
SOCIETY OF ACTUARIES
Design & Accounting Exam – U.S.

Exam RETDAU

MORNING SESSION

Date: Thursday, November 2, 2017

Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 100 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 40 points).
 - a) The morning session consists of 8 questions numbered 1 through 8.
 - b) The afternoon session consists of 6 questions numbered 9 through 13.

The points for each question are indicated at the beginning of the question. Questions 3 and 12 pertain to the Case Study, which is enclosed inside the front cover of this exam booklet.
2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam RETDAU.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

****BEGINNING OF EXAMINATION****
Morning Session

- 1.** (5 points)
- (a) (2 points) Describe the features of an annuity buy-in.
 - (b) (3 points) Compare and contrast annuity buy-ins and annuity buy-outs.

2. (6 points) An employer sponsors a pension plan and a post-retirement benefits plan that includes medical and life insurance benefits. Both plans cover the same active population. The earliest retirement age for the post-retirement benefits plan is age 55 with at least 10 years of service.

The pension plan actuary confirmed that the same assumptions have been used for the pension plan and post-retirement benefits plan valuations.

You have been given the following pension plan assumptions:

| | |
|-------------------------------|--------------------------------|
| Discount Rate | 4.00% |
| Salary Scale | 3.00% |
| Consumer Price Index | 2.25% |
| Retirement Assumption | Age 65 |
| Mortality Assumption | 1994 Group Annuitant Mortality |
| Other Demographic Assumptions | None |

- (a) (3 points) Critique the use of the pension plan assumptions for the post-retirement benefits plan.
- (b) (3 points) Describe other assumptions that may be necessary for a post-retirement benefits plan valuation.

Question 3 pertains to the Case Study.

3. (12 points) NOC is looking to amend the National Oil Full-Time Salaried Pension Plan (Salaried Pension Plan) and to add a new defined contribution (DC) plan for salaried full-time employees. NOC is initially considering converting the Salaried Pension Plan accrued benefit into a DC account balance and having all future benefits accrue under the DC plan.

(a) (4 points) Describe the advantages and disadvantages of this plan conversion from the following perspectives:

- (i) employer
- (ii) employee

NOC is also considering two additional options:

- Freeze existing Salaried Pension Plan accruals and all future benefits accrue under the DC plan.
- Keep the existing employees in the Salaried Pension Plan and provide the DC plan to new hires only.

(b) (3 points) Describe in words the accounting impact for all three options NOC is considering.

No calculations required.

NOC has decided to implement a new DC plan for salaried hires effective January 1, 2018. NOC would like the employer contribution rate of the new DC plan to provide the same value at retirement as the current DB plan for the typical career employee.

You are provided the following assumptions and information for a typical career employee:

| | |
|---------------------------------------|----------|
| Age at retirement | 60 |
| Service at retirement | 30 |
| Salary at date of hire | \$45,000 |
| Salary scale | 3.0% |
| Assumed return on DC plan investments | 6.5% |
| Age 60 annuitization factor | 11.5 |

(c) (5 points) Calculate the DC contribution rate that would provide the same value for a typical career employee at retirement as the current Salaried Pension Plan.

Show all work.

4. (7 points) You are given the following plan design for a company:

| | |
|-------------------------------|---|
| Benefit on pay below \$50,000 | Career average pay defined benefit (DB) |
| Benefit on pay above \$50,000 | Defined contribution (DC) benefit with participant-directed investments |
| Distribution at retirement | DB benefit paid as life annuity; DC benefit paid as lump sum |

Assume this plan design is legislatively permissible.

- (a) (3 points) Describe how the characteristics of the plan design affect the following risks for the plan sponsor and participants:
- (i) Inflation risk
 - (ii) Longevity risk
 - (iii) Investment risk

The company wishes to reduce the plan participant exposure to the above risks in a manner that is approximately cost-neutral to the company.

- (b) (4 points) Recommend plan design changes that accomplish this goal.

Justify your response.

5. (9 points) Company ABC is acquiring a division of Company XYZ through an asset-purchase transaction. Company XYZ sponsors a defined benefit pension plan for the division being acquired. Company ABC currently does not sponsor any pension plan.

