between individuals. **List** the form in which such discrimination may be stipulated with example of each such form. (3)
 - b) From the point of view of the employer, **set out** the key features of Defined Contribution as against Defined Benefit scheme. (4)
 - c) **Discuss** the statement that Defined Benefit final salary schemes are “more difficult for employees to understand and appreciate” compared with Defined Contribution schemes. (3)
- [10]**
- Q. 5)** In the context of use of Actuarial models for decision making purposes in pensions and other employee benefits, **discuss** various aspects of Deterministic Vs Stochastic models. (10)
- [10]**
- Q. 6)** You are Actuary of a defined contribution scheme and are considering various aspects of actuarial issues of such a scheme. In this context answer the following;
- a) **List** the advantage and disadvantages of offering members’ investment choices. (3)
 - b) **Describe and discuss** the concept of Lifestyle Switching. (3)
 - c) **Define and discuss** the concept of Best estimate assumptions and **describe** reasons as to why such assumptions could be different in different circumstances. (4)
- [10]**
- Q. 7)** With reference to a pension fund offering pension as well as death benefits answer the following;
- a) **Define and discuss** the concept of Unit rate method of determining insured death benefit premium and **describe** ways in which for large schemes, an insurer can produce a more accurate premium by taking in to account actual mortality experience. (5)

- b) **Define** “Insured scheme”, “free cover limit” and “Burning cost” approach of valuation. **Discuss** the issues to be taken into account while setting valuation method in a situation where the status of a scheme has changed between “insured” and “not-insured”. (5)

[10]

Q. 8) You are Actuary of an employee benefit scheme wherein issues relating to Sponsor covenant have been on board for some time. Answer the following in respect of such a scheme;

- a) **Describe** the impact which sponsor covenant may have on your advice in respect of i) Valuation and ii) Funding. (6)

- b) **Describe and discuss** the manner in which you will identify causes and formulate measure for risk of benefits being paid at less than x% in say n years time.

(4)

[10]
