INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

16th May 2011

Subject ST4 — Pensions and Other Employee Benefits

Time allowed: Three 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. ****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. ***You must not start writing your answers in the answer sheet until instructed to do so by the supervisor***

4. ***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.***

5. ***Attempt all questions, beginning your answer to each question on a separate sheet.***

6. ***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) List four advantages and four disadvantages of final salary schemes as opposed to defined contribution schemes from the point of view of the employer.

[4]

Q. 2) (i) List the roles the Government is likely to play in relation to retirement benefit provision. (2)

(ii) Outline arguments for and against means-tested benefits. (4)

(iii) Describe how the State may use the taxation system to encourage provision for retirement by or on behalf of individuals. (4)

[10]

Q. 3) You are the advising actuary to a medium-sized defined benefit pension scheme. The finance director of the sponsoring company has heard about the possibility of using asset-liability models to set a pension scheme's investment strategy. He has asked you to provide him with further information.

Outline the uses to which asset-liability models can be put and the limitations of their use.

[11]

Q. 4) An established manufacturing company is considering setting up a contributory final salary pension scheme. There are 2,000 employees, a quarter of them are part-timers. 80% of part-timers are women. One-third of full-time staff is women and their turnover is very high.

Discuss the options to the company as regards conditions of entry to the scheme and indicate their relative merits.

[12]

Q. 5) A developing country is introducing a New Pension System – a defined contribution voluntary pension plan for its citizens. A young individual is considering using the new arrangement to save for his retirement.

(i) Discuss the different investments that are available for the new system and their suitability. (8)

(ii) Outline an appropriate investment strategy over the period to retirement for the young individual. (6)

[14]

Q. 6) You carry out annual valuations for a defined benefit scheme of a medium-sized company. The scheme has been closed to new members for five years. The results of the valuation as at 31 December 2010 in respect of past service were as follows:

Assumptions for liabilities:

Interest : 9% p.a.
Salary increases : 7% p.a.
Method : Projected Unit

As at 31 December 2010, 50% of the past service liabilities related to pensions in payment and 30% related to active members

The figures below have been drawn from two consecutive valuation reports (amount is given in Millions of Rupees)

	31 Dec 2009	***31 Dec 2010***
Value of Past Service liabilities	680	850
Market value of assets	700	900
Average annual salary	0.25	0.27

During 2010 contributions paid were Rs. 80 million, benefits paid were Rs. 20 million and a discretionary pension increases of 5% was awarded.

(i) List all the sources of surplus and deficit which are likely to be considered when carrying out an analysis of surplus for a defined benefit scheme. (5)

(ii) Calculate the surplus/deficit arising during the year (1)

(iii) Estimate the investment return earned over the year and the item in your analysis of surplus attributable to investment returns. You should assume that all transactions taken place in the middle of the year. (3)

(iv) Estimate the items in your analysis of surplus attributable to salary increases and pension increases. (4)

[13]

Q. 7) A company is about to set up under trust, a defined contribution scheme for its employees. The company is considering having a defined benefit underpin based on 1/100th of final pensionable salary for each year of membership, with the larger of the underpin pension and the pension available from the defined contribution fund being payable on retirement or death. The defined contribution scheme will offer a wide range of investment funds for its members.

(i) Discuss the advantages and disadvantages of the underpin from the company’s perspective. (5)

(ii) Discuss the investment implications of the defined benefit underpin. (4)

(iii) Discuss how stochastic techniques may be used if the company wished to fund the cost of the underpin. (6)

(iv) Outline two alternative ways the company could meet the cost of the underpin. (1)

[16]

Q. 8) (i) Define the actuarial liability and standard contribution rate for the four funding methods used to set contributions for a final salary pension plan. (6)

(ii) Describe the main criteria for choosing a method, and explain how these will differ for each method. (4)

A defined benefit pension scheme provides a retirement pension of 1/80th of salary for each year of service payable from the member's 60^{th} birthday. Once in payment, the pension is guaranteed to increase at 3% *pa*. Members who leave the company are entitled to a deferred pension payable from their 60^{th} birthday.

The scheme is funded using the Projected Unit Method with a one-year control period.

The funding basis includes assumptions for investment return of 7% *pa*, salary growth of 5% *pa* and pension increases of 3% *pa*. The Standard and Modified Contribution Rates are calculated assuming that contributions are payable continuously.

The results of the latest actuarial valuation are:

Past service liabilities	*(Rs. Millions)*
Active members	480
Deferred members	48
Pensioners	96
Total past service liabilities	624
Assets	*634*
Standard Contribution Rate	20 % of salary
Modified Contribution Rate	19 % of salary for five years

The following information is also available:

Average age of active membership (unweighted): 40 years
Average age of active membership (weighted by salary): 43 years
Average age of active membership (weighted by salary and past service): 46 years

In view of the funding position disclosed by this valuation, the company decides to change the accrual rate from 1/80th to 1/60th for benefits accruing after the date of the valuation and to change the guaranteed rate of increase to all pensions from 3% *pa* to 3.5% *pa*.

(iii) Estimate the revised Modified Contribution Rate assuming that any imbalance between the assets and liabilities continues to be met over five years. (5)

(iv) Estimate how the Modified Contribution Rate in part (iii) would change if the assumption for salary growth is also changed from 5% *pa* to 4% *pa*. (5)

[20]

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