SOCIETY OF ACTUARIES
Life Finance & Valuation – U.S.

Exam ILALFVU

AFTERNOON SESSION

Date: Thursday, April 26, 2018
Time: 1:30 p.m. – 3:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 4 questions numbered 7 through 10 for a total of 40 points. The points for each question are indicated at the beginning of the question.

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 ILALFVU.

6. Be sure your essay answer envelope is signed because if it is not, your examination will not be graded.

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****BEGINNING OF EXAMINATION****
Afternoon Session
Beginning with Question 7

7. (*12 points*) PMR Life prepares U. S. GAAP financials.

(a) (*3 points*) Describe the treatment of each of the following items on the income statement and balance sheet:

(i) Costs associated with the development of a new illustration system

(ii) Payments made to wholesalers on the sale of variable annuities

(iii) First year commission on a level commission variable annuity

(iv) Termination and policy processing expenses

(v) Salaries and bonuses of actuarial staff

(vi) Charges associated with managing the bond portfolio

(b) (*2 points*) Critique the following statements pertaining to PMR's term life block:

A. *It is good practice to establish a new era for each year of business issued.*

B. *The discount rate for the benefit reserve should be set at the current investment yield level.*

C. *Benefit reserve calculations should assume no lapses.*

D. *Benefit reserve calculations should assume no federal income taxes.*

7. **Continued**

(c) (*4 points*) PMR is performing loss recognition testing on their term life block. You are given the following as of the valuation date:

Assumption Set	PV Benefits	PV Net Premiums	PV Gross Premiums
Original best estimate with PAD	2,200	1,100	1,400
Original best estimate without PAD	2,000	1,200	1,600
Current best estimate with PAD	2,500	800	1,100
Current best estimate without PAD	2,300	900	1,200

Assume:

- DAC balance prior to loss recognition testing is 300
- Prior to the valuation date, the block has not been in loss recognition

Calculate the premium deficiency reserve on the valuation date. Show all work.

(d) (*3 points*) You are given the following for Company SAM:

- Market capitalization on December 31, 2016: 100 million
- 2017 net income: 10 million
- 2017 other comprehensive income: 1.5 million
- 2017 dividends declared and paid: 2 million
- PMR acquired 40% of SAM on December 31, 2016

Calculate the following:

(i) PMR's 2017 net income

(ii) PMR's 2017 other comprehensive income

(iii) PMR's carrying value on December 31, 2017

Show all work.

8. (*12 points*) JDB Life is implementing VM-20 as the statutory accounting standard for their life insurance products.

(a) (*5 points*) JDB sells Universal Life with Secondary Guarantee (UL-SG) products with two designs:

- **Design A**: Contains a dual shadow fund charge structure where one of the shadow accounts has no-lapse Cost of Insurance (COI) charges significantly higher when the no-lapse fund is at or near zero.
- **Design B**: Contains a single shadow account as the no-lapse guarantee mechanism.

(i) (*2 points*) Describe how Actuarial Guideline 38 (AG 38) and its subsequent revisions have changed UL-SG statutory accounting.

(ii) (*3 points*) Describe the assumption changes driven by the revision of AG 38 8E for each of JDB's two UL-SG product designs.

(b) (*4 points*) Critique each of the following statements in JDB's working document on VM-20 valuation of its UL-SG business :

A. The minimum reserve that we will hold for our UL-SG model segment is the Net Premium Reserve (NPR), plus the excess of the sum of the Deterministic Reserve (DR) and the Stochastic Reserve (SR), reduced by any deferred premium asset held on account of those policies

B. For certain Universal Life policies, the NPR will use a prescribed lapse rate determined by the level of base account funding

C. Alternately, the model for the DR and SR only uses company-specific assumptions

D. The SR total will be the greater of the VaR for the 90^{th} percentile and a 80 CTE reserve level

E. Under rules-based methods, the direct writer calculates a direct reserve on each policy before reinsurance and determines the reinsurance reserve credit separately also using a rules-based methodology and prescribed assumptions

F. The expenses used for the DR and SR shall be the same in all scenarios and will use expense improvements and only fully allocated expenses

8. Continued

(c) (*3 points*) JDB is determining margins on its lapse assumptions for the VM-20 valuation. The following experience study and sensitivity test results for JDB's ULSG and Whole Life (WL) products are available:

	ULSG	**WL**
Issue years	1995-2016	2010-2016
Actual/expected experience	101%	104%

	ULSG Reserves (millions)	**WL Reserves (millions)**
Base lapse rate	58	75
Lapse +5%	57.1	82.4
Lapse +10%	56.2	91.2
Lapse -5%	59.7	67.9

It is proposed that a margin be added by increasing the lapse assumption by 5% for both products, since actual experience has been less than 5% over expected.

Evaluate this proposal.

9. (*9 points*)

(a) (*3 points*) Critique the following comments regarding the new FASB proposal for long duration contracts:

A. *The cash flow assumptions for the net premium ratio would be updated at the same time that the premium deficiency test is performed.*
B. *The discount rate should use the expected investment yield.*
C. *For traditional life and limited pay products, the discount rate should be updated at each reporting date. Any resulting change in liability would be immediately recognized in other comprehensive income. For universal life products, there is no change to how the discount rates are determined.*
D. *Deferred balances accounted for under the insurance model would be amortized based on the discounted amount of insurance inforce.*
E. *The "profit followed by loss" test would be done annually.*
F. *The net cost of reinsurance will be amortized in the same way as the DAC.*

(b) (*6 points*) SJU Life is considering reinsurance for its two-year term life product.

(i) (*1 point*) Identify the basic conditions that must be met under SFAS 113 in order to qualify for reinsurance accounting.

(ii) (*1 point*) Describe the "paragraph 9b" significance of loss test.

(iii) (*4 points*) You are given:

Ceded Annual Premiums:	20,000
Expense Allowance as % of premiums	35%
Expected Loss Ratio of Reinsured Business:	65%
Discount Rate	3%

Loss Ratio Range & Probability	
30%-50%	25%
50%-70%	45%
70%-90%	30%

Expected Loss Payment Run-off Pattern	
Year 1	85%
Year 2	15%

Determine whether this proposed structure should be treated as reinsurance under SFAS 113. Show all work.

10. (*7 points*) You are given the following simplified balance sheet as of 12/31/2017 for CPA Life:

Assets			**Liabilities**	
Cash	100		Reserves for Life Contracts	1000
Invested Assets	1000		Policyholder Dividends Liability	40
Receivables	100		Interest Maintenance Reserve	60
			AVR	30
			Surplus	70
Total Assets	1200		**Total Liabilities and Surplus**	1200

CPA Life's Risk-Based Capital (RBC) components are as follows:

C_0	10
C_{1a}	40
C_{1cs}	10
C_2	15
C_{3a}	20
C_{4a}	25

(a) (*3 points*) Describe any regulatory consequences which are triggered by CPA's RBC ratio. Show all work.

(b) (*2 points*) CPA subsequently discovers its receivables are over-valued by 35. Assume that this has no effect on CPA's Authorized Control Level RBC.

Describe the immediate regulatory consequences of this discovery.

(c) (*2 points*) Describe the potential impact on CPA if the state regulators from CPA's state of domicile institute more stringent capital requirements.

****END OF EXAMINATION****
Afternoon Session

USE THIS PAGE FOR YOUR SCRATCH WORK

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