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

Exam RETDAU

MORNING SESSION

Date: Thursday, April 27, 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 5 questions numbered 9 through 13.

   The points for each question are indicated at the beginning of the question. Questions 10 and 11 pertain to the Case Study.

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.

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

1. (*6 points*)

(a) (*3 points*) Describe retiree group benefit plan provisions that should be considered under Actuarial Standard of Practice No. 6, Measuring Retiree Group Benefit Obligations.

(b) (*3 points*) Describe the differences between U.S. accounting standard ASC 715 and international accounting standard IAS 19, Rev. 2011 when accounting for an unfunded retiree group benefit plan.

2. (*8 points*) Company XYZ sponsors a retirement plan with five participants expected to each receive a one-time lump sum payment as follows:

	Payment Date	Amount
Participant 1	January 1, 2018	$100,000
Participant 2	January 1, 2020	$200,000
Participant 3	January 1, 2021	$50,000
Participant 4	January 1, 2025	$1,000,000
Participant 5	January 1, 2030	$100,000

Calculate the following for the retirement plan as of January 1, 2017, assuming a discount rate of 5.0%:

(a) (*3 points*) Macauley duration

(b) (*1 point*) Modified duration

(c) (*3 points*) Effective duration

(d) (*1 point*) Convexity

Show all work.

3. (*12 points*) Company ABC operates in Country Z, with a salaried and hourly workforce. Salaried employees are eligible for a bonus program. Hourly employees are not eligible for the bonus program, but usually receive a significant amount of wages in overtime.

Country Z offers a social security program funded by a 5% payroll tax paid by the employer for earnings up to $70,000 per year which provides a flat $30,000 annual life annuity benefit at age 65.

Company ABC sponsors a defined contribution (DC) plan with employer contributions of 12% of base earnings plus bonus, but excluding overtime. The plan allows employees to make voluntary contributions and direct the investment of their accounts.

You are given the following information about two employees of Company ABC:

	Employee S	Employee H
Employee type	Salaried	Hourly
Age	50	42
Retirement age	65	65
Base salary in most recent year	$100,000	$60,000
Bonus in most recent year	$25,000	$0
Overtime in most recent year	$0	$10,000
Current DC account balance	$225,000	$130,000
Assumed future return	5%	5%
Assumed future wage, bonus and overtime increases	3%	2%
Price of a life annuity paying $1,000 per year starting at age 65	$13,000	$13,000

(a) (*4 points*) Calculate the projected replacement ratios at retirement for Employee H and Employee S from the DC plan.

(b) (*2 points*) Compare and contrast the direct versus indirect method of integrating the DC plan with Social Security.

(c) (*6 points*) Recommend an employer contribution formula to integrate the DC plan with Social Security using the direct method that results in the same replacement ratio at retirement age for Employee S and Employee H.

Show all work.

4. (*5 points*) Company ABC sponsors an open final average pay defined benefit pension plan subject to U.S. accounting standard ASC 715. The CFO requested updated Net Periodic Pension Cost (NPPC) projections due to a current economic downturn, which the CFO expects will continue in the future.

(a) (*1 point*) Identify assumptions that may be affected by the economic downturn.

(b) (*2 points*) Evaluate four key assumptions from part (a) with respect to:

(i) Potential change in assumption

(ii) Impact on NPPC

No calculations required.

The actuary sent the following email to the CFO:

CFO –

As requested, the projected NPPC for Company ABC's pension plan is estimated to be: $15 million in 2018, $16 million in 2019, and $13 million in 2020.

Our calculations are based on data provided by Company ABC as of January 1, 2017, rolled-forward in each projected year, based on assumptions documented in the January 1, 2017 report, sent earlier this year, with adjustments made for the current economic downturn.

Let us know if you would like to set up a time to discuss any questions.

-Actuary, FSA

(c) (*2 points*) Propose two disclosure statements that should be added to the email, taking into consideration Actuarial Standards of Practice.

5. (*9 points*)

(a) (*7 points*) Describe the U.S. accounting standard ASC 715 accounting methodology for each of the following transactions:

(i) Plan merger of two plans sponsored by the same company

(ii) Plan acquisition as a result of a company purchase

(iii) Plan split into two plans sponsored by the same company

(iv) Plan split in connection with a divestiture

(b) (*2 points*) Describe plan sponsor considerations when developing a communication strategy during a plan split.

Justify your response.

6. (*4 points*) Company XYZ sponsors two unfunded non-qualified pension plans.

- Plan A is a defined benefit plan that restores qualified plan benefits restricted by tax limits.

- Plan B is a defined benefit plan that provides supplemental benefits to a specified group of executives.

Both plans are subject to Internal Revenue Code section 409A.

Company XYZ is considering terminating plan B.

Describe the implications of terminating Plan B from the employee and employer perspectives.

7. (*8 points*) Company DEF sponsors a defined benefit pension plan. Company DEF is considering an annuity buyout for the retired members of the plan.

(a) (*2 points*) Describe the reasons why the annuity buyout cost may be different from the accounting liability for the retired members.

(b) (*4 points*) Describe in words the impact of the annuity buyout on the 2017 Net Periodic Pension Cost and year-end 2017 Accumulated Other Comprehensive Income (AOCI) under U.S. accounting standard ASC 715.

No calculations are required.

(c) (*2 points*) Compare the accounting treatment of the annuity buyout under international accounting standard IAS 19, Rev. 2011 and U.S. accounting standard ASC 715.

8. (*8 points*) The CEO of Company XYZ has asked you to evaluate its cash balance retirement plan to determine if it is meeting the needs of both the company and its employees. The plan has the following features:

- 3% of pay is credited annually to a notional account for each participant.
- The notional account earns interest based on the maximum of 5.0% and the 30-year Treasury bond rate.
- The plan has a 3-year cliff vesting provision.
- Upon termination or retirement, participants can immediately receive the value of their notional account balance, either as a lump sum or as an equivalent monthly annuity. Participants may also defer benefit commencement until age 65.

(a) (*3 points*) Critique how well the plan meets the following objectives:

(i) Attract young employees

(ii) Retain mid-career employees

(iii) Encourage employees to retire between ages 55 and 65

(b) (*2 points*) Describe how the following risks are shared between employees and Company XYZ in the cash balance plan:

(i) Longevity risk

(ii) Interest rate risk

Company XYZ is considering replacing the current plan with a new 401(k) plan with 3% non-elective employer contributions.

(c) (*3 points*) Compare and contrast the plan design features of Company XYZ's cash balance plan to the proposed 401(k) plan.

****END OF EXAMINATION****
Morning Session

USE THIS PAGE FOR YOUR SCRATCH WORK

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