(a) (3 points) Describe the advantages and disadvantages of the following pension arrangements for the acquired division’s employees from both companies’ perspectives:

- (i) Company XYZ retains all past-service pension liability and Company ABC establishes an identical pension plan for all future service.
- (ii) Company ABC assumes XYZ’s pension plan, including all past service pension liabilities.

The transaction occurs on September 30, 2017. You are given:

- Company ABC will assume sponsorship of Company XYZ’s defined benefit pension plan, including all past and future service liability associated with the division’s employees.
- No other changes are made to the pension plan.
- Company ABC’s existing employees will not participate in the pension plan.
- Financial statement information for the pension plan is shown below:

| Funded Status and Accumulated Other Comprehensive Income | December 31, 2016 |
|---|--------------------------|
| Accumulated Benefit Obligation | \$100,000,000 |
| Projected Benefit Obligation | \$150,000,000 |
| Fair Value of Assets | \$120,000,000 |
| Funded Status | (\$30,000,000) |
| | |
| Unrecognized Transition Obligation | \$0 |
| Unrecognized Prior Service Cost | \$75,000,000 |
| Unrecognized Losses | \$25,000,000 |

5. Continued

| Net Periodic Pension Cost (Prior to the Transaction) | Fiscal 2017 |
|---|---------------|
| Service Cost | \$8,500,000 |
| Interest Cost | \$5,800,000 |
| Expected Return on Assets | (\$7,350,000) |
| Amortizations of: | |
| • Transition Obligation | \$0 |
| • Prior Service Cost | \$7,500,000 |
| • Losses | \$2,500,000 |
| Net Periodic Pension Cost | \$16,950,000 |

| | |
|---------------------------------------|--------------|
| Discount Rate | 4% |
| Expected Return on Assets | 6% |
| Fiscal Year Expected Contributions | \$15,000,000 |
| Fiscal Year Expected Benefit Payments | \$10,000,000 |

- Actual contributions and benefit payments through September 30, 2017 were as expected and made uniformly during the period.
- Actual return on plan assets through September 30, 2017 was 10%.
- There were no other gains, losses or assumption changes during the period before the transaction date.

- (b) (3 points) Calculate the fiscal year 2017 Net Periodic Pension Cost under U.S. accounting standard ASC 715 by component for Company XYZ.

Show all work.

- (c) (1 point) Calculate the October 1, 2017 Funded Status and Accumulated Other Comprehensive Income for Company ABC with respect to the pension plan under U.S. accounting standard ASC 715.

Show all work.

- (d) (2 points) Calculate the fiscal 2017 Net Periodic Pension Cost under U.S. accounting standard ASC 715 by component for Company ABC, assuming no changes to the assumptions.

Show all work.

6. (8 points)

- (a) (4 points) Describe the challenges in achieving full integration of an employer provided retirement plan with a defined benefit social security program.

Company XYZ sponsors a defined benefit plan in a country where the social security program offers a flat \$300 monthly benefit to employees whose final salary is less than the Social Security Covered Limit. Employees whose final salary is more than the Social Security Covered Limit do not receive any government benefit.

You are given the following:

| | |
|---|---|
| Company XYZ Plan Formula | 1.4% of final salary up to the social security covered limit plus 2.0% of final salary above the social security covered limit for each year of service |
| Social Security Covered Limit | \$54,000 |
| Company XYZ Lifetime Plan Service Maximum | 35 years |

- (b) (4 points) Explain why Company XYZ's plan design is not equitable for all lifetime employees.

Justify your response, including examples using replacement ratios.

Show all work.

7. (5 points)

- (a) (3 points) Describe the reasons why a company may implement an International Pension Plan.
- (b) (2 points) Describe the considerations when evaluating whether to fund an International Pension Plan.

8. (8 points)

- (a) (3 points) Identify the objectives of all public sector pension plan stakeholders.

The local government has proposed to freeze the non-contributory public defined benefit pension plan and replace it with a defined contribution plan with the following features:

- Required employee contributions
- Required employer contributions
- Employee directed investments

- (b) (5 points) Describe the effect this proposal will have on all public sector pension plan stakeholders identified in part (a).

****END OF EXAMINATION****

Morning Session

USE THIS PAGE FOR YOUR SCRATCH WORK

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