INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

24th May 2013

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.***

7. ***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) You have been asked to advise a State wanting to set up a social security scheme with earnings related contributions and benefits for the population.

i) Discuss the suitability of having an earnings threshold and/or earnings ceiling.

As part of your role, the state has also asked you to advise on various issues relating to population projections. (6)

ii) Discuss the various ways in which fertility rates can be defined and suggest methods by which the fertility rate f_X can be estimated. (7)

[13]

Q. 2) A new company ARIMA Ltd has recently been formed following the management buyout of a division containing 2000 employees from a large company ARMA Ltd. The finance director of ARIMA Ltd has asked you to advise on the type of pension benefits that should be established for its employees.

i) Discuss briefly the information you will require from the finance director prior to making your recommendations. (8)

ii) Discuss the relative risks of introducing a money purchase arrangement compared to a final salary arrangement from the point of view of the company and the employees (7)

[15]

Q. 3) A defined benefit pension scheme valuation has revealed a deficit of Rs.50 lakhs on a specified ongoing funding basis.

i) Suggest reasons for the deficit arising in the scheme (2)

ii) Suggest, with reasons, what information you would need to determine whether the Scheme Sponsor is "viable ongoing" or "in distress". (8)

[10]

Q. 4) A medium-sized 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 decided to close its defined benefit pension scheme to new members. 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 advice on the contribution rate for the 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 2,568.
- Value of assets at valuation date is 2,719.

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	285	1,810
2	278	1,745
3	272	1,659

You can assume that all members of the defined benefit scheme retire at the end of 3 years from now.

i) Calculate the Standard Contribution Rate for the defined benefit scheme based on the following methods:

a) Projected Unit method, using control periods of 1 year, 2 years and 3 years.
b) Attained Age method. (4)

ii) Calculate the Modified Contribution Rate you would recommend under each method, stating any assumptions you make (2)

iii) Discuss the relative advantages and disadvantages of the Projected Unit method and the Attained Age method for this scheme. (6)
[12]

Q. 5) A final salary pension scheme has just completed a statutory valuation using a prudent actuarial basis. A new Trustee has been appointed who is interested to understand the work done by the Actuary.

i) Set out the main reasons for performing a valuation of the scheme. (2)

ii) Explain the steps an actuary would follow in valuing the scheme's assets and liabilities. (5)

iii) Describe the general approach used to analyze the experience of the pension scheme since the previous valuation date. (4)

iv) Suggest how the results of the analysis in part (c) might be used. (2)
[13]

Q. 6) The formal actuarial valuation of a large defined benefit pension scheme with more than 40,000 pensioners is due this year and the Trustees have asked their Scheme Actuary for advice on selecting an appropriate post-retirement mortality assumption for the funding valuation.

i) Explain why post-retirement mortality is an important assumption. (2)

ii) Explain how the Scheme Actuary would determine the post-retirement mortality assumptions to recommend to the Trustees for the funding valuation (3)
[5]

Q. 7) A defined benefit pension scheme provides members with a single life pension at age 65. The pension increases each year in line with price inflation.

The Employer wants to reduce the risks and uncertainties associated with the provision of pensions or other benefits. Therefore he is thinking of transferring the risk to an insurance company.

Discuss the points the employer will consider to assess the value of insurance.

[6]

Q. 8) A large company currently runs a defined benefit final salary scheme for its employees. The current fund size is 500 crore. The scheme was 130% funded on the statutory basis. The last actuarial valuation on an ongoing basis used the Projected Unit Method and disclosed that liabilities were split 70% active members 25% pensioners and 5% deferred pensioners. Pensions in payment increase in line with Limited Price Indexation.

i) Discuss how an asset liability modelling exercise could assist the trustees in determining an appropriate investment policy. (4)

ii) Briefly describe the limitations of such an exercise. (4)

[8]

Q. 9) A large company in a developed country operates an established funded final salary pension scheme. The scheme is contributory and the assets are directly invested.

The Actuary has recently completed a valuation and provided results showing the position on an on-going and discontinuance approach. The Trustee of the scheme is not able to understand why a discontinuance valuation has been completed for an on-going scheme.

i) Contrast the main features and purpose of the two types of valuation. (4)

ii) Describe the differences between a discounted cashflow funding approach and a market value approach. (4)

iii) Suggest why different methods might be used by defined benefit pension schemes at different times. (4)

[12]

Q. 10) A pension arrangement provides one benefit only, a pension which does not increase in payment. However, members are allowed to commute up to 50% of their pension for cash at retirement age. The sponsor of the arrangement has asked you to recommend commutation factors. It is intended that the factors should be stable for long periods of time.

Explain the factors which should be taken into account when determining the basis to be used for these factors.

[6]

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